

ANTHROPOLOGICAL PAPERS
OF
THE AMERICAN MUSEUM
OF NATURAL HISTORY

VOL. XXVI, PART II

THE HOUSE OF THE GREAT KIVA AT THE AZTEC RUIN

BY

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NEW YORK
PUBLISHED BY ORDER OF THE TRUSTEES
1921

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INTRODUCTION.

In the summer of 1916 when the Museum began the exploration of the Aztec Ruin, the first work undertaken was the removal of the thicket of *chico* brush which covered the entire area and obscured the view of the hill-like mounds which marked the several wings of the building. After the destruction of the vegetation, a conspicuous feature was a large crater-like depression, with raised rim and sunken center, lying south of the longitudinal axis of the enclosed court. Such is the characteristic appearance of a ruined kiva; there appeared to be nothing unusual about this one except its great size, which argued against, rather than for, its immediate excavation. Generally, kivas are filled with *débris*, solidified almost to the consistency of stone. Hence, for a matter of four years, the uncovering of this very large subterranean chamber was looked forward to as a laborious task to be performed sooner or later, but about which there was no especial hurry.

Recently, the accidental discovery of supplementary chambers concealed beneath the *débris* which formed the rim of the crater, completely altered the point of view, because it indicated the presence of a building markedly different from the ordinary kiva. As a consequence, the removal of the *débris* was begun in February, and completed in March, 1921. The structure proved to be a highly specialized architectural unit of most unusual form. While by no means the only one of its kind to be found among prehistoric Pueblo remains in the San Juan watershed, it is the first to be explored and is deemed of such importance that in the order of publication it is given preference over the results of much previous excavation in the Aztec Ruin.

May 15, 1921.

EARL H. MORRIS.

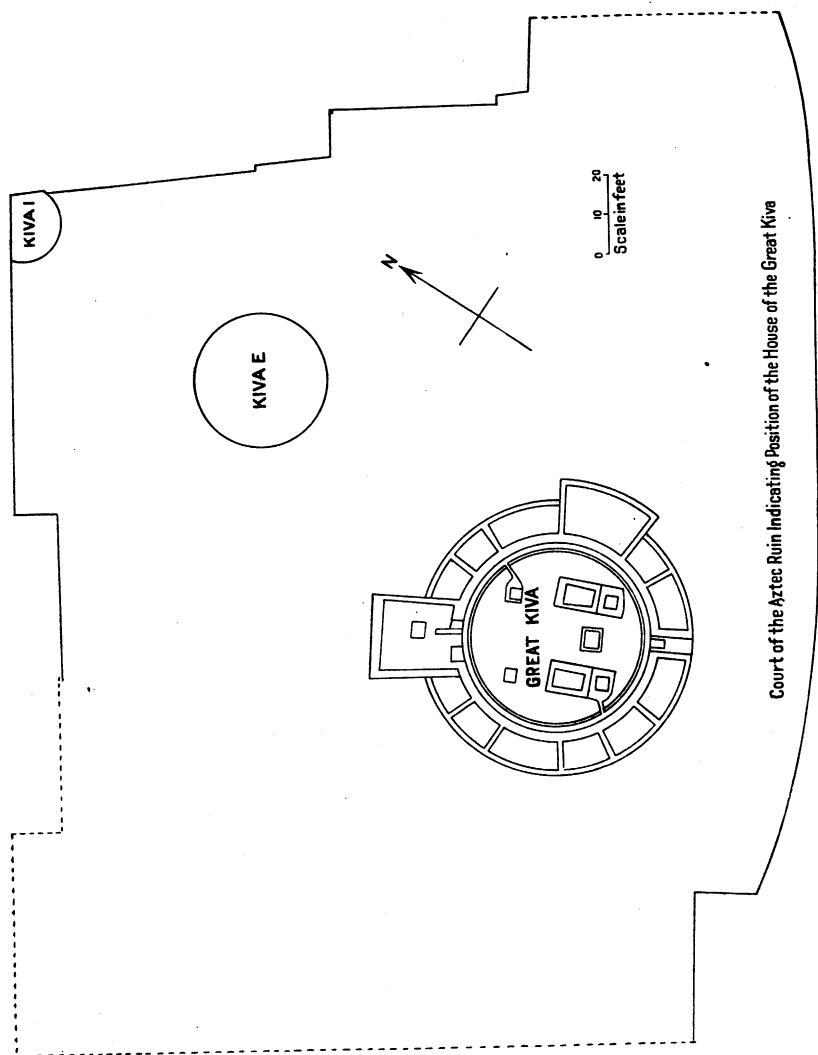
DESCRIPTION OF THE BUILDING.

The House of the Great Kiva is essentially circular in form and is composed of two distinct parts: an inner circle, the kiva proper; and an outer circle which is, in reality, a concentric ring of arc-shaped rooms. With reasonable accuracy the building may be likened to an enormous wheel, of which the kiva, though disproportionately large, is the hub, and the spaces between the stubby spokes the rooms of the encircling ring. The hub of the wheel is let down into the earth sufficiently so that the spokes and rim rest upon the last used level of the court, thus making what remains of the kiva subterranean, and the enclosing chambers above ground in the relation shown by the accompanying cross-section (Fig. 2).

THE KIVA.

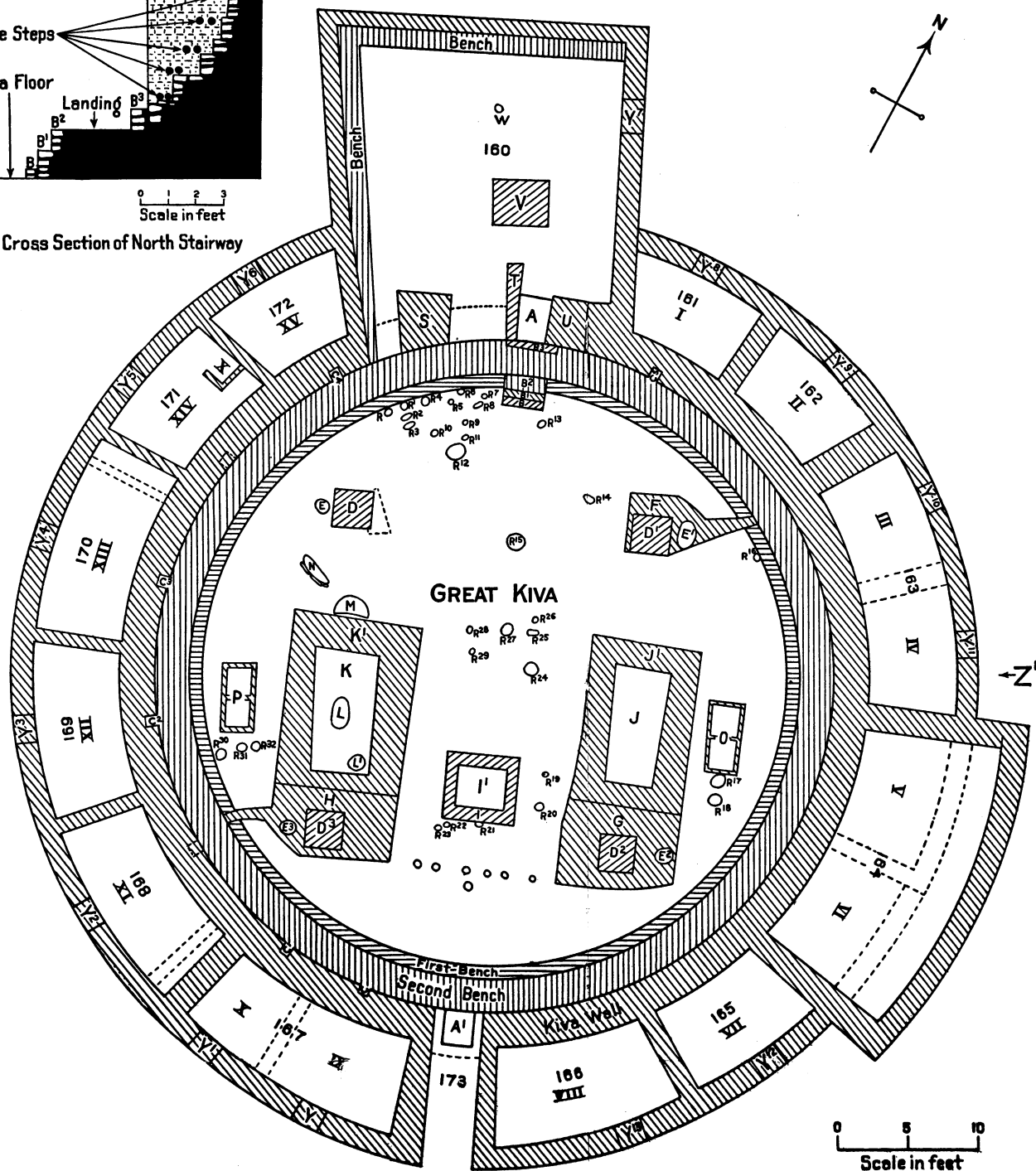
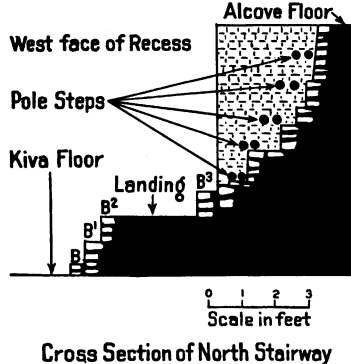
The diameter of the kiva at floor level is 41 feet 3½ inches, and 3 feet above the floor, 48 feet 3½ inches. This difference is due to the presence within the bounding wall of two concentric rings of masonry indicated in the groundplan (Fig. 2) as the first bench and the second bench. The first bench is one foot in width. Because of the unevenness of the floor along its eastern arc, this bench lies entirely beneath the former, while at the west side 6 inches of it are visible. The second bench averages 2 feet 6 inches in width, and 1 foot 6 inches in height. Both benches, though somewhat irregular, are continuous, being broken by no niches or recesses whatsoever. The kiva wall varies somewhat from 2 feet 6 inches in thickness and stands to a height of 7 feet 8 inches.

At the extremities of a north and south diameter the wall is cut by recesses that slope outward and upward from just above the second bench. Each recess housed the major portion of a stairway. Although only a part of it is directly related to the kiva wall, the north stairway will be described at this point. Three masonry steps (B, B¹, B²) lead from the floor to the level of the second bench. Their dimensions are: B, length, 2 feet 8 inches, width, 7½ inches, height, 4 inches; B¹, length, 2 feet 8 inches, width, 7 inches, height, 9 inches; B², length, 2 feet 9 inches, width, 1 foot, height, 9 inches. The top of the third step and the bench form a landing. From it rises a fourth masonry step (B³), at the top of which the wall recess (A) begins. The proportions of the fourth step are: length, 3 feet 9 inches; width, 8 inches; height, 9 inches. The dimensions of the recess are: height, 5 feet; depth at top, 3 feet 3 inches; width at front, 2 feet 1 inch; width at back, 2 feet 4 inches. The sloping back is irregularly terraced, but the jutting courses of masonry were not

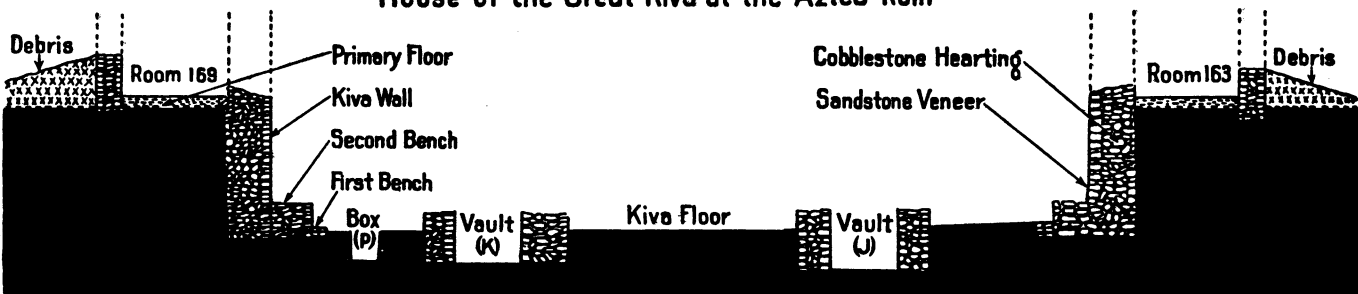


Court of the Aztec Ruin Indicating Position of the House of the Great Kiva

Fig. 1



House of the Great Kiva at the Aztec Ruin



Cross Section, House of the Great Kiva from Z to Z'

used as steps. Instead, for this purpose five pairs of cedar poles, spaced as shown in Fig. 2, were set across the opening, their ends embedded in the stone work of either side. Thus, the stairway consisted of four masonry steps, a landing, and five wooden steps, the steps having an average rise of $9\frac{1}{10}$ inches. As only the charred stubs of the poles remained, the wooden steps do not show in the photographs.

The south stairway was obliterated while the kiva was still in use. The stone steps which must be assumed to have led from the floor to the top of the second bench had been dismantled, and not a trace of them remained. The recess (A¹) was filled with masonry, neatly and carefully aligned with the curving wall, so that when covered with plaster there would have been nothing to suggest the former presence of a stairway. The recess was found to be practically identical with the one previously described. The dimensions are: height, 4 feet 11 inches; depth at top, 2 feet 6 inches; width at front, 2 feet 1 inch; width at back, 2 feet 1 inch. The decayed poles of five steps like those in the north stairway were enveloped by the masonry fill. The first one formed the bottom of the recess, and the others were spaced at intervals of approximately 1 foot.

Aside from the stair recesses, the face of the kiva wall is broken by a series of vertical slots of almost the same proportions, marked C, C¹, C², etc. in the plan (Fig. 2). As may be seen, each slot is in the line of a radius, which, if projected to cut the circumference or outer wall of the building, would pass through the blocked doorway of one of the peripheral rooms. Although as indicated, the series is not complete, there is every reason to suppose that there was a slot in front of each of the original chambers, excepting the two with which the stairways connect. It is only where the face of the wall has fallen that their presence could not be demonstrated.

The first slot west of the south stairway (C) is the best preserved of the series. It begins 10 inches above the second bench, is $8\frac{1}{2}$ inches wide and 8 inches deep, and continues to the top of the wall. One foot above the bottom it is crossed by two round cedar sticks, about $2\frac{1}{2}$ inches in diameter, laid side by side with their ends extending into the masonry. At upward intervals of two, three, and four feet, there are similar sets of poles, dividing the slot into four vertical compartments, each one foot in height. There may have been a fifth, or even more, since the slot can be traced to the present top of the wall, and may have extended higher.

Four pillars (D, D¹, D², D³) of the same size and symmetrically placed rise from the kiva floor. They are 2 feet $8\frac{1}{2}$ inches square and are composed of alternating layers of masonry and poles. In each case

the basal course is of masonry 5 to 7 inches thick, and the second of peeled cedar poles 2 to 3 inches in diameter laid side by side from east to west, with the interstices filled with adobe. The third course is of masonry, and the fourth of poles, but running at right angles to those in the second course. This sequence was repeated thence upward.

The maximum height of the pillars, that of D¹, is 3 feet 6 inches, but the presence in the surrounding débris of many dressed cornerstones like those in place, proved that they had been much higher.

Just beneath the floor at the east side of the northwest pillar (D), occupying the area indicated by the dotted line, is a single course of masonry the relation of which to the pillar is not clear. In a shallow excavation (E) one foot westward from the pillar a pine log 9-11 inches in diameter stood upright. Flat cobblestones were wedged between the butt of the log and the sides of the hole to hold the former in place.

Three sides of the northeast pillar (D¹) are encased in masonry of secondary construction (F). On the west, it is a mere shell 5 inches thick, on the north, a wall 1 foot 7 inches thick, while against the east face it is a massive wedge-shaped block that tapers into a narrow wall and continues with a northward curve to a junction with the second bench. The height is 2 feet 8 inches. Rising vertically through the wedge one foot from the pillar and continuing for a distance into the floor, stood two pine logs (E¹) placed in a line parallel to the face of the pillar. Previous to decay they had been from 9 to 11 inches in diameter.

An approximately rectangular masonry platform (G), also of secondary construction, surrounds the base of the southeastern pillar (D²). Its width on the west is 2 feet 11 inches, on the north, 2 feet 1 inch, on the east, 2 feet 5½ inches, and on the south 12½ inches. The height at the south side is 2 feet 1 inch. The other sides are somewhat broken down, but probably in their original condition were of the same height. One foot 6 inches eastward from the pillar, the stub of a large pine log (E²) stands in a cavity in the masonry. The log was severed below the intended height of the platform so that what remained of it was completely hidden by the mud surfacing of the latter.

A similar platform (H) surrounds the southwestern pillar (D³). On the north it is 1 foot 6 inches wide; on the east, 3 feet 1 inch; and on the south, 10 inches. The southwest corner is rounded off to form an arc concentric with the neighboring arc of the second bench. The northern end of this arc connects with the south side of a thin wall which runs with a southerly curve from the center of the west side of the platform to the bench. One foot distant from the center of the west face of the pillar, a

cylindrical shaft (E³) extends downward through the platform. This is the mold of a now-decayed pine log 10 inches in diameter. At the south side the platform is 2 feet 1 inch high. The fact that the north face of the pillar retains plaster to this height, while above it has peeled off, indicates that the north side of the platform was on a level with the south.

Midway between the southern pillars, but sufficiently forward of them that its south side is in line with their north faces, stands a rectangle of masonry (I), 1 foot 8 inches in height and 5 feet square. The four walls bound an area 3 feet 4 inches from east to west, and 2 feet 7 inches from north to south. The box thus formed (I¹) was filled from bottom to top with fine white ashes, the residue of a fire that had burned therein long and continuously.

A rectangular vault (J) 8 feet 6 inches long, 3 feet 6 inches wide and 3 feet 4 inches deep, with long axis north and south, occupies the space in front of the southeast pillar (D²). The walls rise 1 foot 2 inches above the floor of the kiva, forming a rim to the vault (J¹). On the south end the rim abuts against the platform. The width on the west side is 2 feet, on the north, 1 foot 9 inches; on the east, 2 feet 3 inches; and on the south, 1 foot 6 inches. The floor of the vault was of smoothed earth. Beneath the north half of it the soil had been disturbed to an unknown depth. Eight feet below the kiva floor, where excavations ceased, sandstones, charcoal, and occasional potsherds were encountered. Beneath the vault floor, the west face of the test pit cut through a fire hole about 3 feet wide and 2½ feet deep, which was full of charcoal.

There are two longitudinal cedar logs built into the base of the north end of the east wall of the vault. Apparently they were intended to serve as a foundation to prevent that portion of the wall from settling into the loose earth beneath.

In front of the southwest pillar (D³) there is a vault (K), in every respect like the one just described, except that it is not quite so deep and seems to have been dug into the virgin soil. It is 8 feet 6 inches long, 3 feet 6 inches wide, and 3 feet deep. The south member of the rim (K¹) is built against the north side of the platform surrounding the pillar. The height of the rim is 1 foot; its width, on the west, 1 foot 7 inches, on the north, 2 feet 5 inches, on the east, 2 feet 5 inches, and on the south, 1 foot 7 inches. In the floor of this vault there are two holes (L, L¹). L, at the center, is oval, with long axis parallel to that of the vault, and is 2 feet 7 inches long, 1 foot 10 inches wide, and 1 foot 8 inches deep. L¹, in the southeast corner, is circular, 1 foot 6 inches in diameter and 1 foot 9 inches deep.

Northward of the vault, upon an adobe pedestal 7 inches in height built adjacent to the north member of the rim, is a large semilunar stone (M) with its concave edge toward the south. It is a fine-grained gray slab, apparently of quartzite, 2 feet 4 inches long, 1 foot 3 inches in maximum width, and $4\frac{1}{2}$ inches thick. Originally the upper surface was level and so well smoothed that it seemed polished, but many jagged flakes were riven from it by the heat of the burning roof.

Beginning 1 foot 4 inches northwestward of the stone, with long axis diagonal to it, there is an oval pit (N) 2 feet 4 inches long, $8\frac{1}{2}$ inches in greatest width, and 1 foot deep. Three slabs of sandstone set in adobe form its southwestern curve and rise 3 inches above the floor.

Two feet distant from the east side of the eastern vault (J), and parallel to it, is a rectangular masonry box (O), divided by a thin partition into two compartments of nearly equal size. The top of it is flush with the floor. The dimensions are: length 4 feet 6 inches; width 1 foot 10 inches; depth 1 foot 9 inches. A replica of this device (P) occupies the same relative position to the western vault (K). It is 2 feet 3 inches distant from the west member of the rim, 4 feet 8 inches long, 1 foot 7 inches wide, and 1 foot 10 inches deep.

A row of six post holes (Q) crosses the space between the south sides of the platforms surrounding the southern pillars. These contained the decayed stubs of upright timbers from 3 to 4 inches in diameter, which extended 10 inches to 1 foot into the floor.

North of the line of posts, the entire area of the kiva floor, not otherwise occupied, is literally full of small holes. Numbers R to R³² indicate the distribution of the thirty-three which were cleaned out. Probably as many more could have been found had the search been continued. In vertical section the holes range from cylindrical to bottle shape. The orifices of most of them are circular, but a few are oval. The variations in dimensions are: diameter of mouth $3\frac{1}{2}$ inches to 1 foot 6 inches; depth 6 inches to 2 feet 6 inches. Two were filled with clean sand, the rest with brown earth and decayed refuse. The walls of most of them bore vertical grooves left by the sharp-pointed implement with which they were dug.

No plaster remains on the kiva wall except for a short distance on either side of the north stairway. Here it is smoothly coated, but so blackened by fire that the original color is uncertain. However, the bases of the pillars and platforms are pale red where they were protected from the conflagration, and along the bases of the walls were quantities of flakes of adobe, plainly fallen from above, with one surface white.

Hence it may be assumed that the first 2 to 3 feet of the wall were colored red, and the upper portions white, which was not an uncommon color scheme for kiva interiors.

THE PERIPHERAL CHAMBERS.

The portion of the building above ground is divided into fourteen enclosures, numbers 160 to 173, inclusive. Twelve of them, numbers 161 to 172, inclusive, are essentially similar, one to another, but the remaining two differ markedly from the twelve, and exhibit no common resemblance of form. Of the latter number, 173 may be dismissed with the brief statement that it is an open passage, 3 feet 6 inches in width, leading directly from the court to the head of the south stairway. The other, number 160, demands detailed description for the reason that its numerous singular features and peculiar relation to the kiva suggest that, in function, it may have been of as great importance as the circular chamber itself.

The Alcove. Room 160, connected with the kiva by the north stairway, could as well be called a raised alcove as a separate chamber, since half of the south side opens directly into the kiva at a height of 7 feet 7 inches above the floor. For a distance of 1 foot 8 inches from the west wall an extension of the alcove floor continues to the brink of the kiva, forming a passage bounded on the east by a trapezoidal block of masonry (S). The dimensions of the latter are: north side, 3 feet 10 inches; south side, 3 feet 3 inches; east side, 3 feet; west side, 3 feet 4 inches. The maximum height is 2 feet 4 inches at the northwest corner, but as this point marked the surface previous to excavation, the original height is undiscoverable.

For 3 feet 9 inches eastward from the masonry element just described, the alcove floor again continues to the inner face of the kiva wall. The eastern terminus of this open space is a wall (T) 5 feet 7 inches long, 1 foot 2 inches thick at the north end, and 11 inches at the south. The south half of it is an upward continuation of the west face of the stair recess, beyond which it runs northward into the alcove. At the north end the wall is 1 foot 6 inches high; at the south it is completely broken down.

Between the stairway and the southeast corner there is a continuous wall, but it was not always so. From the corner original masonry extends 1 foot 7 inches, and ends in a square corner. The portion thence westward (U) is of secondary construction, and occupies the area of what was once an open space similar to the one westward of the stairway.

The east, north, and west walls vary in height from a minimum of 2 feet 10 inches at the northeast corner to a maximum of 4 feet 6 inches at the south center of the west wall. A bench 2 feet 8 inches high is continuous along the west and north walls, but is absent on the east. On the west side the bench tapers from a width of 1 foot at the south end to 1 foot 8 inches at the north. Thence eastward it is 1 foot 4 inches wide. Two feet 6 inches from the north end of the east wall there is a blocked doorway (Y⁷) which was 2 feet 3 inches wide.

The floor of the alcove is of adobe, unusually hard and smooth. The walls and masonry elements on the south side were first plastered with adobe, then whitewashed with gypsum, and later tinted with a thin wash of red. Both floor and wall plaster were so hardened by the burning of the roof that when uncovered they resembled coats of cement.

With its northwest corner at the center of the alcove stands a rectangular block of masonry (V) with long axis parallel to the north wall. Its dimensions are: length, 3 feet 7 inches; width, 2 feet 11 inches; height, 1 foot 11 inches. Three peeled saplings between 3 and 4 inches in diameter were set upright in the floor so that their north curves were flush with the north face of the masonry. Two formed the northeast and northwest corners respectively, and the third was about midway between them. These slender posts had been of greater height than the masonry. The sides of the block received the same treatment as the walls of the alcove; that is, were plastered with adobe, whitewashed, and tinted red. The top was smoothed with adobe and colored red except for a central circle of white, 1 foot 8 inches in diameter. The white area must have been covered with something which protected it at the time of the fire, as it was not discolored by smoke and heat as were all neighboring surfaces.

A cylindrical hole (W) 5 inches in diameter and 9 inches deep pierces the alcove floor 4 feet from the north wall and 8 feet 6 inches from the east. A smooth flat stone of greater diameter than the hole forms the bottom, and the sides are plastered with adobe.

The Arc-Shaped Chambers. An individual treatment of the chambers which compose the remaining portion of the outer circle would be largely a useless repetition of detail; hence, they will be considered as a group. Here we are dealing with two series of rooms, one of primary, the other of secondary construction. The latter, twelve in number, were components of the building as last used, and are so indicated in the groundplan. As the configuration of the space they occupy demands, all are arc-shaped, but of varying proportions, as may be seen from an examination of the following table.

Room Number	Length at Center	Width at Center
161	8 ft. 6 in.	5 ft. 9 in.
162	8 " 3 "	6 "
163	17 " 3 "	6 " 6 "
164	19 "	10 " 4 "
165	9 " 3 "	6 " 6 "
166	12 " 7 "	7 "
167	15 " 3 "	6 " 8 "
168	12 " 6 "	6 " 3 "
169	11 " 6 "	6 " 5 "
170	13 " 6 "	6 " 3 "
171	9 " 3 "	6 " 3 "
172	8 " 4 "	6 "

The foundations of dismantled walls, bounded by dotted lines in the plan, lie beneath Rooms 163, 164, 167, 168, 170. When these were functional they divided the area of the twelve secondary chambers into fifteen rooms of more nearly uniform size, whose dimensions were as follows:—

Room Number	Length at Center	Width at Center
I	8 ft. 6 in.	5 ft. 9 in.
II	8 " 3 "	6 "
III	7 " 9 "	6 " 6 "
IV	8 " 3 "	6 " 6 "
V	8 " 9 "	6 " 6 "
VI	8 " 3 "	6 " 6 "
VII	9 " 6 "	6 " 6 "
VIII	9 " 0 "	6 " 6 "
IX	8 " 9 "	6 " 9 "
X	8 " 6 "	6 " 3 "
XI	11 "	6 " 2 "
XII	11 " 8 "	6 " 4 "
XIII	12 "	6 " 5 "
XIV	11 " 3 "	6 " 3 "
XV	8 " 4 "	6 "

In the outer wall of each of the primary series there was a doorway (Y to Y¹³) which gave access to or from the court.¹ In width, they varied less than one inch from 1 foot 10¼ inches. The sills were about 10 inches from the floors. In no place do the walls stand to a sufficient height to reveal their vertical dimension.

¹This statement is made on the assumption that during the process of remodeling, the groundplan of the building was not materially altered. However, when the débris beyond what is here considered the outer wall is removed, the foundations of other chambers, perhaps of a complete second ring, may be found.

During the one or several remodelings which reduced the number of chambers, every one of the doors was solidly filled with masonry, thus completely isolating the secondary chambers from the outside world. Presumably at the same time the floors were raised some 12 inches by a fill of clean earth.

The outer wall seems to have been moved at but one point. The arc bounding Room 164 was set out 4 feet, producing an asymmetry of form in the secondary arrangement of the building which was not present in the original plan. This outer wall wavers slightly from a mean thickness of 1 foot 6 inches with the exception of its secondary arc which has a transverse dimension of 2 feet 2 inches. The primary partitions present little variation from an average thickness of one foot, thus being in marked contrast to those of later construction which range between a minimum of 10½ inches and a maximum of 2 feet 6 inches. In height the walls vary from 3 inches to four feet.

The presence of quantities of gypsum-coated flakes of adobe in the lower layers of *débris* which was removed from the chambers leads to the conclusion that the walls were plastered with earth and finished in white.

The floors of both series were of adobe, neatly smoothed, but in no instance noticeably stained by use. There is a fireplace (X) in Room 171. It is a rude depression in the floor, 1 foot 8 inches square and 4 inches deep, adjacent to the north wall of the room, and enclosed on the east and south by a single-course rim of re-used sandstone building blocks placed with faced sides toward the fire. In no other member of the secondary series is there any sort of a provision for fire. Inasmuch as the *débris* in the primary chambers has been but partially removed, it cannot be stated whether or not this condition holds in regard to them. However, in the several test pits sunk to the lower level no fireplaces were encountered.

MASONRY.

As a whole, the masonry in the House of the Great Kiva is neither poor nor excellent. Although the walls are vastly superior to some built of cobblestones, and others of stick and mud construction to be found in the south wing, they are inferior to those in the best built portions of the east, north, and west wings. Up to the floor levels of the surrounding chambers, the kiva wall is composed of two parts; a veneer of sandstone one course in thickness, and a massive hearting of river cobbles. A panel of sandstone was set in the hearting to form the back of each of the vertical slots, and the stair recesses were lined with the same material.

No discoverable attempt was made to tie the veneer to the hearting, which decided structural oversight largely accounts for the disappointing proportion of the wall face which has peeled away and fallen.

The primary walls of the upper chambers are of sandstone throughout, but rest upon two to three course foundations of cobblestones which were let down into the earth sufficiently to be hidden from view. Though fairly large in comparison with the average found in the pueblo, the individual blocks are much smaller than the modern mason would prefer to use. Practically all of them are of a greenish-yellow, coarse-grained, very soft variety, which from the point of view of durability was the poorest quality of sandstone used by the ancient builders. To compensate for its softness, it was easily worked, which fact may have been the reason for its selection, since reasonably true faces were pecked upon all exposed stones, and the corners of doorways, pillars, etc., were dressed with much more precision than would have been readily possible had the material been of a hard quartzitic variety. Notwithstanding a noticeable absence of close chinking with spalls and potsherds such as was commonly done in many parts of the ruin, when new and unweathered, these walls must have presented a very good appearance.

Those features of the building which are of secondary construction present a marked contrast to the work of the first builders. Most of the materials used seem to have been gathered from fallen or dismantled walls in various quarters of the pueblo, and thrown into place in a haphazard fashion with no regard for appearance and little for stability. Dressed cornerstones were buried in the hearting, and round cobbles were laid side by side with dressed blocks in the face courses. The outer wall of Room 164 is the worst example of the later masonry. It was built almost entirely of river boulders, and as a result has fallen to within 1 foot 6 inches of the ground, and would have been completely destroyed had it not been protected by débris.

COMPOSITION OF THE FILL.

In the kiva the initial fill was a deposit, averaging 10 inches in thickness, composed of alternating strata of dusty sand and earth of more clayey consistency, packed and tramped to unbelievable hardness. The origin of this mass is attributable to successive re-surfacings of the kiva floor. Each layer of clay represented a fresh coat of adobe applied over a previously used surface without the thorough removal of the dust and sand which had accumulated since the floor had last received similar treatment. There was evidence of at least nine renewals in this fashion.

Fragments of broken vessels were fairly numerous in the sandy strata, as were beads and the elements of turquoise mosaics, particularly in the area in front of and west of the foot of the north stairway. One strand of olivella shells lay in order as when strung, with a turquoise pendant at the center.

At opposite sides of the kiva there were considerable refuse deposits. One filled the space back of the south pillars, its surface sloping upward from the level of the ultimate floor to just above the top of the second bench. Among its components decayed vegetable litter, principally corn refuse, was much in evidence. The other deposit covered the area eastward of the north stairway and back of the northeast pillar. It extended from the bottom of an excavation carried slightly beneath the original floor, to six inches above the second bench. Here sweepings, ashes, and potsherds were very plentiful, but vegetable substance was not absent. Two pine logs 9 feet long and 9 to 11 inches in diameter lay adjacent to the second bench. It is difficult to imagine why such timbers would have been discarded rather than laid away for future use.

The refuse and vacant areas of the floor were covered with from 4 inches to 1 foot 3 inches of wind-blown sand and fallen plaster, upon which lay the coarse charcoal and reddened adobe which had composed the roof of the chamber. Above the fire stratum, the fill was principally of fallen masonry near the walls, and in the center of sandy loam deposited by the winds and rains of centuries.

The initial fill in all of the upper chambers except the alcove and Room 164 was of wind-blown sand and fallen plaster, varying in depth from 8 inches to 1 foot 8 inches. There was burned roof material in but four of the rooms containing the sand fill, numbers, 161, 169, 170, 173. In the alcove and Room 164 the charcoal and reddened adobe lay immediately upon the floors.

In the northwest corner of Room 161, well beneath the roof layer, there was a small pit filled with fine wood ashes, the remains of a fire that had been kept going for some length of time. Crushed down beside the pit was a small crude cooking pot, rough but uncorrugated. The form, finish, and extremely coarse sandy composition of the paste made this pot unlike anything previously found in the ruin, and strikingly similar to certain cooking utensils now made and used by the Navajo.

HEIGHT OF THE BUILDING.

The height of the building remains to be accounted for. The outer wall is much thinner than those elsewhere in the pueblo, which are known

to have been surmounted by a second story. Moreover, the quantity of building stones in the adjacent débris, with due allowance for some that have disintegrated, and others that have been removed from the surface in recent years, would have been barely enough to have finished out a single story. The wall of the kiva, which above the level of the ground formed the inner curve of the peripheral chambers, must necessarily have been of practically the same height as the outer wall. The fallen masonry removed from the kiva would have rebuilt this wall ten feet above its present height, but not twenty or more as would have been the case had there been a second story. Hence it may be said that the House of the Great Kiva stood one story, or from ten to twelve feet above the court.

ROOFS.

The alcove was the only room whose contents gave definite proof of the details of roof construction. Two pine logs, at least 10 inches in diameter, formed the roof support. They were laid from east to west and so spaced as to divide the area to be covered into thirds. Resting upon the large logs, and running at right angles to them, was a layer of spaced peeled saplings, either pine or cottonwood, which in turn were covered with closely-laid cedar splints, lying at right angles to the saplings, or parallel to the major supports. A coat of adobe from one to two inches in thickness was applied over the splints, presumably to keep the earth which constituted the final element of the roof from trickling through between them.

The other above-ground chambers were arcs of so large a circle that they were nearly rectangular in form, and doubtless were roofed as were rectangular rooms in general, that is, after the same plan as the alcove, but with supporting timbers running parallel to the shorter dimension of each one.

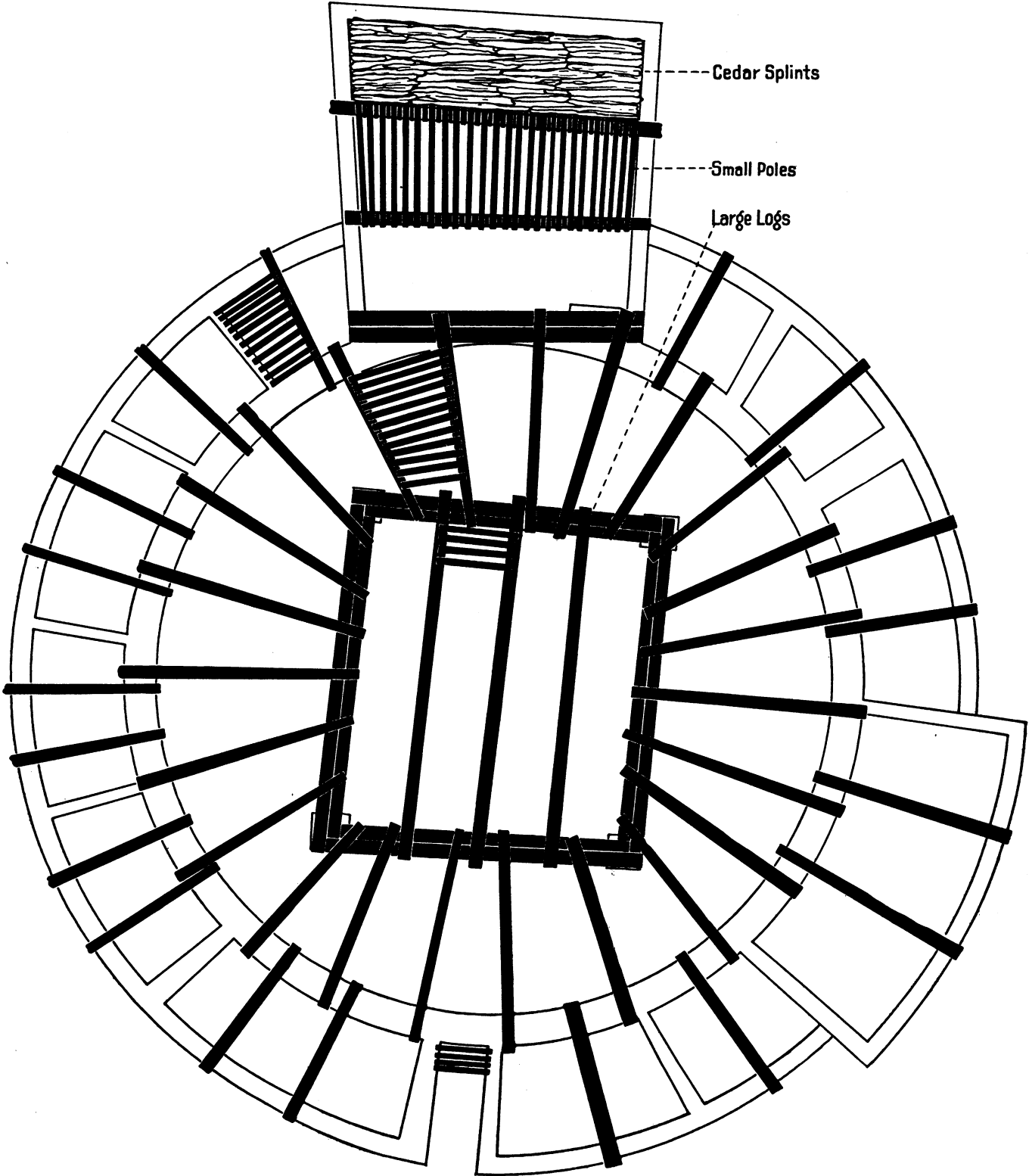
Such roofs were simple and demanded of their builders no greater qualification than patience; but the roofing of an enclosure like that of the kiva presented a problem of entirely different magnitude. Here was an area of 1832.25 square feet to be covered with such materials as nature provided, without the help of mortice or tenon, or the use of peg or nail. Not only must the wooden framework support its own weight, but in addition, if one may judge from roofs and ceilings which are still intact, an average covering of about one foot of earth, or the equivalent of a direct load of from ninety to ninety-five tons. The successful accomplishment of a task of this character necessitated a preconceived plan

thought out to the last detail before the first girder was swung into place. The quantities of charcoal and burned clay encountered as the kiva was being excavated gave indubitable proof that the plan was conceived and carried into execution. It is doubtful if in all the Southwest there is to be found a more convincing testimonial of the skill and ingenuity of its aboriginal architects than is provided by the fact that this roof was built and fulfilled its function until destroyed by a force operative through no inherent defect in its construction.

Most of the ordinary kivas in the Aztec Ruin were covered with vaulted roofs, which in each case depended for support upon a series of from six to ten masonry pilasters built against the inner face of the wall. The absence of pilasters in the great kiva proves conclusively that its roof was not of the vaulted type. But with this negative point established, certainty ends, and the exact plan of the wooden framework which spanned the chamber must remain more or less in doubt. However, a tentative reconstruction may be offered without too great risk of error. The basis of the reconstruction is the assumption that the four pillars which rise in orderly arrangement from the kiva floor had as their basic function the support of the roof. It is evident that they were intended to bear great weight, for the courses of poles could not well have been introduced in the masonry for any other purpose than to bind it together in the most secure manner known to Pueblo architects, as a provision against the failure of the columns under the load they were to carry.

The wall on the south side of the alcove was not continuous. It would be contrary to precedent to suppose that a chamber designed to shelter sacred objects and secret rites would have been left partially exposed to the elements or the gaze of possible intruders. Therefore, it is assumed that the alcove opened into the kiva; that its roof was an extension of the kiva roof and was in the same horizontal plane as the latter. It is 7 feet 7 inches from the kiva floor to the floor of the alcove. Granting to the alcove a minimum clearance of $8\frac{1}{2}$ feet, which is less than the average for the rooms of the pueblo, the ceiling height of the kiva was at least 16 feet, and possibly somewhat more. Then 16 feet would represent the minimum original altitude of the pillars.

When in the progress of the fire, the roof collapsed, the flame was smothered out so that fragments of many of the timbers, although reduced to charcoal, retained their form. These fragments were representative of the three major elements invariably present in flat roofs; namely, great logs, small saplings, and cedar splints. Carbonized sections of two logs more than 1 foot in diameter lay in nearly continuous



Probable Plan of Roof, House of the Great Kiva

parallel lines between the northwest and southwest pillars. Similar though less continuous sections ran from the southwest to the southeast pillar, and there were lumps of charcoal from timbers of equal size between the northeast and northwest pillars. Parts of two large timbers lay parallel to the wall west of the north stairway. Several logs of smaller diameter—9 to 11 inches—extended inward from the wall in the general lines of radii of the circle. There were three in this position in the southeast quadrant, one in the southwest, two in the northwest, and one in the northeast. Over the south half of the rectangle of which the pillars are the corners, small poles lay parallel to each other from east to west, equally spaced, and about four inches apart as if here the roof had fallen *en masse*. Between the pillar rectangle and the wall the small poles were in no uniform order, but more of them were parallel to the nearest arc of the wall than in any other discoverable position. Upon the supposition that the fallen timbers gave a key to their arrangement when in place, the accompanying drawing has been made. (Fig. 3). Thus it is seen that five pairs of girders were the primary support, four of them resting upon the pillars, and the fifth spanning the south side of the alcove as a substitute for the missing wall. Resting upon the girders and the kiva wall there are twenty-three radial timbers which constitute the secondary supports from the pillar rectangle outward, and three parallel logs spanning the latter. Upon these timbers lay the small poles which were covered with cedar splints as in the alcove. Inasmuch as the writer's idea of the roof is presented in the drawing, further verbal description would be superfluous.

DISCUSSION OF FUNCTION.

In the preceding pages an attempt has been made to describe the House of the Great Kiva without detracting from the clarity of the description by encumbering it with mention of the possible functions of the various parts of the building. So many novel features are presented for interpretation that a good deal of what may be said of them will be of a negative rather than of a positive nature.

We are even in doubt as to the function of the kiva benches. It is altogether possible that the first bench is nothing more than the basal ring of a somewhat smaller kiva of earlier construction which was torn out to make room for the one that now occupies the site, and hence should not be considered an integral part of the latter. A bench, of which the second bench of the great kiva is the homologue, is an almost constant feature of the kivas of the upper San Juan drainage. Not infrequently

the statement is made that this bench was for the support of the pilasters which held up the roof. In the majority of cases it does serve as a foundation for the pilasters, but structural necessity does not account for its presence. Pilasters built up from the floor would have been of practically the same strength, and of equal utility. Moreover, both bench and pilasters occur in kivas where the roof was otherwise supported, and, as in the great kiva, the bench is present where the pilasters are absent. Therefore, it would appear that the kiva bench is an architectural conventionality concerning the origin and primal function of which nothing is known.

The purpose of the vertical slots in the wall is uncertain. Their position directly in line with the center of the kiva and the doorways in the outer wall of the peripheral chambers is suggestive and no doubt would be significant were the motives of the builders understood. The slots may have been cupboard-like niches, each with several compartments, but it is more probable that they had something to do with a means of communication between the kiva and the rooms above ground. If openings from the latter pierced the upper half of the kiva wall, the slots may have served as built-in ladders of which the transverse poles were the rungs or steps. Though narrow and inconvenient from a modern point of view, they would have provided an agile person with a means of ascent or descent.

A function has previously been assigned to the four pillars. Presumably the upright logs standing in the same relative position to each pillar were supplementary roof supports.

The platforms surrounding the southern pillars and the masonry on three sides of the northeast pillar might have been intended for buttresses to strengthen the bases of the columns. But whether or not this was the case, from the fact that their upper surfaces were level and smoothly finished with adobe, it is evident that they were put to some other use.

The curving walls connecting the northeast and southwest pillars with the second bench prevented free passage behind the pillars, and may have been erected for that express purpose. Their position in diagonally opposite quarters of the kiva is worthy of note.

The rectangular vaults are an enigma. As they were being excavated, the quantities of charcoal exhumed gave rise to the belief that they were enormous fire pits. But subsequent examination revealed that the lower limit of the charcoal was considerably above the floors. The fill beneath the fire stratum was of clean sand and dust which had accumulated before the burning of the roof, of which the charcoal was the

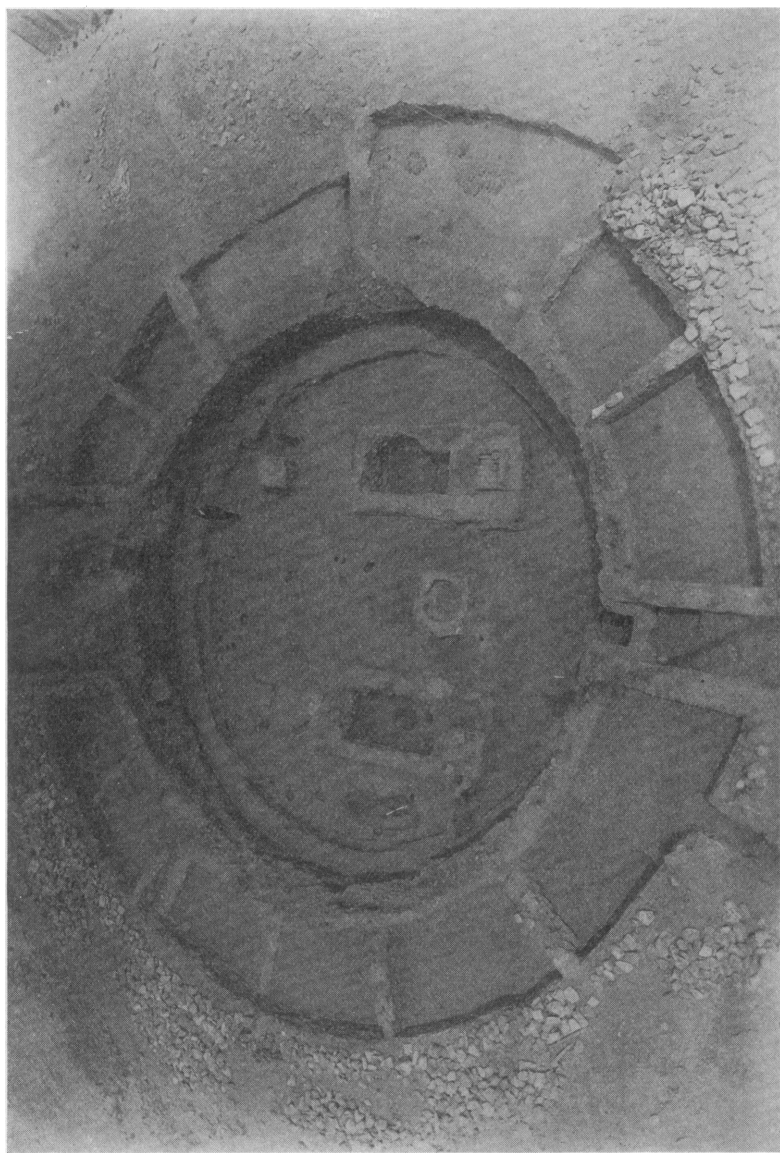


Fig. 4. Bird's-eye View of the House of the Great Kiva.

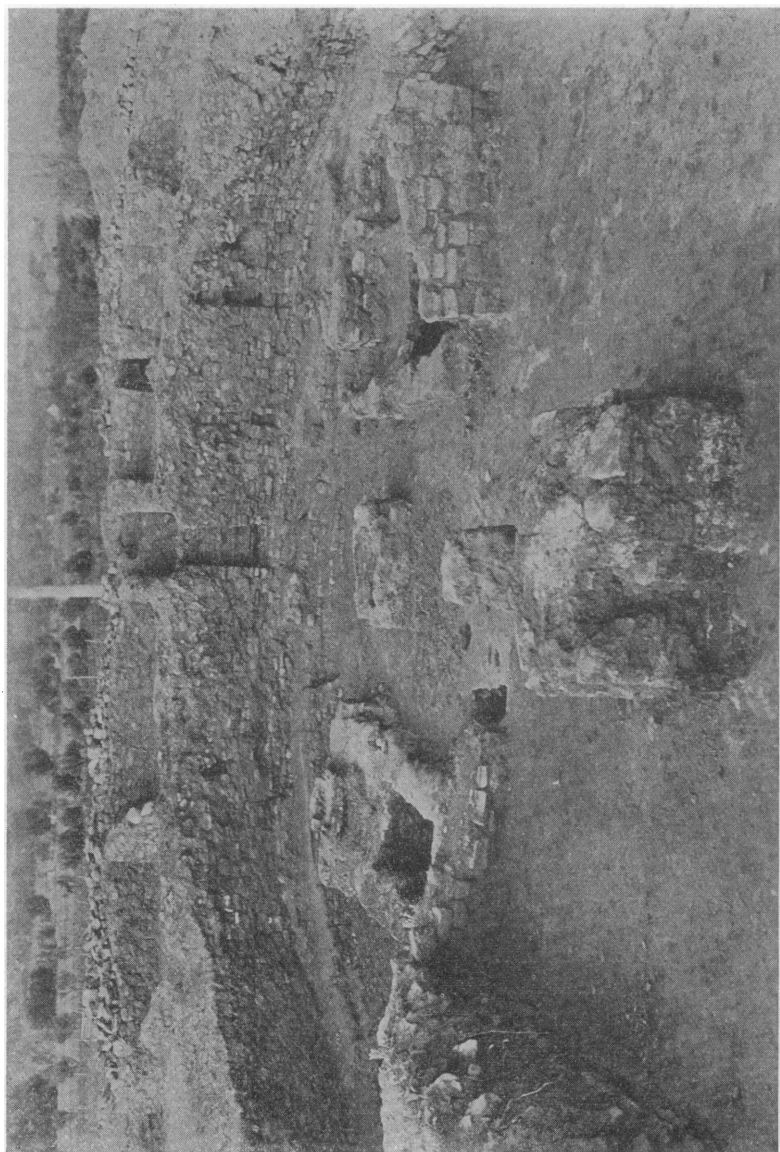


Fig. 5. View of the Kiva, looking north.

result. Where the walls were protected they were clean and uncolored by heat. Thus it became evident that whatever the use of the vaults, they were not built as containers for fire.

There can be little doubt that the masonry box midway between the south ends of the vaults was a fire altar. In the normal kiva the fireplace is a pit at or near the center of the floor. Here it is raised above the floor and framed with substantial walls of stone. Convenience or caprice would not have justified so wide a breach of custom. It is the belief of the writer that the flame which burned within this enclosure was held in greater reverence than those which warmed and lighted the other kivas of the village, and was no less than the sacred fire of the community.

Had there been no provision against it, it would have been possible for those who, by accident or intention, looked in through the passageway at the south to have beheld much of the interior of the kiva and what was there being enacted. The row of posts, back of and parallel to the fire altar, may be considered to have been the vertical supports of a screen set up before the entrance to render the secrecy of the chamber inviolate. It would have been necessary for the screen to have reached nearly to the ceiling, and the objection might be raised that poles of the diameter indicated by the post holes would not have been of sufficient length to have permitted it to have done so. But that timbers of such proportions were available is proven by the presence in various ceilings in the main ruin of cottonwood saplings $3\frac{1}{2}$ inches in diameter and 16 feet in length.

The receptacles in the floor between the vaults and the wall probably were storage places, but for what class of objects one can do no more than surmise. Nor does a satisfactory suggestion come to mind in regard to the purpose of the many small pits in the floor. The first few found were believed to have been post holes, but as the number increased and not a trace of decayed wood could be found among the contents, this theory became subject to question, and was abandoned when it became clear that the holes manifested not the slightest approach to orderly arrangement.

It would be important to know whether or not there was a functional similarity between the holes in the kiva floor and those in the bottom of the western vault. In the pit occupying the center of the latter there were several worked turquoises and a few shell beads. The other contained an intentionally shaped sphere of copper ore and some bits of turquoise. These may have been deposited as offerings in accordance with a custom widespread among Pueblo peoples, ancient as well as modern.

The curious form of the semilunar stone, its polished surface, position relative to the western vault, and direct alignment with the western pillars justify the opinion that it was an important feature of the chamber, but nothing further can be said. Beyond the probability that it bore some direct relation to the stone, the same is true of the oval pit north-westward of the latter.

The situation of the rectangle of masonry near the center of the alcove, the careful workmanship displayed in its construction, and the circle of white on its upper surface would make it difficult to account for the existence of this feature of the chamber as an object of purely utilitarian function. The statement that it was a permanent altar should meet with little valid criticism. The three poles which rise in line with the northern face and were of greater height than the masonry may be considered to have been the principal elements of a *reredos*, and it is probable that their visible portions bore either carved or painted ornamentation.

Assuming that the altar is properly identified, the alcove, without further justification, will be designated a shrine room. The bench along the north and west walls is strikingly suggestive of the analogous device which is continuous along the walls of the Hopi kiva. Perhaps still more suggestive is the opening in the floor between the altar and the north wall, which possesses every superficial similarity to a *sipapu*. The bench and the *sipapu*-like hole tend to confirm the belief that the alcove was an unusually sacred chamber.

Not enough remains of the thin radial wall in front of the altar to indicate what it may have been. Being so thin, it could not have been of any considerable height. Likewise the block occupying the west front of the alcove must also have been low. It is faced with stone, but filled principally with earth; hence, would not have held up its own weight if several feet in height, and certainly could not have supported even a portion of the roof.

The arc-shaped chambers were not ordinary living rooms. This is proven by the scarcity of fireplaces and the total absence of the stain and litter which were the invariable results of every-day occupation. Their actual use and functional relation to the kiva remain as problems for future solution.

Considered as a whole, the House of the Great Kiva exhibits a symmetry of form seldom exemplified by Pueblo buildings of any period. The principal axis is a line from the north to the south of the ancients. Although this line deviates considerably from the true directions, it

appears to have been the determining factor in the alignment of the pueblo and the orientation of every kiva in it. The axis passes through the principal entrance at the south, both stairways, the fire altar, and the altar in the shrine room. The median line of the alcove does not coincide with the axis of the building which may have been the reason that the altar was placed a short distance eastward of the center of the chamber. The pillars and vault on either side of the axis lie in lines parallel to and equidistant from it. In the primary, or original, series of peripheral rooms there were eight in the eastern arc and seven in the western. The presence of the eighth chamber on the eastern side mars the perfection of the plan, but does not detract materially from it.

Despite the uncertainty concerning the specific use of many of its features, it is manifest that the House of the Great Kiva is a ceremonial structure of high order. It is an elaborate variant of the common type of ceremonial house and has as distinctive characteristics, complicated form, great size, and intricate interior arrangement. If it be granted that specialization of form indicates proportionate specialization of function, it would seem a not untenable hypothesis that this edifice was the sanctuary of the entire community; a super-kiva wherein the members of the various priesthoods assembled to perform rites as sacred as were known to the Pueblo world of that time.

RELATIVE AGE AND SEQUENCE OF OCCUPATION.

The life history of Pueblo culture in the San Juan area is essentially a record of transition from the simple to the complex. In no other phase of material accomplishment was the dominant tone of that long cycle more faithfully expressed than in architecture. The postulated shelters of boughs and grasses which afforded the Basket-Makers indifferent protection from the elements were superseded by habitations wrought of earth and wood and stone, scarcely less crude, but of more permanent nature. From these humble beginnings the art of house building grew apace and reached its culmination in such vast community dwellings as the Aztec Ruin and those in the Chaco Cañon. The population of the immense fortress-villages was recruited from many small groups which previously dwelt more or less independently, each in a village of its own. Whatever integrating force drew the scattered units together imposed upon them the necessity of modifying their religious-social systems sufficiently to conform to the new conditions. One result, if it be permissible to judge from the size of ceremonial chambers, was the formation of religious orders of much larger membership than had

previously been the rule. Greater intricacy and elaborateness would have been the normal consequence of the coöperation of many minds in the preparation and performance of the ceremonies. The form and arrangement of any particular ceremonial chamber would have been more or less influenced by the complexity of the rites that were to be enacted therein. In conformity with this point of view, the inference is unavoidable that the House of the Great Kiva was of relatively late construction. Material substantiation of the inference comes from another quarter. But before it can be presented, a dogmatic statement of the sequence of occupation of the Aztec Ruin by two Pueblo groups of different cultural and geographical affiliations will be pertinent.

The builders of the ruin were closely related to the inhabitants of the Chaco Cañon, and may well have been emigrants from that culture center. The major and minor features of the Aztec Pueblo are so definitely of Chaco type that this ruin, were it not for the 65 miles which separate it from the parent cluster, would be considered an integral member of the latter. The similarity continues to so fine a point as the presence of offerings of shell and turquoise in certain kiva timbers.

Ceramics confirm what architectural resemblance would of itself establish as reality rather than hypothesis. The ranking types of the earlier pottery from Aztec, in structure, ornamentation, and range of form are indistinguishable from Chaco Cañon wares, and exhibit the most diagnostic peculiarities of the latter.

The descendants of the builders occupied the pueblo for a considerable length of time, if the refuse which accumulated during their residence may be accepted as a criterion. Eventually, as it would now seem, after a period of complete abandonment, a Mesa Verde group found shelter in the erstwhile home of their neighbors from the south. They remodeled and repaired the structure to some extent, constructed kivas after their different fashion, and deposited, with their dead and in their refuse piles, pottery so like that from the cliff-dwellings that it occasioned the first-hand impression, given in Part One of this Volume, that at the Aztec Ruin we were dealing with a hybrid subculture of which Chaco Cañon architecture and Mesa Verde ceramics were the incongruous elements.

The House of the Great Kiva was erected after the court of the pueblo had risen several feet above the level of the surrounding country by the gradual deposition of material attributable in major portion to human agencies. The length of time necessary for the growth of so extensive an accumulation would be measurable by generations rather than years. Where examined, the strata contained no Mesa Verde

sherds whatever. Therefore it is patent that the pueblo had been long inhabited by the Chaco group before the construction of their most pretentious ceremonial house was begun, and also that the Mesa Verde people had not at that time appeared upon the scene.

The potsherds from the several kiva floors and those from a refuse deposit heaped up against the outer side of the north wall of the alcove are of the earlier type, whereas the wares from the refuse deposits in the kiva, from the secondary series of arc-shaped rooms, and from the alcove are representative of the Mesa Verde complex. These facts may be explained as follows: The House of the Great Kiva was used by the group of Chaco Cañon derivation as long as they continued to reside in the pueblo, and after their departure it was taken over and occupied by the newcomers from the Mesa Verde. It is altogether probable that as the result of a period of abandonment, the structure had fallen somewhat into decay, and in rehabilitating it the Mesa Verde masons became responsible for the miserable workmanship of which the secondary walls are eloquent. For a short time subsequent to its reoccupation, the kiva may have been used for ceremonial purposes, but at length it fell to the lowly station of a repository for refuse, and eventually, in common with eleven of the twelve arc-shaped rooms, was abandoned to the drifting sands. However, the presence of the burned roof timbers directly upon the floors of Room 164 and the alcove proves that these chambers were used up to or within a very short time of the conflagration which closed the final chapter of aboriginal occupation of the Aztec Ruin.

DISTRIBUTION OF THE TYPE.

It is to be expected that the building to which these pages are devoted will prove to be an example of a distinct type with a definite and more or less extensive area of distribution.¹ Obviously that area cannot be circumscribed with any degree of finality at the present time. However, in various localities there are ruins that bear close superficial

¹It is doubtful if the archaeology of the San Juan area offers a problem of greater magnitude than the determination of the chronological and functional relationship of its types and subtypes of circular structures. They vary from the simple earth-walled pit rooms of pre-Pueblo time to the complex tower forms known to occur on the north side of the San Juan from Aztec westward. In the opinion of the writer these extremes represent the beginning and the end of a developmental series, not alone in position relative to the surface of the earth, but in time as well.

Superficial resemblance lends credence to the belief, that, intricate though it be, the great kiva variant was a point of departure for the elaboration of a distinct type of circular buildings. Within a stone's throw of the main pueblo at Aztec there are two ruins which appear to be amplifications of the same basic concept. One consists of a kiva and two concentric rows of arc-shaped chambers, the other of a kiva and three concentric rings. In both cases the kiva is of much smaller proportionate diameter than in the building which has herein been described, but the general similarity of form is so marked that a definite relationship between them must be assumed to exist until it is proved or refuted by excavation.

similarity to the type example. On the basis of this similarity, which, to be sure, might not in all cases be confirmed by exploration, a few remarks may be ventured with moderate assurance that they will not be inopportune.

There is a very large kiva just beyond the south end of Peñasco Blanco, at least one near Pueblo del Arroyo, one at the west side of the south court of Pueblo Bonito, two in the court of Pueblo Chetetrokettle, one in the court of Hungo Pavie, one in Wijegi, and one or more in Pueblo Pintada. Casa Rinconada across the Cañon from Pueblo Bonito is an unusually well-preserved great kiva occurring at a considerable distance from the nearest contemporary pueblo. There is also a detached example near Pueblo Viejo, and there may well be others in the Chaco Cañon and vicinity that have escaped the observation and inquiry of the author. Surrounding chambers, in each case including a shrine room of relatively large size and approximately rectangular form situated at the north side, are discernible in Peñasco Blanco, Pueblo Chetetrokettle, Casa Rinconada, and Pueblo Bonito. In the latter instance the peripheral rooms are not concentric, nor are they continuous along the eastern side. However, the shrine room is in the normal position, and the altar, uncovered by excavations made more than twenty years ago, is still partially standing.

There is a large circular chamber south of the smaller of the two principal pueblos at Aztec. The Mummy Lake ruin on the Mesa Verde is another, and about it the walls of surrounding rooms are traceable at the surface. At least one probably similar structure is present at Aztec Springs (Yucca House National Monument).

The great kivas enumerated above occur without proved exception in association with Chaco Cañon architecture. Aztec Springs and Mummy Lake are far to the northwest of the recognized limits of the Chaco area, but that fact alone is of no particular significance, because until these ruins are excavated the identity of their builders will remain unknown. Therefore, upon the basis of evidence, which, it must be admitted, is neither complete nor conclusive, the hypothesis is advanced that buildings of the type of the House of the Great Kiva at the Aztec Ruin will be found to have an area of distribution practically coextensive with that of the Chaco Cañon type of community dwellings.

