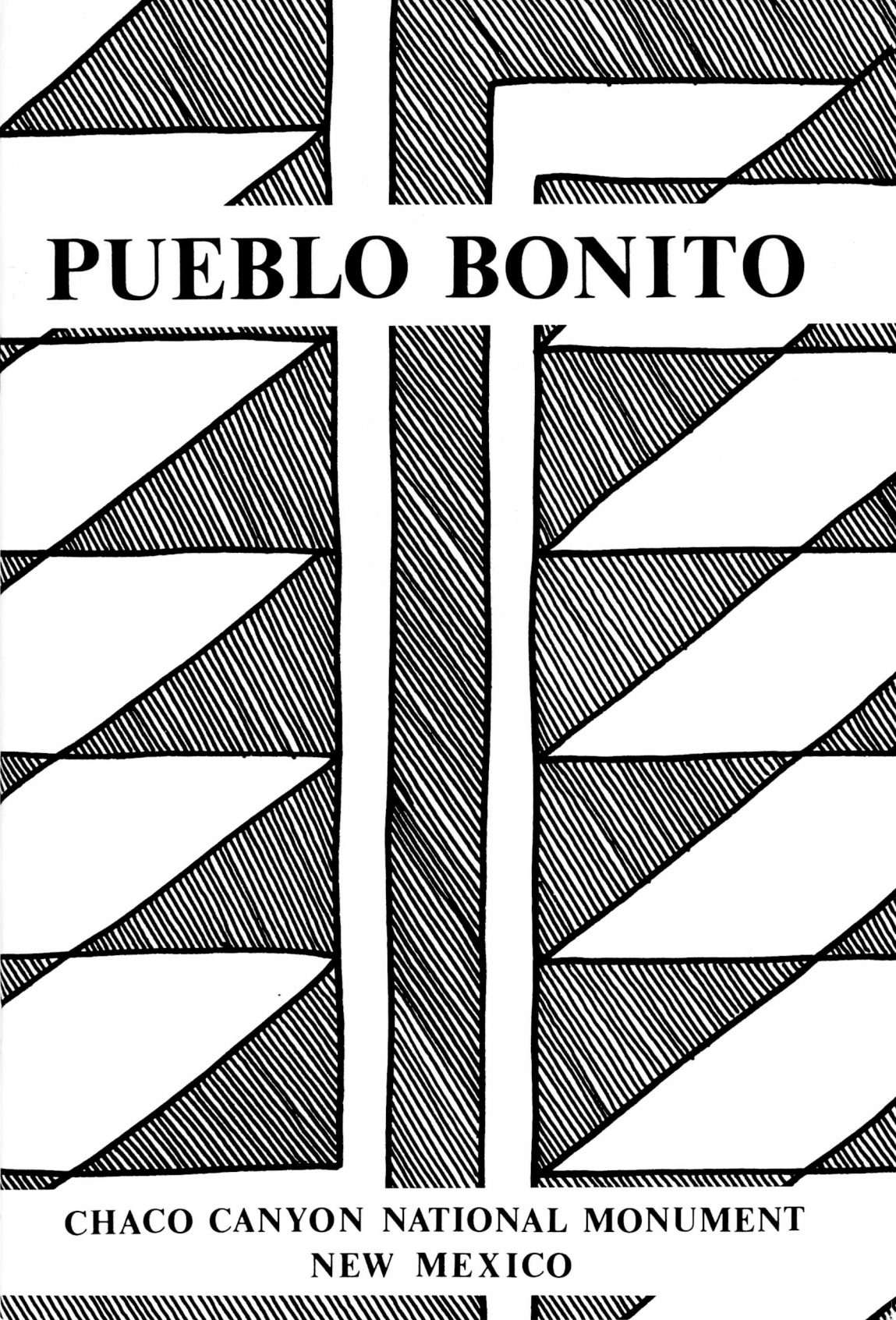
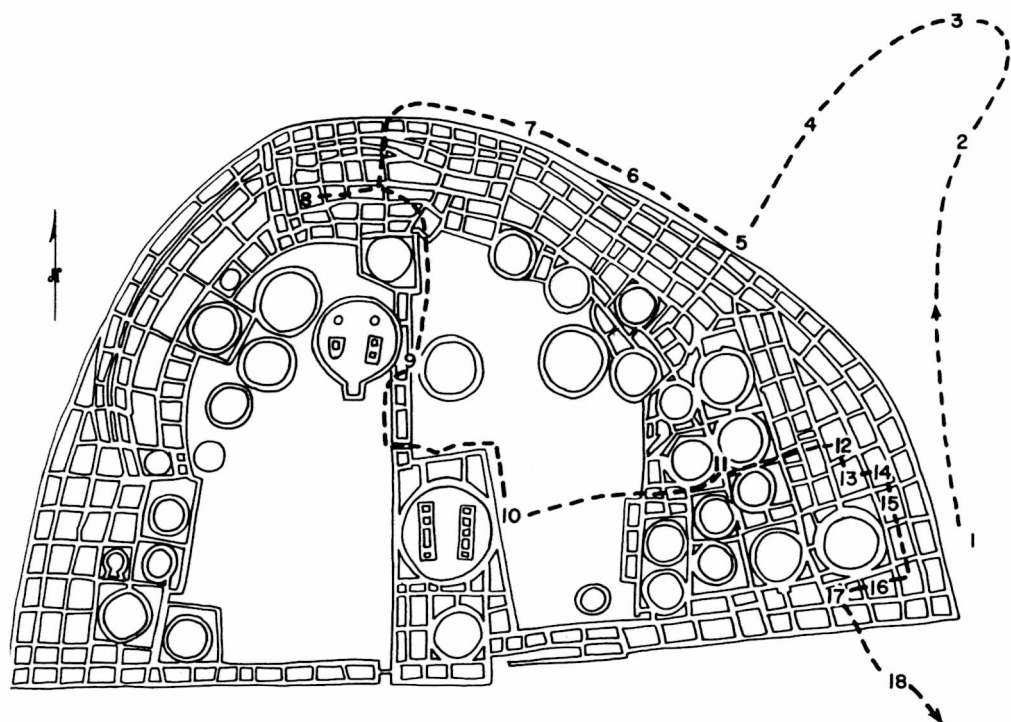


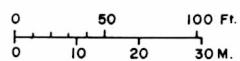


PUEBLO BONITO

CHACO CANYON NATIONAL MONUMENT
NEW MEXICO



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Chaco Canyon National Monument was established by presidential proclamation in 1907, owing largely to the efforts of Edgar L. Hewett, Director of the Museum of New Mexico and the School of American Research, whose first of many expeditions into the canyon was in 1902.

Pueblo Bonito, "the pretty village," has been known by that name since at least as far back as 1840, and was probably named by Spanish or Mexican soldiers or traders.

Excavation of Pueblo Bonito was begun in 1896 by Richard Wetherill who homesteaded in the canyon, and by George H. Pepper of the American Museum of Natural History. The work was financed by two wealthy young brothers from New York, Frederick and Talbot Hyde, who formed the Hyde Exploring Expedition for the purpose. In four seasons 190 rooms were cleaned out. Research was resumed by a joint National Geographic Society—U.S. National Museum expedition in 1921 under the direction of Neil M. Judd, who in seven summers completed the excavation of 600 or more rooms and 33 kivas, and made extensive tests in the large trash mound, and in the plaza.

The Bonito Trail is about one-third of a mile long.* Along it you will find numbered markers corresponding to numbered paragraphs in this booklet. Please keep off all ruin walls.

1 Pueblo Bonito, probably the largest single prehistoric Indian building in the Southwest at the time it was constructed, represents the highest development of Anasazi architecture. Most of the construction was between the years A.D. 1030 and 1079. The bulk of the wall's thickness was made up of rough, unshaped random stones laid in mud mortar. Then the walls were veneered, inside and out, with the carefully fitted stone you see here. The stone used for the facing, a hard, dense sandstone, was quarried from a narrow band of rock at the top of the cliff behind the pueblo. So much of this stone was used to build the great houses of the canyon that most of it has been removed for a mile east and west of Pueblo Bonito, but in other places the signs of ancient quarrying are still evident.

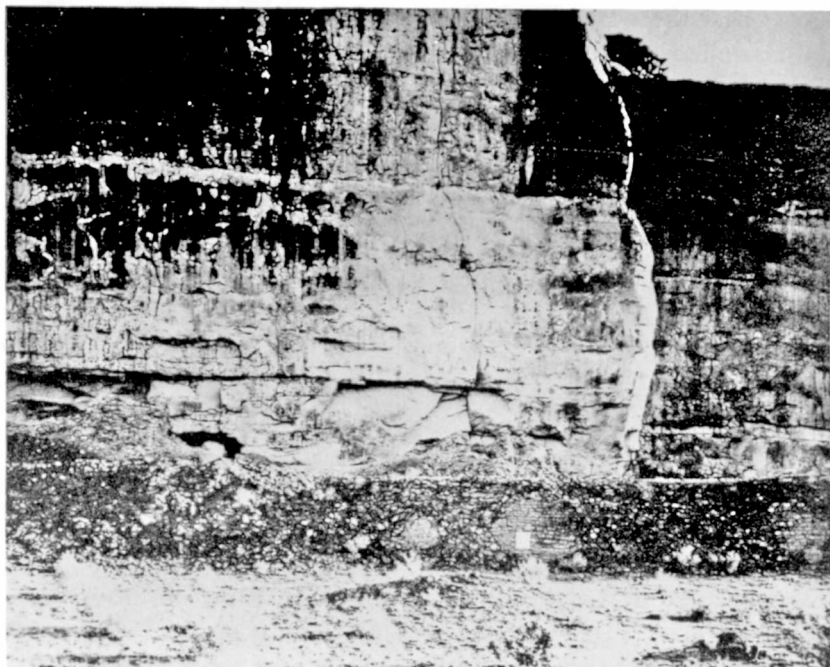
*For metric conversion see table in back.



*West end of Pueblo Bonito during excavation
by Wetherill and Pepper in the 1890's*

The small, rectangular openings in this wall were vents for air and light in the lower rooms. The round holes are sockets for vigas, ceiling beams.

2 The large, broken stones here and to your left are what remain of Threatening Rock, a large vertical slab of native rock which once stood separated from the cliff by a wide crack. The people of Pueblo Bonito felt the threat of its fall, for using posts, mud, and stone masonry, they attempted to shore up the rock, or



*Prehistoric masonry at base of Threatening Rock
before it fell — photo 1896*

to prevent erosion of its base. Here you can see a remnant of that early attempt. The Navajos, who were not here until long after the last of the Anasazi departed, call Pueblo Bonito “the place where



the cliff is propped up”, and they relate a tale about their predecessors pouring baskets of turquoise and white shell behind the rock as an offering to the spirits to prevent its fall. When the huge slab finally came down in January 1941, no turquoise was found, but it was discovered that the Anasazi had placed prayer sticks behind the rock. These are peeled and carved willow wands, painted and decorated with feathers, which are still used by Pueblo people somewhat in the way altar candles are used.

3 The rock around you is sandstone of the Cliff House formation, a member of the Mesaverde

group of sedimentary rocks laid down in Cretaceous times — 70 to 80 million years ago — near the edge of a shallow sea. When the shoreline retreated and the waters became shallower, and fresh or brackish, the sediments were in the form of carbonaceous shale and coal which are exposed across the canyon. The Indians made no use of the coal as fuel, but jet and shale from that formation were made into figurines, beads, and pendants, and decomposed shales were used for pottery clay and for mortar.

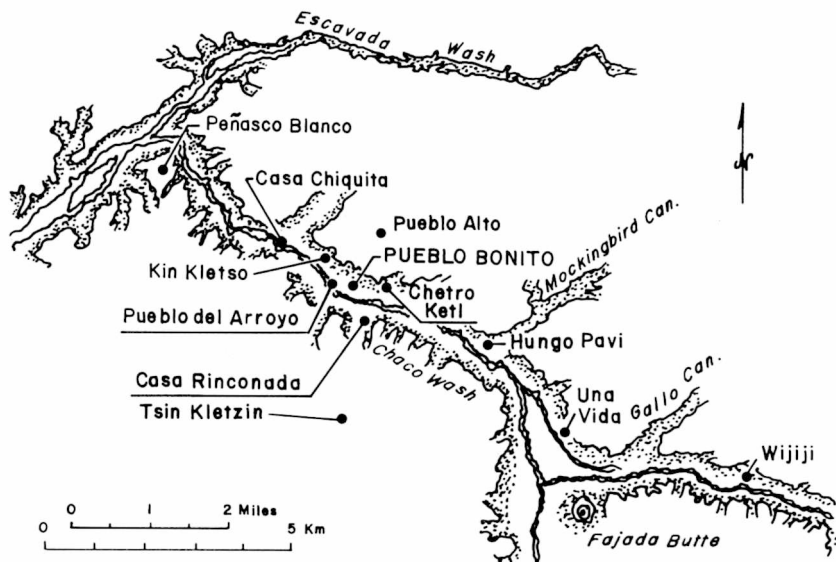


4 Here is an overall view of Pueblo Bonito and the more than three acres it covers. The panels in front of you describe the construction sequences. An existing southeast-facing pueblo was used as the nucleus for the grander multi-storied Pueblo Bonito. The symmetry of the ground plan indicates that a well-conceived basic plan was adhered to throughout three generations of re-modeling and enlarging.

We don't know the exact number of rooms the pueblo contained because many of the upper walls had fallen during the centuries it stood empty and abandoned, but sections of the rear wall were known to be five stories high, and some estimates run to 800 rooms. However, many of the rooms in the older section were trash-filled to serve as footings for the rooms above, and other rooms were destroyed to clear space for kivas, and it is probable that no more than 600 rooms were usable at any one time. The excavator, Judd, estimated a population of 1,000.

From here, too, you can see the pueblo in relation to its canyon setting and to some of its sister communities. The deep arroyo in the middle of the floodplain was probably a shallow streambed bordered by sedges, willows, and cottonwoods. Otherwise the environment was not much different from what we know today. Garden plots, irrigated both from the arroyo and by runoff water from the cliffs, covered much of the canyon bottom.

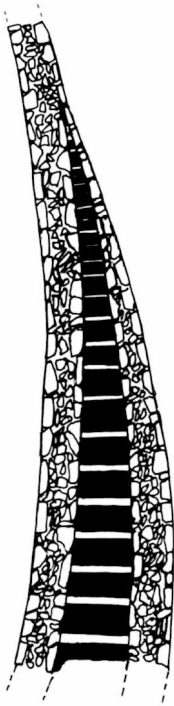
A relatively smaller population of Anasazi had inhabited the canyon for at least 500 years when, with the building of Pueblo Bonito and other large communal houses, the population was greatly swelled. The increased demands for wood and water,



more intensive cultivation, and the heavy foot traffic on friable soil undoubtedly placed a strain on the environment, but the deterioration of resources alone doesn't explain the total abandonment of the area at about A.D. 1300. It is likely that there were political, or other social factors involved whose traces are hard to find in the archeological remains.

5 This broken section of wall shows its construction of a core of rough stone faced with smaller, selected stones, each having at least three plane surfaces. Note that the wall is thick at the bottom where the entire weight was carried, but is narrower at the top where less strength was needed. The tapering is evidence of prior planning — the builders knew when they started that they were going to build four to five stories — but the wall was not erected as a single operation. As the height for each story was reached, beams were built into the wall, and the ceiling was covered to provide a platform from which to work while raising the walls another stage.

6 You are standing near the ceiling level of the ground floor rooms. Rock debris and silting from the canyon wall has buried the lower part of the house. By referring to the ground plan at the front of the booklet you can see that this section



of the wall is a "curtain wall" with a narrow, triangular space behind it. Visible in the masonry are the butts of small poles used as tie rods that bridge the opening behind the wall. The space was not a room, but was filled to lend strength to the juncture of the older western section and a new arc of outside wall running east. At the top of the wall to your right you can see timbers built into masonry like reinforcing rods.

At the foot of the cliff behind the ruin are the remains of a kiva and a one-room house built against the rock. There is an interesting petroglyph cut into the sandstone.

7

You may walk into this small ground floor storeroom to inspect the original ceiling. The doorway was once plugged with masonry, but it was opened by an early explorer. This section of the pueblo is part of the first construction of Pueblo Bonito behind the older pueblo of the A.D. 900s. Tree-ring dates from the Ponderosa

pine vigas indicate that the room was built in A.D. 1038. Peeled willow sticks were laid across the beams and covered with juniper bark, and finally about six inches of packed soil to make a floor for the room above. The room to the left has not been excavated.

The next doorway you pass on your way to Station 8 is now closed with a modern gate. The room behind it was used for a storeroom by Richard Wetherill whose first camp was pitched outside the wall of the pueblo in this vicinity. When Pueblo Bonito was built there were 18 doorways in the rear wall, but all were plugged up by the Indians at some later date so that the only entry into the house was at the south wall of the plaza.

8

The rooms surrounding you are part of the old, southeast-facing pueblo, built between 919 and about 936, over and around which the grander Pueblo Bonito was built 100 years later. Note the cruder masonry and thinner walls. The vertical poles incorporated into the wall in front of you represent an earlier method of construction. Often the poles supported a matting or wattle of small branches which served as lath to hold a thin wall of mud



Hyde Expedition camped behind Pueblo Bonito, 1890s

plaster. Later the people used small posts as a frame for stacking hand-molded adobe bricks or stones, and still later began to lay ashlar courses in which the strength was gained by lapping stones across the joints between stones in the course below. When Pueblo Bonito was built, the eastern end of the old pueblo was leveled to make way for new rooms, and some rooms at the southwest end were torn out when kivas were put in.

Many of the old rooms were filled with trash and it is possible that the smaller pueblo was not occupied when the new builders started to work on the later structure. Eight or more of the rooms (including the one you are standing in) had been used as burial chambers for more than 90 individuals.

The burials that have been found in Chaco have been of the people who preceeded the builders of Bonito and the other great

pueblos, or of contemporaries of theirs from the many smaller pueblos in the canyon, or of members of a small group that moved into the canyon from the north after Pueblo Bonito was largely, if not entirely, abandoned. So far archeologists have not discovered how, or where, the considerable population that lived in Pueblo Bonito, Chetro Ketl and other large houses disposed of their dead.

The modern roofs in this area protect remains of original ceilings.

9 This open area is the plaza or courtyard. It served much the same function as a town square where ceremonial dances and other group activities took place. Also, when weather permitted, much of the daily domestic work was done here – shelling corn, twisting cordage, scraping hides, firing pottery, and fashioning tools of stone, bone and wood.

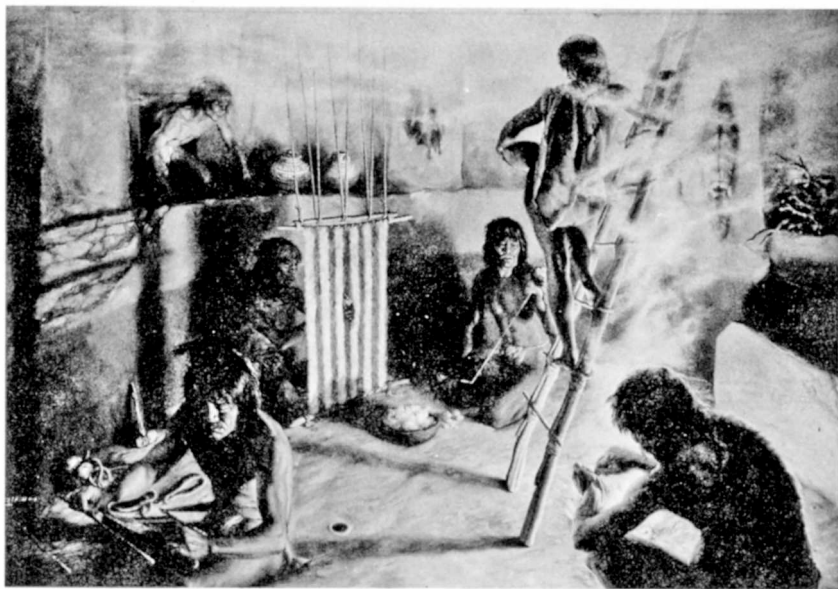


The plaza was divided by a single row of rooms into two courts. Many grinding stones were found in these rooms which served as one of two community centers for mealing corn into flour. Corn was ground on a large troughed stone, the metate (meh-TAH-tay), with a smaller, loaf-shaped stone, the mano.

The metates were arranged in a line of bins where several women could work together. Another milling center was in four adjacent rooms in the east wing.

10 The round underground room, a bit over 45 feet in diameter at the floor, is a great kiva which served as a religious center. Its roof, supported by four rubble-filled masonry columns, was 9 feet 7 inches above the floor. Thirty-four niches around the wall above the upper bench may once have held offerings of jewelry and other valued materials, but were open and empty at the time of excavation. The chamber was entered at the north end by a series of stone steps. You may enter and examine in detail a great kiva across the canyon at Casa Rinconada.

Another great kiva in the west court, and the division of the plaza, suggests to some students that the people were divided into two groups, each group responsible for certain ceremonies at different times of the year — summer people and winter people — as is true of many of the Rio Grande pueblos today.



National Geographic painting by Peter V. Bianchi, February 1964

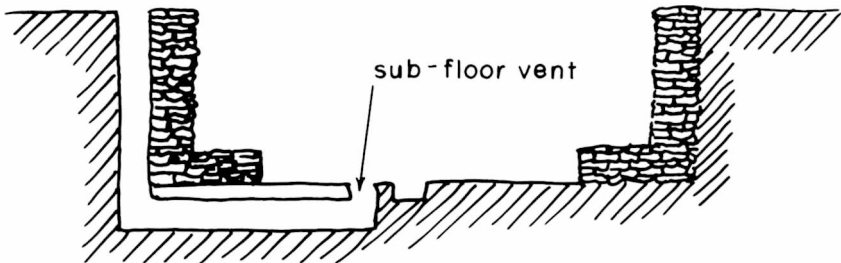
11 The ordinary kivas let down into this raised terrace served smaller groups than the great kiva. In today's Pueblo villages kivas are used as meeting places by both male and female members of

curing societies, as workshops for making ritual equipment, for dance rehearsal, and as sleeping places for boys while they are receiving religious instruction.

Kivas were more numerous than great kivas – 37 have been identified in Pueblo Bonito – though not all were usable at one time. The kiva on the left was razed. All the timbers were removed and the open pit was used as a refuse dump by people in nearby rooms.

An architectural trait peculiar to Chacoan kivas is the low bench with from four to ten pilasters made of juniper logs buried in the wall and extending horizontally onto the bench. The pilasters supported the butts of log stringers which encircled the kiva. The stringers held the weight of another, but smaller, circle of stringers, and that circle still another, until 12 to 14 layers of poles in ever-decreasing circles made a dome-like ceiling of cribbing. A nearly intact roof in a nearby kiva was found to have used 350 timbers in its construction.

Close to the wall the ceiling was only about three feet above the floor, but at the center of the room there was an eight to ten foot clearance. The space between the outside of the roof-dome and the wall of the kiva was filled with earth and rubble to level off a flat court even with the level you are standing on. When these kivas were all in use their presence was indicated only by ladders protruding from rectangular openings which served both as entryways and smoke holes.



The trench in the floor, once covered with slabs of stone, was an air duct. Rising heat from the fire in the round pit pulled fresh air through the duct and down a vertical shaft just outside the kiva wall to provide ventilation.

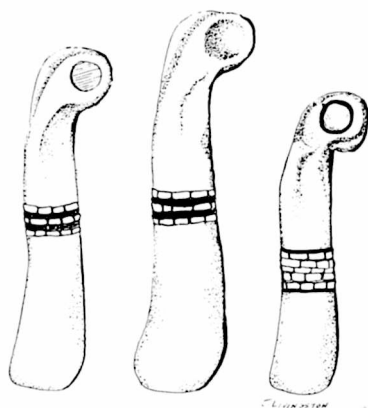
The smaller kiva on your right, as you proceed along the trail, is unusual in having four tall masonry pilasters. Rather than a cribbed roof, it probably had a flat roof of horizontal timbers to

give it an even seven-foot clearance over the entire space.

12 These ground floor rooms were used for storage and were reached from the living rooms above them by means of ladders through open hatchways in the ceiling.

Doorways were closed by leaning large, flat slabs of ground sandstone against sloping collars of masonry in the jambs, or by suspending matting from small sticks in the lintel.

13 The fire-reddened walls in this room resulted from a fire that destroyed the ceiling. The unburned area near the floor shows that the fire occurred after abandonment of the rooms. The earthen floors of the rooms above had leaked through and piled up against these walls. Tree-ring dates from charred beams fallen to the floor indicate construction at about A.D. 1100 — one of the last additions to be built. The room had been left empty except for three scrapers made from deer bone. Each was beautifully inlaid with turquoise, jet and shell.



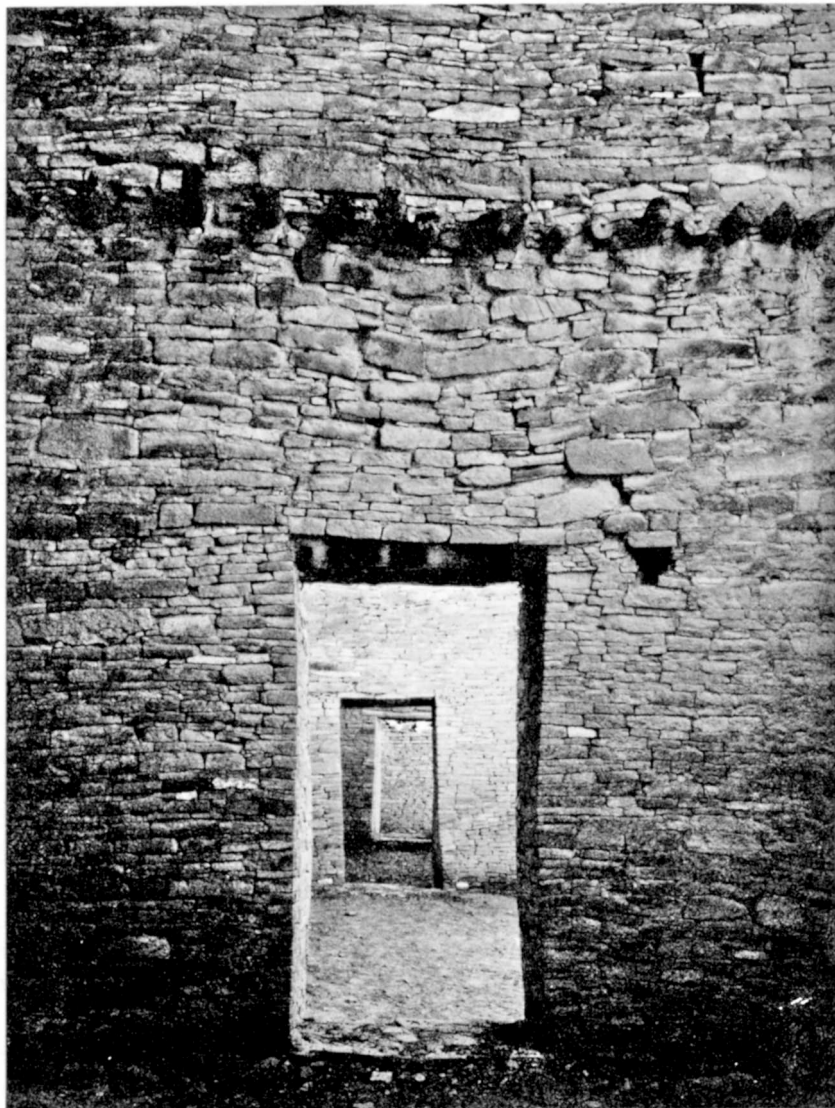
Note the diagonal doorway in the southeast corner of the room above.

14 The three doorways in this room have been successively modified by adding new sills, lintels, and secondary jambs, sloped to accommodate door slabs.

The doors may seem small but they were not made for ease of passage, but rather for reduced heat-loss and to make them easier to close off. In fact, the doors of the great Chacoan pueblos were unusually large for Anasazi houses. Typical doorways for the period were narrower and with high sills.

The mud plaster on the south wall is original.

15 The doorway in the east wall was plugged with masonry. Such sealed-off doors were common and probably for a variety of reasons as the use of rooms changed and apartments were



Series of doorways

[photo by Hal Malde]

rearranged. Sometimes grain-storage rooms were temporarily closed with quickly-laid, crude masonry and mortar to render them rodent-proof.

Almost ten feet below this floor is the floor of a kiva which was part of an earlier version of Bonito's town plan. It was filled and buried by this later construction.

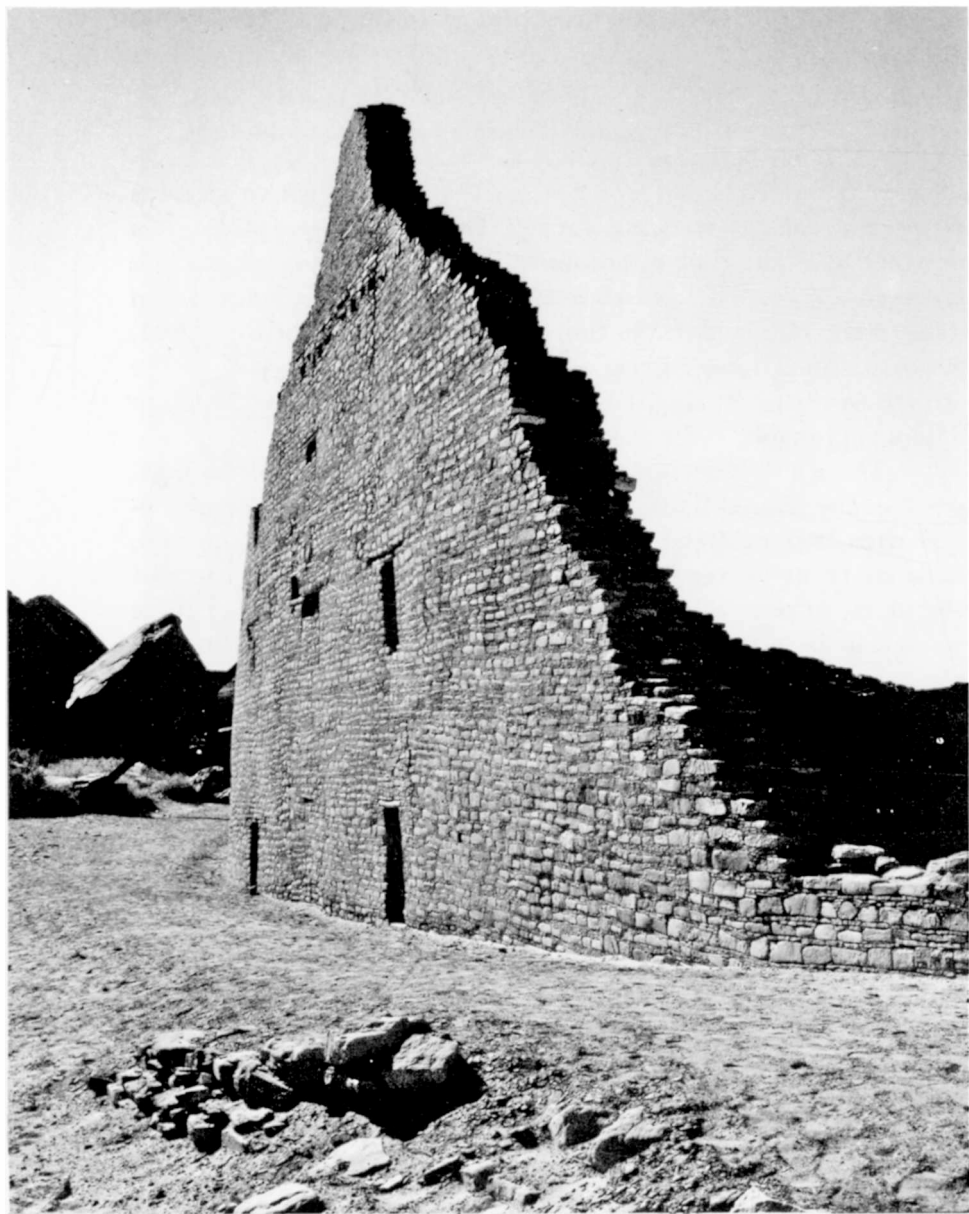
16 The T-shaped doorway, though not common, is found from Colorado and Utah south into the mountains of northern Mexico. We can only speculate about its purpose. Of the 32 T-doors remaining in Pueblo Bonito, most are exterior doors facing kiva courts.

17 This well-preserved ceiling is the original one. The fresh-looking sawed ends and notches in the beams is where sections were removed for tree-ring dating. The small round holes, less destructive of the timber, are made with a hollow auger bit which removed a core – the preferred method of taking samples. Seven dates were obtained from the cores and sections in this room. Three of them were cutting dates, indicating the last year of the growth of the trees: A.D. 1077, 1078, and 1079. The construction date was probably 1079 or 1080.

Though this section of the pueblo was three stories high, some of the ground floor rooms were used as living quarters equipped with firepits. Relatively few firepits were found in the ruin, most of them in one story sections, in the open on the edges of the plaza, or next to an outer wall in a kiva courtyard, but there was evidence in the fill of the rooms that others had existed on the upper floors and on the terraced roofs.

18 Above and to the left of the rooms you have just left is another corner window. On the morning of the winter solstice in December the rays of the rising sun shine through this window and strike the opposite corner of the room behind it, a fact that is probably more than coincidental. We know that in the 11th century Indians in Mexico were making solar and lunar observations and calculations that were in some respects more sophisticated than were possible in most of Europe.

The long low ridge in front of the pueblo was the trash dump. It was built up of ashes from the firepits, floor sweepings, construction debris, bones, food refuse, human waste, scraps from craftwork, broken pottery – everything that was no longer of any use. With only a little imagination one can picture the mound with a band of small, naked children playing “king of the hill”, and with foraging turkeys, and dogs burying or digging up bones.



Four story wall

[photo by Hal Malde]

OTHER PLACES TO VISIT IN CHACO CANYON

- 1) Just west of Pueblo Bonito is PUEBLO DEL ARROYO where you can see the ruins of a smaller communal house occupied at the same time.**
- 2) Across the canyon, on the CASA RINCONADA TRAIL, you can go down into the largest great kiva in Chaco Canyon, and you can inspect three small pueblos.**
- 3) One-half mile east is CHETRO KETL, the second largest of the great pueblos, with some features not seen at Pueblo Bonito.**
- 4) Four miles east, up the canyon, is the VISITOR'S CENTER with restrooms, a museum, and an information desk.**

**PLEASE RETURN THIS BOOKLET
OR YOU MAY TAKE IT WITH YOU FOR 40¢ DEPOSITED
IN THE STAND**

Brief Metric Conversion Table

$\frac{1}{2}$ inch	=	12.70 millimetres
1 inch	=	25.40 millimetres
2 inches	=	50.80 millimetres
1 foot	=	30.48 centimetres
1 yard	=	0.914 metres
$\frac{1}{4}$ mile	=	400 metres
$\frac{1}{2}$ mile	=	800 metres
1 mile	=	1.6 km
$3\frac{1}{2}$ miles	=	5.6 km
$4\frac{1}{2}$ miles	=	7.2 km
15 miles	=	24 km
20 miles	=	32 km
60 miles	=	96 km
200 miles	=	320 km
1 acre	=	0.4 hectares
$2\frac{1}{2}$ acres	=	1 hectare

