

*EXCAVATIONS AT RAINBOW HOUSE
BANDELIER NATIONAL MONUMENT
NEW MEXICO*

BY

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PLATE I



General view of Rainbow House in 1959.

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FOREWORD

For more than 80 years there has been archeological interest in the ruins of the Pajarito Plateau and especially those in the Cañon de los Frijoles.* In 1880 under the auspices of the Archaeological Institute of America, Adolph F. A. Bandelier did the first work of recording archeological remains in what is now Bandelier National Monument. He visited the area later in 1880 with a photographer and made two more brief visits, in 1885 and in 1890, in company with Charles Lummis (Hobbs 1940: 128-131).

The first general published descriptions of ruins on the Pajarito Plateau came in 1906 under title of "Antiquities of the Jemez Plateau" as Bulletin 32 of the Bureau of American Ethnology. Hewett (1906: 14-32) inventoried the more important ruins and gave ground plans to substantiate the need for research and preservation under government protection.

Beginning in 1908 and continuing through 1912, Hewett and other Southwestern archeologists, under the auspices of the School of American Archaeology, did considerable work in the cavate and pueblo ruins in the Cañon. However, Hewett's first field work on the Pajarito Plateau was done in 1896 while serving as superintendent of the training department at the New State Normal in Greeley, Colorado (Bloom in Brand and Harvey 1939: 14-16). Then, as first president of the Normal University (now New Mexico Highlands University) at Las Vegas, New Mexico, he continued this work before it was sponsored by the School of American Archaeology. Collections from Pajarito Plateau were stored at the museum of the New Mexico Normal University (Hewett 1906: 55), but in 1930 were acquired by the Philmont Boy Scout Ranch, Cimarron, New Mexico. Other collections are at the Museum of New Mexico, Peabody Museum, Smithsonian Institution, and Southwest Museum (Hewett 1910: 190).

During the 1930's and continuing through 1950, small excavations at several ruins were made in the Cañon de los Frijoles and reported on, but these were in the nature of minor testing and in connection with ruins repair projects.

Beginning in 1948 and continuing through the fall of 1950, a complete excavation was made of the small ruin called Rainbow House. This began as a field session in archeology for Adams State College of Alamosa, Colorado, to be carried out over a five-year period. However, at the end of the 1950 session the project folded. Frederick C. V. Worman continued and completed the excavations of the pueblo and the kiva in the fall of 1950 under the sponsorship of the National Park Service. Neither Adams State College nor Worman produced the required report on the excavations.

In 1959 a ground plan of Rainbow House was prepared by the National Park Service which has been used in modified form as the basis for figure 3 of this report. At the same time two photographs showing the pueblo were made. The negatives of these have not been found, but they were combined and rephotographed for use in this report (plate I) as a panoramic view.

*This name has been taken from the Frijoles, New Mexico U.S.G.S. quadrangle map of 1952. According to local usage it is called Frijoles Canyon.

To fill the void the National Park Service assigned the study of the Rainbow House excavations to one of its archeologists. Again developments did not proceed according to plan. John F. Turney was the first person to whom this project was assigned because he had been at Bandelier during 1950 and knew first-hand some of the details of the work. He arranged for separating much of the bone material from the artifacts. These bones were turned over to Collaborator Lyndon L. Hargrave at the Southwest Archeological Center, who took out and identified some of the bird bones at that time. Turney also sorted datable charcoal from unmarked bags, divided each specimen into two parts and sent one set to Terah L. Smiley at the Laboratory of Tree-Ring Research for dating.

In 1960 Archeologist Charles B. Voll was given the job of preparing this report. His work on the project included reboxing the Rainbow House material stored at the Southwest Archeological Center at Globe, studying and tabulating a portion of the pottery. Voll's terminus on this assignment came when he transferred to Ocmulgee National Monument, Macon, Georgia, in November 1961.

When the author took over the Rainbow House project late in 1961, Voll carefully advised me of the work he had already done. He went over the glaze pottery identification as he had been using it and left sufficient marked and bagged sherd samples so that there should be little question to identify and classify the Rainbow House pottery. He cited the main references to which I would refer for information on the Rio Grande area.

The reader will realize as he progresses through this report that the author has tried to leave no stone unturned to locate all missing records, gather personal remembrances and other information to fill in the voids.

Attempts to correlate the accession records with the excavated material on hand at Globe immediately revealed that the material was not complete. The possibility that it might be stored at another location was checked. Inquiries revealed that it was not at Bandelier National Monument, but that a considerable quantity of archeological material was stored at Adams State College, Alamosa, Colorado. This was transferred to Globe by the author in February 1963.

As the third archeologist assigned to the project, I have found that taking over the incomplete notes and materials from an excavation in which I did not participate has been most frustrating at times. To attempt to work up a coherent and comprehensive contribution to archeological literature has been a difficult task. It is hoped the results will be of some value to future archeologists.

ACKNOWLEDGMENTS

Many persons have given of their time in the preparation of this report. Mr. Frederick C. V. Worman contributed to the work in many ways. Former students of the summer field schools of 1948, 1949, and 1950 who were most helpful included Mrs. Barton Wright (Margaret Nickelson), and Dr. Earl Swanson, now Director of the Idaho State Museum at Pocatello. In addition, thanks go to many without whose assistance this report could never have been completed. To the staffs at the Southwest Archeological Center, Gila Pueblo, Globe, Arizona, and the Southwest Regional Office go my wholehearted thanks. Dr. Alfred E. Dittert of the Museum of New Mexico and Dr. Florence Ellis of the University of New Mexico helped with pottery identifications.

Dr. Leo G. Hertlein, Curator of Invertebrate Paleontology, California Academy of Sciences, San Francisco, identified shell specimens. Seeds were identified by Dr. Stanley L. Welsh, Brigham Young University. Fish bone identifications were by Dr. Robert R. Miller, Curator of Fishes, Museum of Zoology, University Museums, University of Michigan. Identifications of worked and unworked bones were made by Collaborator Lyndon L. Hargrave and Archeologist Thomas W. Mathews of the Southwest Archeological Center.

Mrs. Lorraine Langham typed and retyped drafts, arranged the plates and figures, cut and ran the stencils, and finally helped in assembling the pages. Her expert assistance is much appreciated.

Working at a distance from the area had many disadvantages, but through correspondence Archeologist James C. Maxon, of Bandelier National Monument, continuously aided the author with clear and concise answers to the many questions which arose.

Figures 1 and 2 were delineated by Dee Dodgen, Museum Technician at the Southwest Archeological Center. The remaining figures and plates are the author's work, except figure 4 which carries the delineator's name. Reproduction of the illustrations and cover was through the courtesy of Southwestern Monuments Association, Globe, Arizona.

After this was typed, the report of the corn study was received from Drs. Paul C. Mangelsdorf and W. C. Galinat of the Botanical Museum, Harvard University. The information they furnished is most appreciated and adds to the study of corn in the Southwest.

INTRODUCTION

Location and Environment

Bandelier National Monument is located in the canyon-slashed volcanic mesa country on the east side of the Jemez Mountains (fig. 1). Lying between the Rio Grande River and the Jemez Mountains, it is approximately 45 miles from Santa Fe by highway. The Pajarito Plateau is composed largely of tuff, or consolidated volcanic ash, and basalt lava ejected thousands of years ago from vents in Valles Caldera, one of the world's largest calderas, or collapsed volcanic summits. Volcanism began in the early to middle Pliocene and culminated in the Pleistocene with two catastrophic eruptions of tremendous volumes of rhyolitic ash flows. These ash flows, popularly called tuff, represent two periods from an older, unnamed caldera, and a younger truncated caldera called Valles Caldera. The tuff appears to have been laid down in a number of layers deposited in two rather short periods, one in the Pliocene and the other in the Pleistocene (Northrop 1961: 139 and Fig. 1).

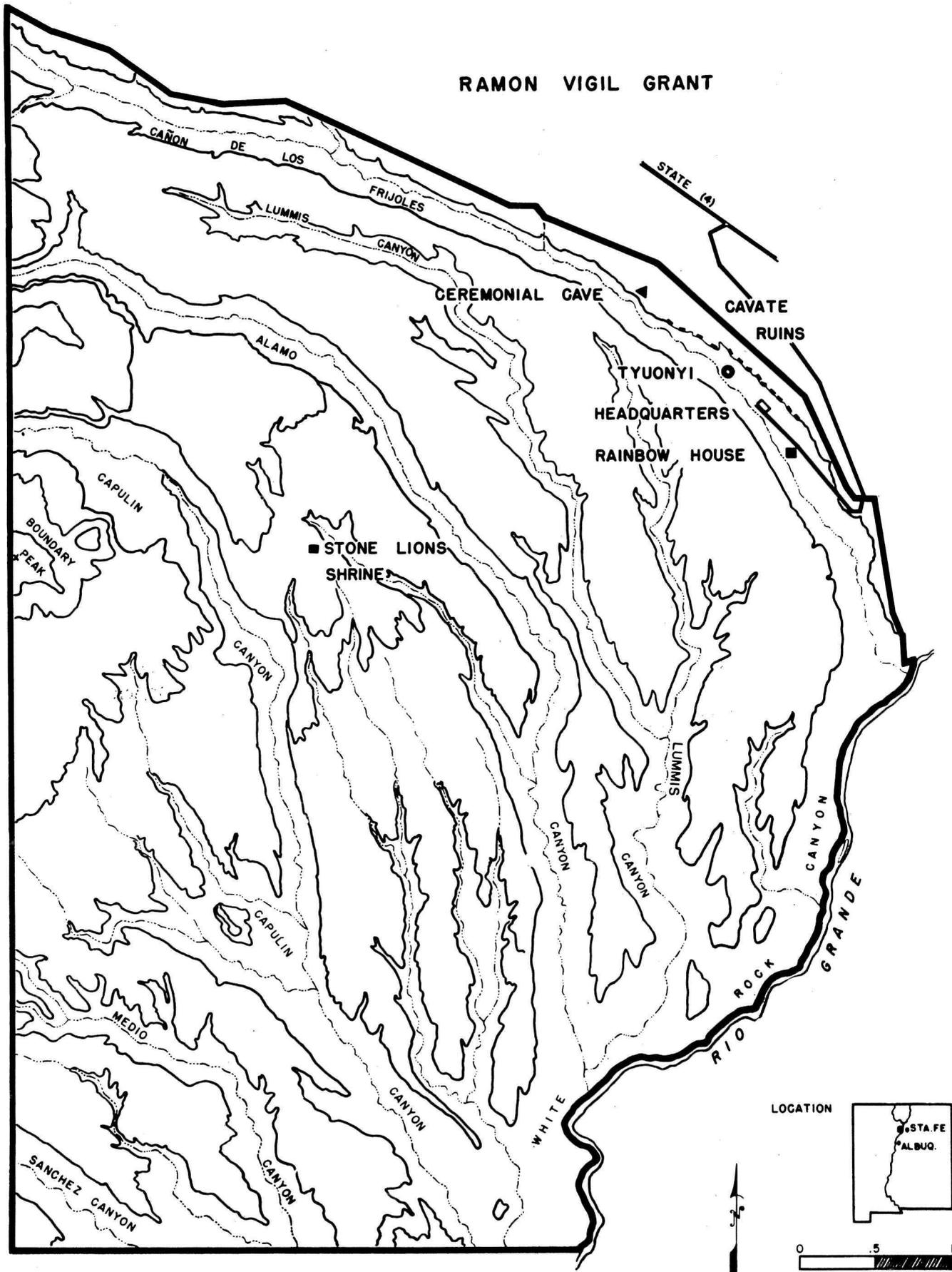
Through this large plateau of volcanic material, running water has cut many steep-walled canyons down to the Rio Grande River. Wind action has sculptured the cliffs into fantastic shapes with many natural caves. El Rito de los Frijoles is spring fed and heads on the south slopes of Cerro Grande (elev. 10,199), and at about the 8,000-foot elevation, drops into Cañon de los Frijoles. A constant water supply was available for those prehistoric people who made this canyon their home from about the 13th to the 16th century. Elevations in the canyon range from approximately 6,800 feet, where it enters the Monument at the northwest corner, to more than 6,000 feet in the vicinity of Rainbow House.

The canyon was ideally situated geographically for the prehistoric pueblo Indians who occupied it. They settled here because of the unusual and advantageous combination of climate, shelter, water, fertile soil, and variety of vegetal and animal life. On the north is a precipitous cliff of tuff, ideal for a good southern exposure which these people usually chose. It was a simple matter to dig out a house in this tuff cliff. On the opposite side the forested slope reached gradually to the mesa top.

The area lies in the Upper Sonoran and Transition life zones (Bailey 1913: plate 1). Game was probably abundant at the time of occupation. The mesa tops and valleys were covered with pine, pinyon, oak, and thick growths of juniper. Wild plants afforded sources of food, materials for crafts, and medicinal herbs. The soil of the narrow valley bottoms was suitable for the cultivation of corn, beans, and squash, with or without irrigation, according to changes in climate.

History of Archeological Work in Cañon de los Frijoles

Rainbow House is one of a number of pueblo, talus, and cavate ruins in Cañon de los Frijoles. Here, in a short two-mile stretch of narrow valley, running almost due east and west, were found the remains of villages ranging from Pueblo III through the various Rio Grande Glaze Paint periods. All but one of these ruins are on the north or sunny side of the canyon. Edgar L. Hewett identified 13 cliffhouses consisting partially of cavate lodges hewn out of the soft tuff cliffs and of talus buildings along the



RAMON VIGIL GRANT

**BANDELIER NATIONAL MONUMENT
FIGURE 1**

LOCATION

0 .5 1
SCALE MILE

The boundaries of Bandelier National Monument have changed since Rainbow House was excavated. About 3,000 acres embracing most of the Upper Frijoles Canyon were acquired from the Atomic Energy Commission on May 27, 1963. However, since the new area is not archeologically significant, the boundaries of the Monument are shown before the addition.

north wall of the canyon. There are five separate pueblos in the valley proper (see fig. 2). The largest of these is the ruin of Tyuonyi. About 200 feet east of Tyuonyi is an unexcavated pueblo mentioned by Bandelier (1892: 144). A third separate pueblo is located up the canyon, a little less than a mile from Tyuonyi, and is a small, unexcavated Pueblo III ruin on the south bank of the Rito nearly opposite the Ceremonial Cave. A very small, poorly preserved structure, the fourth, is found immediately north of the utility area on the north slope near the stone residences. This site contains eight or nine rooms with walls about two courses high. Sherds found here appear to be Pueblo III. Approximately three-quarters of a mile downstream from Tyuonyi is the fifth pueblo, Rainbow House. This ruin has been given the Laboratory of Anthropology survey number 217. During the 1948 excavation season it was named Kastiatzi, or Rainbow House, by the Keres laborers working at Bandelier National Monument. Four more very small, poorly preserved ruins are about three-eighths of a mile down canyon from Rainbow House.

First mention of this small pueblo was made by Bandelier, who briefly visited Cañon de los Frijoles on five different occasions between 1880 and 1890. Bandelier stated, "A third ruin, situated nearly a mile farther down the gorge in a grove of pine trees, formed an L, with a rude stone enclosure on its north side, and connected with it is a small estufa. It is quite as much decayed as the large polygon, and the potsherds covering its surface are similar" (1892: 145).

Bandelier wrote that the people of Cochiti had told him the caves, as well as the pueblo ruins, were the work of their ancestors. Charles H. Lange in his book on the Cochiti states:

In many tales, present-day medicine societies and various tribal officials are mentioned, indicating either their considerable antiquity or a subsequent inclusion through rationalization of these important features into the tribal origin story. Details of the account become clearer and more consistent as the Cochiti established residence in Frijoles Cañon, and the final divisions, such as that with San Felipe, occurred. (Such traditions still lack archaeological verification; if they are true, verification should be demonstrable by archaeological excavation, a project the author hopes to pursue.) (1959: 228).

In 1904 in a printed circular entitled "Historic and Prehistoric Ruins of the Southwest and Their Preservation," published by the General Land Office of the Department of the Interior, Hewett recommended that speedy action be taken in preserving the area known as the Pajarito Park District. The area was then under withdrawal by the General Land Office, because of its great scenic beauty, accessibility, and for the number of well preserved prehistoric ruins.

Hewett not only was active in the field of safeguarding the antiquities of the Southwest, but as a researcher was responsible for studying them. As director of American research (School of American Archaeology) of the Archaeological Institute of America, he organized and supervised excavations in ruins on the Pajarito Plateau. In 1907 there was summer field work at Puye. From 1908 through 1911 the work centered in Cañon de los Frijoles.

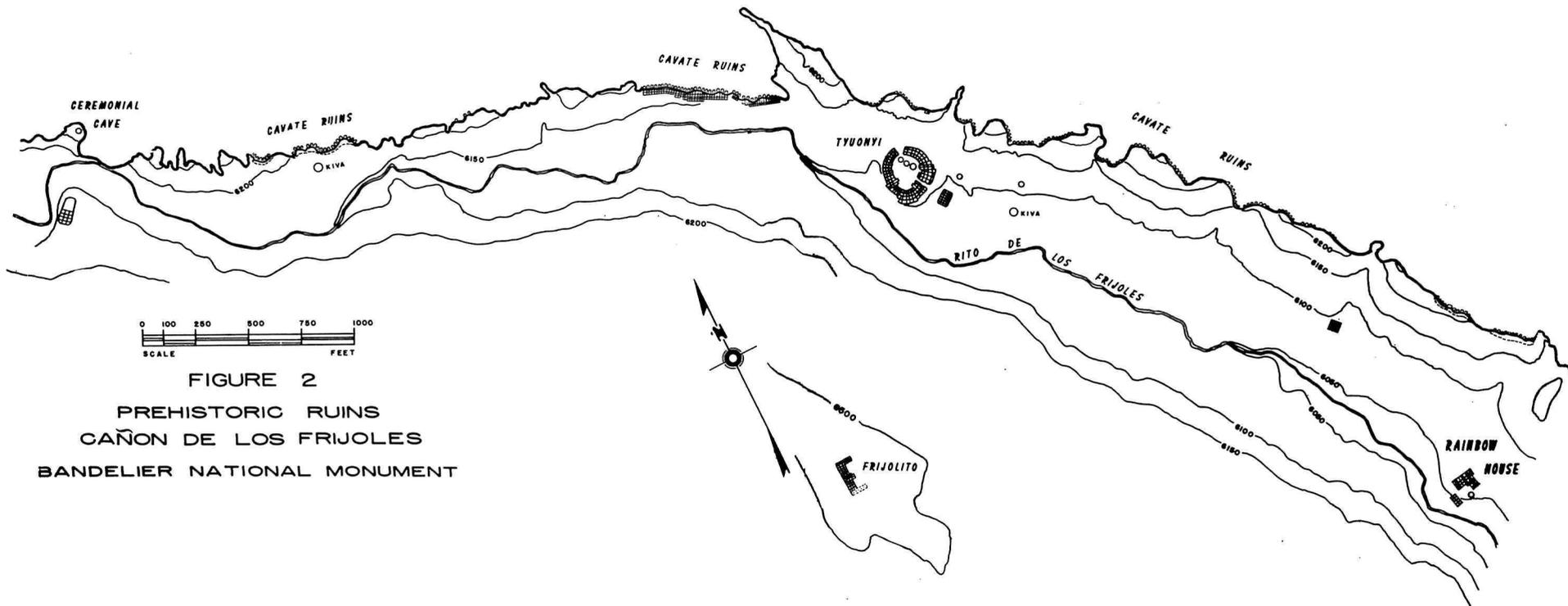


FIGURE 2
 PREHISTORIC RUINS
 CAÑON DE LOS FRIJOLES
 BANDELIER NATIONAL MONUMENT

In 1908 Hewett excavated in the great community house of Tyuonyi. Excavation of this pueblo was not completed. Description of the work (Hewett 1909) is inadequate from a general standpoint. The architecture was amply described, but studies of artifacts, especially the pottery, were left without proper documentation.

As excavations continued, field sessions concentrated on the numerous cavate and talus structures. The sessions were attended by many whose names are legend in Southwestern archeology--A.V. Kidder, Jesse Nusbaum, Neil Judd, Kenneth Chapman, J.R. Harrington, S.G. Morley, and others. The excavating force consisted of a number of Tewa Indians from San Ildefonso pueblo. The photography by Jesse Nusbaum, the mapping by Kenneth Chapman, and the work of other members of the school were excellently done.

It appears that excavations at Tyuonyi and in the cave and talus structures were not completed by the School of American Archaeology because of lack of facilities and time (Hendron 1940: 7). This may have had something to do with the lack of further reporting on the work.

However, reconstruction and stabilization of some of the structures excavated apparently were continued by the School of American Research, because we find the following note in El Palacio (Vol. VIII, Nos. 7 and 8, July 1920, p. 185):

K.M. Chapman of the Museum staff reports satisfactory progress in the reconstruction of the House of the Sun Clan, which is the culmination of twenty years of research work in the Rito de los Frijoles by the School of American Research, a piece of work that is unique and epoch-making in the history of American archaeology. Wesley Bradfield supervised the preliminary work of gathering the material for the reconstruction, being assisted by three Tewa Indians from San Ildefonso.

In 1916 the area was established as Bandelier National Monument in honor of the great historian, ethnologist, and traveler, Adolph F. A. Bandelier. Until 1933 it was administered by the Forest Service, of the Department of Agriculture. In that year it was transferred to the jurisdiction of the National Park Service, Department of the Interior.

From 1934 through 1940 some excavation was done in connection with necessary ruins stabilization. As a result of the CWA and CCC programs, funds and personnel were available to repair damage to excavated ruins through years of neglect, vandalism by visitors, and erosion by wind and rain. Since none of these programs called for complete excavation, reports did not give all the information desired, although they were well written and documented with photographs, charts, and maps.

From 1937 through 1943 more ruins stabilization work, entailing some archeological excavation, was done by the National Park Service under the supervision of J. W. Hendron. Reports were made on stabilization work, and Turney made a complete analysis of materials recovered in connection with the excavations and stabilization (Turney 1948).

Parts of Tyuonyi Ruin were stabilized during the years of 1947 and 1948 by Thomas B. Onstott. In addition to the stabilization report Onstott (1948) wrote a comprehensive report on findings made in connection with the project.

It was with considerable hope and enthusiasm that the National Park Service and Southwestern archeologists looked forward to reports on archeological surveys and excavations resulting from the Adams State College proposed plans for a five-year project on the Pajarito Plateau.

Resumé of the Adams State College Excavations

Archeological studies were proposed in 1947 by Adams State College through an arrangement between the college and the National Park Service. The National Park Service was satisfied with the proposed program because it would strengthen knowledge of Pajarito Plateau archeology.

Worman, of the Department of Science of Adams State College, wished to begin a series of annual summer field sessions in archeology centering on Pajarito Plateau. He proposed to National Park Service personnel in the Region Three* Office in Santa Fe, and to the Custodian of Bandelier National Monument, that such field sessions be held annually for five years beginning in 1948, with Bandelier National Monument as headquarters. Each summer for a period of 10 weeks, interested students chosen from colleges and universities throughout the country would carry on archeological research for credit. Objectives of the program, according to Worman's written request of October 27, 1947, were as follows:

First, to ascertain the horizons of occupation in this area, which are, so far, assumed; and to determine the distribution of differing groups through an intensive survey of the distribution of pottery types and other evidence of material culture; second, to procure, through carefully planned excavation, enough skeletal material to ascertain prehistoric physical types; third, to assist the educational program of the National Park Service in presenting the archeological material found in the area, through recovery of additional specimens and preparation of additional exhibit ruins; fourth, the training of students in proper field techniques of excavation, survey and stabilization.

We propose a planned five-year program, of approximately ten weeks per summer, about June 5 to August 25, of work by a field party consisting of approximately fifteen students and four or five supervisory personnel.

Specifically, the program is to consist of: part one, excavation--a three-year project of excavation in the small pueblo, IA 217; one year excavating a selected portion of the remaining rooms in Tyuonyi; one year excavating in the unfinished portion of Long House or in one of the small black-on-white sites on the South Mesa, to be determined by the survey to be carried on over the available portions of the Pajarito Plateau. Where

* Now Southwest Region.

the ruins show unusual patterns of culture, stratigraphy tests would be used to augment the surface collections for a comparative study.

The beginning date is contingent upon ability or inability to proceed with investigations on the Ramon Vigil grant. Negotiations are being initiated toward this end with the Atomic Energy Commission.

Adams State College agrees to submit a detailed program of excavation to the National Park Service, and further agrees to carry work to completion and publish scientific reports thereon. Student labor will be furnished for concurrent stabilization of portions of ruins desired for interpretive purposes by the National Park Service. We believe that an equitable division of specimens can readily be worked out as Adams State College wishes to retain only a representative synoptic series.

With full agreement of all concerned, permits for a general research project were obtained from the Department of the Interior, the Department of Agriculture, and the Atomic Energy Commission.

A rather lengthy chronological résumé of the archeological work follows. This is to show how the plan was followed, where and when the organization and supervision broke down, and to point out the safeguards that might have been taken by the National Park Service to ensure that the applicant institution would fulfill the requirements of the permit. An unfortunate series of events, culminating with the resignation of Worman from the teaching staff of Adams State College, left the National Park Service without the results originally agreed upon.

Cooperative planning for the five-year project by personnel of Adams State College and the Park Service appeared to have been well done. Programming of archeological excavations and surveys by Worman in 1948 was carefully carried out. Work was divided among 10 student participants in such a way that each undoubtedly received well-rounded experience by the end of the field season. Miss Margaret Nickelson, a graduate of Adams State College, acted as Field Assistant.

Arrangements for food and lodging were made by Mr. and Mrs. Worman. Camp equipment, including tents for kitchen, dining hall, laboratory and dormitories, was arranged in the public campground at Bandelier. Mrs. Worman took care of the difficult task of keeping the crew well fed and happy.

The records which were to be kept included the following:

1. Maps and room sketches.
2. Photographs and a photographic record book.
3. Day book.
4. Accession books for all artifacts as found.
5. A diary.
6. Field notes on 5 x 8 cards.

According to the 1948 interim report submitted to the National Park Service in March 1949, all of these records were kept. This was further verified by correspondence with Mrs. Barton Wright (Margaret Nickelson). The records presented to the National Park Service after the project was closed in 1950 included only items 3, 4, and 6. The map of the site may still be in existence, but James McEntyre, who prepared it, did not answer correspondence regarding it. The photographic record book has not been found. This is unfortunate because some 67 photographs, although only $2\frac{1}{4}$ x $3\frac{1}{4}$ inches in size, were extremely clear but without data. The day book was partially kept for 1948 and 1949, but no entries were made for 1950. The diary has never been found. The field notes on 5 x 8 cards are intact for the three years, the last was made on August 8, 1950. Three accession books were used from June 23, 1948 to August 8, 1950 with a total of 6,350 accessions. No method of field catalog numbering was used. If field accession numbers had been placed on bags and on artifacts, the processing and cataloging of the artifact material would have been greatly simplified.

According to the various records kept by the staff of the 1948 Field Session, the session was held from June 21 to August 26. The day book records began on June 23, 1948 when the ruin was surveyed in 9-foot squares. Each square was then to be divided into nine 3-foot square blocks lettered from A through I when work began in any block. The vertical method of continuing the excavations in depth was also in 3-foot sections lettered A, A₂ and A₃, or B, B₂ and B₃, etc., so that according to the system adopted excavations could go to 9 feet or deeper if necessary. The blocks were to be worked in 6-inch levels.

On June 24 trenching was started in the plaza area. No mention is made in the day book entries of a map or ground plan having been completed for Rainbow House, but undoubtedly one was. In the interim report for 1948, under Acknowledgments, Worman gave credit to McEntyre for a fine job of mapping and survey. However, no ground plan has come to light in the notes or other records.

According to the 1948 day book a total of 22 days or parts of days were spent in actual excavation at Rainbow House making test trenches and excavating four rooms. The entries are not complete, and the final notation was for August 11. During the 1948 session, survey work was done on the Ramon Vigil Grant (designated by the letters RV), and archeological excavations were carried out at RV 128. According to the day book entries for Rainbow House on July 29 and 31, 1948, "The floor of one of the plaza rooms was cleaned out The girls found another plaza room and took the trench down to floor level."*

In 1949 five additional rooms were excavated, making a total of nine rooms uncovered in the pueblo. Excavation work in two rooms in the plaza unit was completed. Some work was done in LA 207 (RV 128), a ruin with both Laboratory of Anthropology and Ramon Vigil numbers. Three trenches were dug in RV 45 located near the National Park Service checking station. Surface survey work continued with a total of 84 sites located and plotted on an archeological base map during the two summers.

* No records exist to show that these plaza rooms were completely excavated in 1948. Sherd cards for plaza Rooms 1 and 2 are dated June 27 to July 9, 1949.

Interim reports were prepared for 1948 and 1949 to cover the report requirements as originally planned. Although these were general in makeup, many details would not otherwise be known and they proved very helpful in preparing this report.

During the 1950 field season conducted by Adams State College nine additional pueblo rooms were excavated, making a total of 18 rooms uncovered in the three-year period. No plaza rooms were excavated. A number of additional test trenches were dug.

Final excavation work at Rainbow House, from September through November 1950, was made possible by funds furnished through efforts of Erik Reed and Regional Director M. R. Tillotson. Worman was hired as foreman. Local laborers were employed to excavate the remaining 28 pueblo rooms and one known kiva. Exploratory excavation was done for a second kiva which was not found. A few of the outside rooms were left unexcavated to help support and stabilize the excavated portions of the pueblo. The remaining seven rooms in the plaza unit were also excavated at this time.

After this final work the entire pueblo was stabilized to protect it as an outdoor exhibit. Only a few written records exist for the completion of the excavations; none were found for the complete stabilization of Rainbow House, which is known to have been done in the fall of 1950.

Although everyone was agreeable that the excavation work at Rainbow House should be completed and the pueblo stabilized, no one made a concerted effort to check the matter of records kept during the 1950 season or during the Park Service excavation period. Nor did anyone arrange for Worman to prepare the interim report for the 1950 Adams State College field season.

In 1954 Reed approached Turney concerning preparation of the Rainbow House report. Turney picked up the excavated material then stored in Worman's house in Tesuque, New Mexico, and hauled it to Globe. Some of the bone material was then removed from sherd bags and given to Hargrave, who separated the mammal and bird bones and identified the bird bones then available.

When the author began the sherd study, deficiencies were soon encountered. Sherds had been originally bagged with locations noted either by block system or by room or kiva designations. Bags marked with block numbers proved of little value because locations of trenches from which they came are not known. Also, the number of sherds from the various trench levels were very few and often the tests were incomplete. Some unnumbered, unmarked, and undated sherd bags were encountered. Because of these deficiencies, stratigraphic sequences could not be completed.

By 1962 the possibility of checking architectural features of Rainbow House had been lost, either through erosion or stabilization. Only some of the wall abutments could still be determined with some certainty. The following report has been produced from all available data.

FEATURES OF CONSTRUCTION

Plan of the Pueblo

The builders of Rainbow House appear to have had a construction plan. They probably conceived a quadrangle in which the kiva was the central feature. The location they chose would have allowed them to build such a pueblo. The ground plan (fig. 3) shows an irregular arrangement of rooms no different than the plans of contemporary communities at the late pueblo at Pecos (Kidder 1958: Fig. 21), the Jemez pueblo of Unshagi (Reiter 1938: Fig. 4), or the Galisteo Basin pueblos (Nelson 1914: Plans I-VII).

The addition of the plaza rooms, although somewhat at an angle to the plan of the pueblo, still would not have been out of line. Such irregularities appear in the non-alinement of rooms in contemporary pueblos. Undoubtedly, had occupation continued, the plaza unit would have been connected to the pueblo proper.

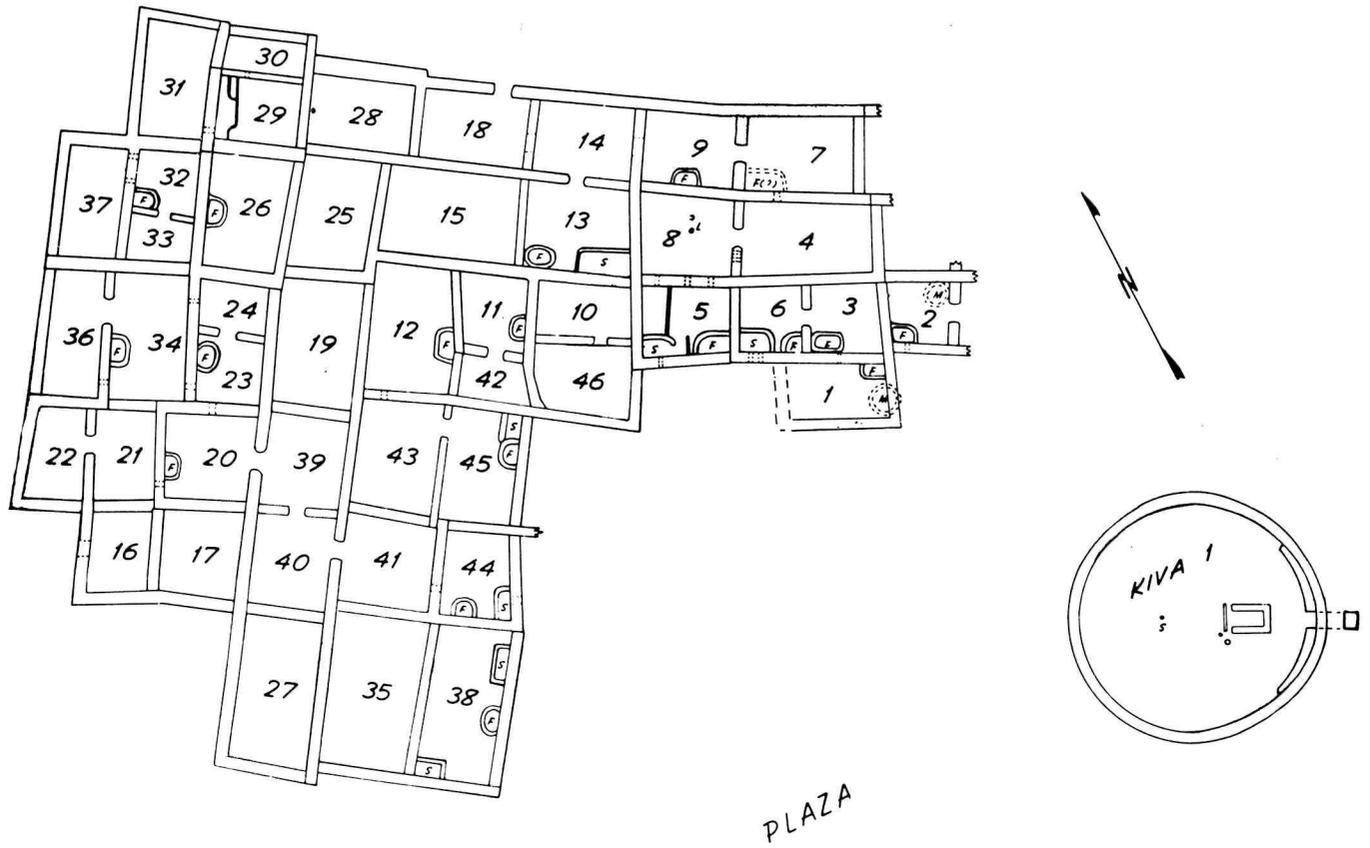
Subfloor tests in six rooms (fig. 5), in Kiva 1, and in a stratigraphic trench in the plaza area reveal that soft earth containing evidence of previous occupation was encountered as much as 5 feet below ground surface.

Room Construction

In general masonry at Rainbow House was above average (plate IIa). Building material commonly used was local tuff, a compressed volcanic ash which was plentiful and easily worked. It was selected for size and roughly shaped into long rectangular blocks, some of which often looked like rough adobes. Because of varying lengths of the blocks, joints were usually well positioned. This probably was accidental, but it did make for better wall construction. As in any community, some of the masonry was well laid, with walls plumb and straight, while other masonry shows poor choice of stones, irregular construction, and walls out of plumb and curved (plate IIb). Walls averaged 8 to 10 inches in thickness.

Chinking stones of varying sizes and shapes were pushed into the wet plaster between building blocks. These strengthened the joints and helped keep the mortar in place. Apparently the mortar was smoothed as walls were built. The smoothed surface may have served as the final plastered wall. Each excavated room usually had plaster in good condition up to about 2 to 3 feet from the floor. Undoubtedly this amount of wall had been protected after abandonment, by fallen roof and wall material, so that it had not deteriorated. Notes were not explicit as to whether there had been any replastering or redecorating of the walls. Samples of red plaster were found in Rooms 4 and 7. In one of the 1948 photographs of Room 2, one coat of plaster appears to be peeling from the wall with another showing beneath. Six layers were found in Room 7, the greatest number in the pueblo.

A study of wall abutments which could still be determined (fig. 3) was made in 1962. Results indicate that the northwest corner of the pueblo may be the oldest section. Rooms appear to have been added toward the east and south in rows and groups. A variety of building additions might be worked out by observing the numerous abutments.



- LEGEND**
-  MORTAR PIT
 -  FIRE PIT
 -  STORAGE BIN
 -  SIPAPU
 -  LOOM HOLES
 -  VENTILATOR HOLES

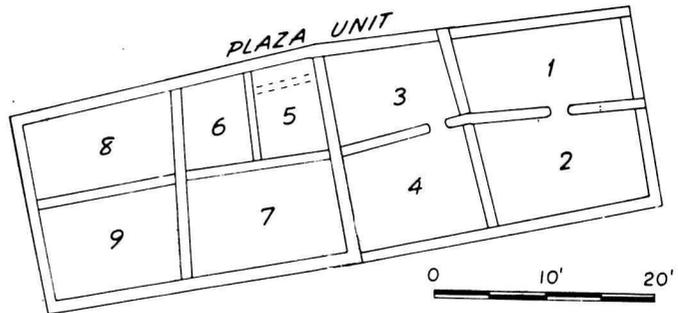


FIGURE 3. PLAN OF RAINBOW HOUSE



a. Typical coursed tuff masonry.



b. Walls of Room 4 illustrating inferior masonry.



c. Doorway in Room 3 on right with lintel sill in place. Typical fireplace with firedogs along south wall.



d. West wall of Room 5 with storage bin and bench on left. Fireplace and deflector in foreground.

Heights of excavated walls varied from 1 foot, on outside rooms, to no more than 5 feet in central portions of the pueblo. Thus, none of the walls were high enough to have impressions of viga holes. Height of walls when excavated was not sufficient evidence on which to state that there were any second-story rooms. Notes were not explicit about remains of more than one ceiling in any of the rooms. However, it is very probable that the inside tiers of rooms were two-story. Figure 4 shows an artist's conception of the pueblo as it may have appeared.

Size of Rooms

All details of room measurements can be ascertained by referring to figure 5, Tabulation of Room Features and Measurements. Rooms of the pueblo proper varied in size, but averaged about 7 x 10 feet. In each of six instances an intermediate wall had been added across the short axis to form two smaller rooms.

Rooms in the plaza unit were larger, averaging about 9 x 14 feet. Only one room showed the possible addition of an intermediate wall.

Doorways and Hatches

As indicated in figure 3, there were at least 18 doorways in the lower walls of the pueblo and 2 in the plaza unit, as checked from notes, wall drawings, photographs, and by Archeologist Maxon in 1962. Some original doorways may have disappeared as a result of erosion and ruins stabilization, although photographs were carefully studied for both open and blocked doorways. All, except those in the north wall of Room 18 and in the west wall of Room 16, were located in interior walls.

In the plaza unit evidence of only two doorways was found and only one intermediate wall. Although no doorway appears in it, there is the possibility that there was one, but higher than the remaining excavated wall.

A total of six doorways was found in intermediate or partition walls constructed across short axes of rooms. These walls, added later, would have needed access openings because hatches in the full-sized rooms would have allowed entrance to only one portion of a room after the partition had been added. A good example of a doorway in a partition wall was the one found between Rooms 3 and 6 (plate IIc).

Doorways ranged in width from 12 to 28 inches, averaging around 16 inches. They varied in distance from corners of the rooms, but in the main were near wall centers. Heights of doors from sill to lintel are not known except those between Rooms 3 and 6, which measured 22 inches. There were no solid stone sills, each was plastered. The only lintel in place was that of poles between Rooms 3 and 6.

No evidence of hatches was recorded in any of the excavation notes, nor was there any evidence of ladders. The number of rooms without connecting doorways would indicate there were a considerable number of hatches in the pueblo.

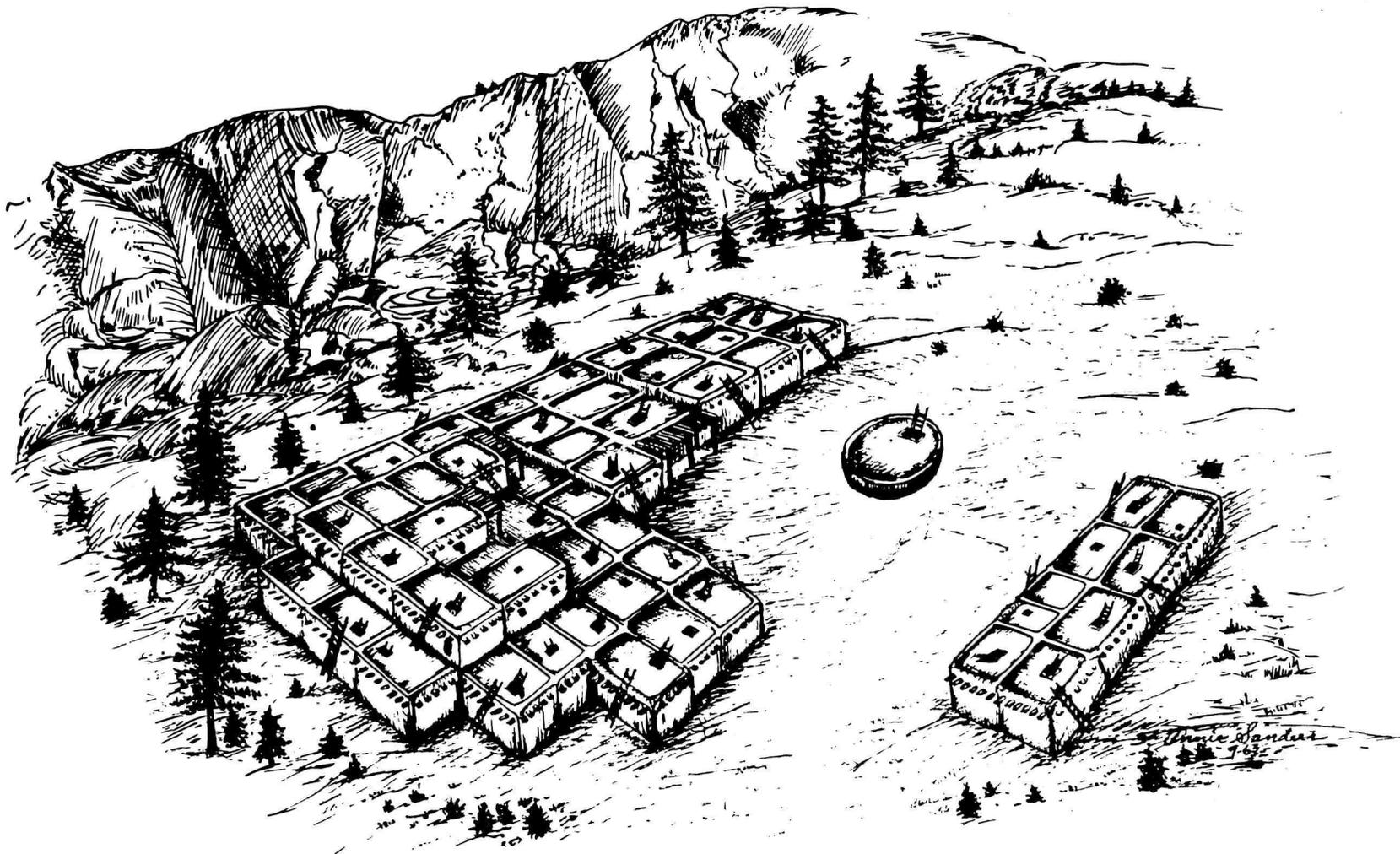


FIGURE 4. RECONSTRUCTION OF RAINBOW HOUSE.

Fig. 5. TABULATION OF ROOM FEATURES AND MEASUREMENTS

Room No.	MEASUREMENTS					ROOM FEATURES					Subfloor Tests	Other	Drawings & Plans	Photographs
	S. Wall	E. Wall	N. Wall	W. Wall	Total Depth	Door-ways	Fire-pits	Bins	Walls					
1	10'0"		10'0"		3'3"		NE				To 3'4". Mortar pit 2'0" below floor.	Room burned. West wall missing.	South, east, and north walls.	No. 61*
2	5'6"	6'0"	6'0"	6'0"	4'2"	E	SE	RV-S			To 5'1". Mortar pit 1'6" below floor.		Four walls and floor plan.	Nos. 39,40,47 and 48 of sub-floor test. No. 43 of N wall.* Four walls.**
3	5'5"	6'6"	4'6"	6'6"	3'0"	W	SW	RV-S			To 5'0".	Room burned. Shelf along SW part of wall, 3'2". Blood floor.	Four walls	Nos. 18,19,21, 22 and 23.* Four walls.**
4	11'6"	5'8"	10'9"	6'10"	3'8"	W		SV-N 2RV-W				Red plaster found in room fill.	Four walls	Nos. 49,59,65, 66 and 67.* Four walls.**
5			8'9"				SE	SW	SV-N 2RV-N RV-S		To 1'7". Ash pit 6" below floor.	Deflector rock. Bench along W wall.	North wall, east wall, and west wall. Sub-floor profile and plan.	Three - north, south, and east walls.**
6	6'8"	6'6"	7'0"	6'0"	2'6"	E	SE	SW	2RV-S			Blood floor.		Three - north, east and west walls.**
7		No data			4'4"	W		SW	SV-S				South and west walls.	Three - north, south and east walls.**
8	8'4"	7'2"	8'8"	8'0"	3'11"	E		2RV-E SV-S 2RV-S				Four loom holes, north-south, in center of room.	Four walls	Four walls.**
9	8'4"	7'0"	8'2"	6'8"	4'1"	E	S						Four walls	Four walls.**
10		No data			3'0"	N	S	2RV-N			To 18" in NE corner.	Room burned.		Four walls.**
11		No data			4'6"	S	E					Vent hole plug found at 40".		Four walls.**
12		No data			4'8"	E		RV-S RV-E			To 36" east half of room.			Four walls.**
13					4'0"	N	SW	SE	2RV-S				Four walls and features.	Four walls.**
14					5'0"	S								Four walls.**
15					5'0"	W(S)						Vent plug found in room.		Four walls.**
16					1'6"	W						"Hewett's heel hole."		Four walls.**
17					4'6"									Four walls.**
18					4'4"	N								North and east walls.**
19-37						E(S)								Four walls.**
38													Floor plan (Fig. 8,c)	North, south and east walls.**
39-43														Wall photos.**
44		No data					S	SE	2RV-E				Floor plan (Fig. 8,c)	North, east and west walls.**
45-46		No data												Wall photos.**

RV - Round ventilator hole
 SV - Square ventilator hole
 * - Photographs taken in 1948
 ** - Photographs taken in 1950

Roofs and Ceilings

Very little is known about the manner of roof and ceiling construction at Rainbow House. A few fragments of roof clay showed impressions of what appear to be smoothed branches, possibly willow, and shakes; charred fragments of vigas and shakes were found in rooms destroyed by fire. However, this was not sufficient evidence to form a basis for any conclusions.

During stabilization of some Group M rooms in 1943, Hendron found "yellow pine splittings probably used for small poles over the main vigas" (1943: 5). From his findings, cattail stems, grass, and pine needles were used over the shakes. Over these were placed thick coats of mud mortar and chunks of volcanic tuff. Corn shucks and stalks were used in the roof mud as a binder. This is the only good description of talus house roof construction in Cañon de los Frijoles.

Floors

Floors had been carefully plastered with mud. According to Worman's studies, Rooms 3, 5, 6, and 8 had excellent blood-plaster mix floors, blood being an especially good coagulating agent for clay. His tests revealed that the blood cells were those of animals.

No mention is made in the notes of any secondary floors, nor were there any stone-paved floors as noted at Tyuonyi (Onstott 1948: 3).

The rooms of the pueblo and plaza section were sufficiently small that central posts were not needed for ceiling supports. At least no post holes were reported as having been found.

Floor elevations were not recorded. From a cursory examination there is some difference in their elevations from one section of the pueblo to the other.

Floor and Wall Features

Floor and wall features recorded (fig. 3) show a diversity of arrangements. Undoubtedly, had complete notes been kept, much additional data would be available. Features will be taken up under the headings of bins, firepits, ventilator holes, and miscellaneous.

Bins: From excavation notes, drawings, and photographs (figs. 3 and 6), bins were located in the corners of Rooms 5, 6, 13, 19, 29, 44, and 45. On a sherd bag a bin had been recorded for Room 7. Although no other record was found, it is shown on figure 3 as a possible bin.

All bins appear to have been of masonry construction and walls averaged 2 feet in height above the floor level. Outside dimensions of four of the bins are as follows:

Room 5	-	25" x 25"
Room 6	-	22" x 45"
Room 13	-	25" x 54"
Room 44	-	19" x 43"

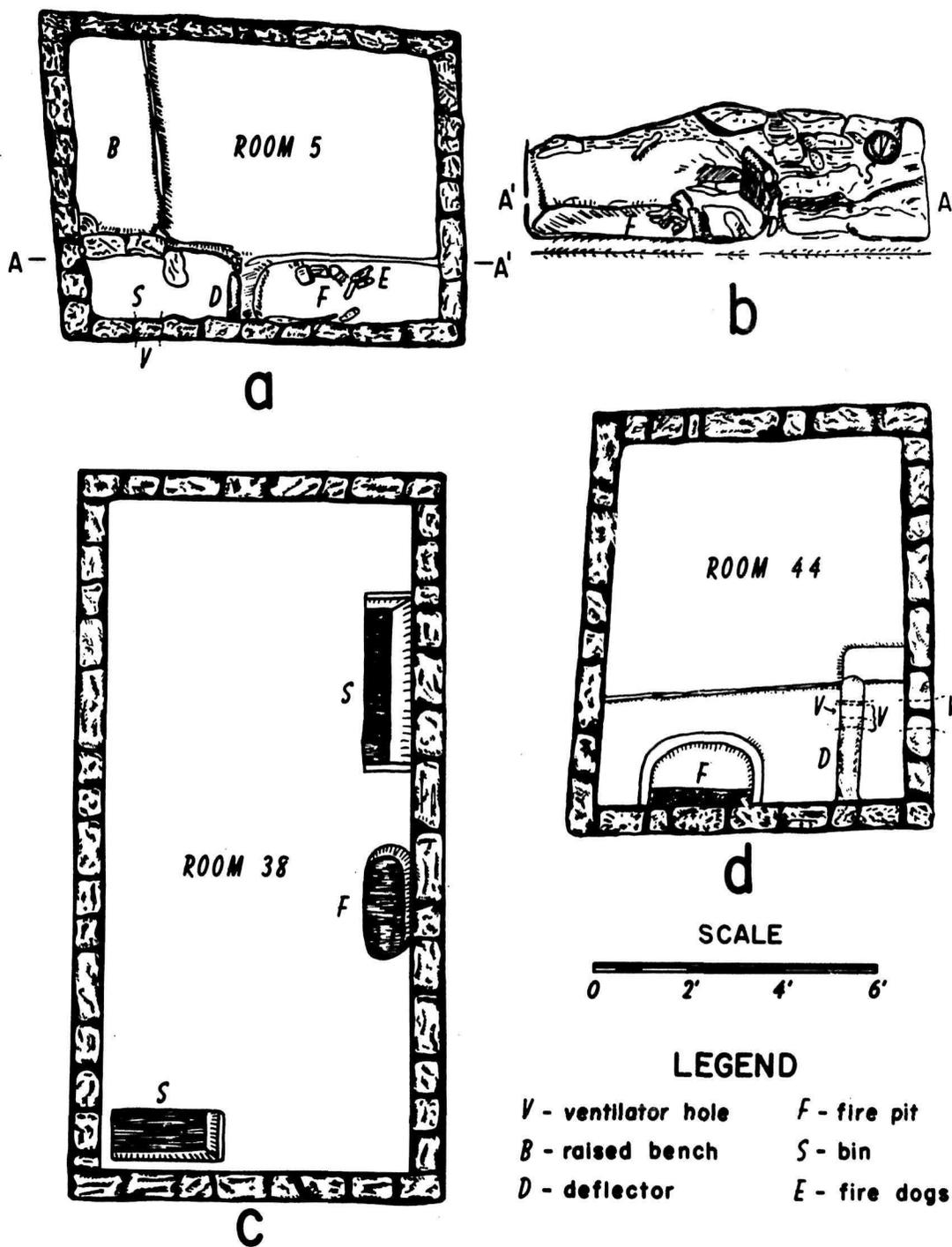


FIGURE 6. Architectural details of Rooms 5, 38 and 44.

Except for the one in Room 5, which opened on the east, the Rainbow House bins do not have the same arrangement as those found at the Unshagi and Gallina sites. Deflectors were parallel to walls and in front of ventilator holes in those ruins, while Room 5 of Rainbow House had the deflector at a right angle to the wall between the bin and firepit (plate IIId, fig. 6, a and b). Some bins may have been covered with stone slabs or with poles and mud, but such evidence is lacking.

Two below-floor bins were recorded for Room 38 (fig. 6c). What these were used for is not known. They measured 41 inches long by 13 inches wide by 7 inches deep and 27 inches long by 13 inches wide by 4 inches deep.

Rooms 19 through 46, except Room 44, have no records of bins, nor could remains of such features be determined from photographs or from an examination of the rooms in 1962. Ventilator holes, usually found in connection with the bins, apparently had been obliterated through stabilization of the walls in 1950.

Bins appear to have been in common use in some other Pueblo IV villages. At the Jemez pueblo of Unshagi (Reiter 1938: 67-70; Figs. 4-6; Plates VI-VIII) a number of bins were found which may possibly have been used to store corn.

Kidder (1958: 139-141) studied the storage bins in Pueblo IV ruins of New Mexico and found them not only in the Jemez pueblo of Unshagi but at the Gallina sites in the Chama drainage (Hibben 1938: 136, Pl. 8, Fig. 1).

A feature not appearing at Rainbow House is the metate bin. Such bins were not found at Tyuonyi, Puyé, nor at other excavated ruins on the Pajarito Plateau.

Firepits: From a thorough study of notes, room drawings, photographs, and one reference in the accession book, a total of 19 possible firepits are accounted for. Worman, in the 1949 interim report, stated that excellent firepits and built-up fireplaces were found in Rooms 1, 2, 3, 5, and 6. An example of a firepit with firedogs in situ and ventilator hole behind was found in Room 3 (plate IIc) and another in Room 5 (plate IIId). In addition, six firepits were noted on the original field drawings of Rooms 12, 13, 38, and 44 (fig. 6c,d). The remaining number were noted in the 1950 photographs, except for Room 26, evidence for which was smoke-blackened plaster on the west wall. A raised fireplace may have been on the platform in Room 29.

As far as could be ascertained, the firepits were constructed with adobe lips, bottoms, and sides. Thin stones were usually placed on edge on the inside as a lining. In Rooms 3, 5 (fig. 6a,b), and 32 long, upright, ovate stones with the ends buried in the firepit plaster, three in number in each case, may have served as "firedogs" (Reiter 1938: 49, Plate IVa). Unfortunately, in the 1950 room photographs made for stabilization records, floor features are not usually shown, only the walls. Since there were no notes for many of the rooms, floor features usually are unknown. If floors had been photographed, more features undoubtedly

could be reported. Except for one or more possible examples of fireplaces on platforms, all of the firepits were slightly below floor level. Three for which there are measurements are 3 inches, 4 inches, and 5 inches below floor level. No mention is made in any notes of firepits having been rebuilt.

Of the 19 possible firepits (and fireplaces), 10 were built along the central portion of a wall and 8 were built in corners. No evidence was noted of firepits in the centers of any rooms.

In checking on excavations made by Onstott in portions of Tyuonyi in 1947 and 1948 (Onstott 1948), 43 firepits were found in 87 rooms. Except for four central firepits in rooms at Tyuonyi, the remaining 39 appear similar in construction and location to those found at Rainbow House. If the same ratio of one firepit to two rooms would hold at Rainbow House, there should have been about 23 firepits. Onstott stated the firepits followed rather definite lines of form in Tyuonyi. They were usually roughly rectangular, about 2 feet long, 1 foot wide, and 6 inches deep, built of adobe, with thin stones set inside. Firepits at Tyuonyi were frequently against and parallel to one of the walls of the room.

Ventilator holes and plugs: A total of 30 possible ventilator holes were found and recorded in notes, drawings, and photographs (fig. 3, plate IIIa, b). From the photographs some of these still appear to be plugged. One, between Rooms 23 and 24, did not go all the way through the wall. All of the holes were round except three, one each in Rooms 4, 5, and 7, which were square or rectangular. They varied in size from about 5 to 9 inches across, average about 7 inches.

A number of vent plugs were found on the floors. One found in Room 2 fitted the hole. A photograph of the west wall of Room 24 shows what appears to be a ventilator hole with the plug in place.

There was no uniformity in placement of these vent holes, and some of their uses are problematical. There may have been more of them in higher sections of the walls. Those behind bins were undoubtedly used for ventilation. Others may have been used for communication between rooms or for hand holes through which to pass objects from one room to another.

Photographs of the south wall of Room 24 and the east wall of Room 44 show what appear to have been perfectly plastered holes which do not go entirely through the walls. These were not noted in any data on the ruin. Similar holes were found at Unshagi, Giusewa and "Amoxiumqua" by Reiter (1938: 49, Plates IVa, and VIa), who called them hand-crypts. No use was assigned for these holes, but 15 were found at Unshagi. No similar holes have been reported from any other excavations on the Pajarit Plateau.

Miscellaneous: In addition to above-floor and wall features there were other structural details not falling under the appropriate headings.

Benches - Solid benches or platforms were built along the west ends of Rooms 5 and 29. The bench in Room 5 (fig. 6a) extended from the bin to the north wall. A very careful detailed drawing was made of Room 5 (fig. 6a)

PLATE III



a. South wall of Room 6 showing vent holes and storage bin (1950).



b. Ventilator hole and bench along west wall of Room 29. Plaster still in place on walls (1950).

and a good photograph (pl. IIId), but no dimensions were given of the bench. However, by reference to the photograph of the west wall and to the floor plan, we know the bench measured approximately 4 feet long by 1 foot 8 inches wide by about 10 inches high. The bench in Room 29 was built in three sections of varying heights. There was no detailed drawing made of this, but the photograph (pl. IIIb) shows the three sections very clearly. On the left is the lowest portion, possibly 6 inches high, behind which is a ventilator hole. The middle section looks as though it varied from 8 inches on the left to 10 inches on the right. The right section is partly wall behind which is an open bin. Onstott (1948: 72) notes a platform 3 inches in height across the south end of Room E, Tier 14 at Tyuonyi.

Other Openings - In two rooms, 14 and 25, there had been small openings, too small for doorways, but much too large for ventilator holes. The opening in Room 25 had been sealed. Use of these openings was not ascertained.

Loom Holes: Worman (1950: 3) states, "Room 8 produced an unusual feature in the presence of four loom holes, in alignment, in the floor in the center of the room. Such loom holes are usually confined to kivas." No record of them appears in any of the notes, photographs, or wall drawings from Room 8. No floor plan was made for this room. Someone at a later time added two holes to the 1959 ground plan, and these are shown in figure 3.

Subfloor Features: Subfloor tests were recorded for Rooms 1, 2, 3, 5, 10, and 12. In Room 1 the test was taken down to 40 inches, and a mortar pit was found at a depth of 24 inches below floor level. In Room 2 a 35 x 43-inch subfloor test was made, and at a depth of 18 inches the top of a well-made mortar pit was encountered, measuring about 30 inches across. This test was extended to 60 inches below the floor but no other features were noted. The test below the floor of Room 3 was taken down 60 inches also, with no features or artifacts found. Sterile washed sand and sandstone were recorded as found at the bottom, 60 inches below the floor. A subfloor test pit measuring 35 inches wide by 52 inches long was made. Other than an ashpit, recorded at a depth of 19 inches, no other details were given for this test. In Room 10 a subfloor pit was encountered at a depth of 18 inches, but no details are given as to what kind of a pit it was nor what was found in it.

Onstott, during the 1947-48 excavations and stabilization work at Tyuonyi, found nine mortar pits similar in size and location to those found at Rainbow House (Onstott 1948: 3, Plate I,a,b, Plate IIa).

No other testing below room floors in the pueblo or plaza unit were recorded. According to artifact bags a test was made below the floor of Kiva 1. The test is marked "top layer." No bottom layer was found nor was any depth given for the test.

Kiva 1

During archeological explorations in the Cañon de los Frijoles by the School of American Archaeology in 1908 and 1909, a number of kivas were excavated. Kivas occur in the canyon in several situations: (1) in the

talus in front of the cavate dwellings, (2) excavated in tuff walls of the cliff, (3) in connection with pueblos in the valley, and (4) one was built in the Ceremonial Cave. These kivas were all roughly circular in shape. At least the apparent intention of the builders was that they would be as circular as circumstances permitted. Obstructions and locations led to some of them being oval rather than circular.

The kiva at Rainbow House (fig. 7), circular in outline and subterranean, was similar to others found in the valley. It was built of shaped tuff building blocks similar to those used in the construction of Rainbow House pueblo. The kiva was excavated in the fall of 1950 after that year's field session. Architectural details and measurements were recorded on a ground plan, but unfortunately, no notes of any kind were found to help explain the plan. Subfloor excavation was made but no plan or notes are extant as to details.

The maximum depth of Kiva 1 was 7 feet 9 inches on the north side, only 5 feet 6 inches on the south. The kiva was not exactly circular, but averaged 20 feet in diameter. These dimensions compare closely with some of the kivas excavated at Pecos. Of the 22 round, subterranean kivas at Pecos, 9 were excavated. Seven have measurements ranging from 19 feet to 21 feet in diameter (Kidder 1958: 143-219, Fig. 21).

Kiva 1 had a number of interesting floor features including a two-course-high veneer bench of stone set in adobe on either side of the ventilator orifice. This veneer was not bonded to the kiva wall and was reduced to one course in front of the ventilator. The rectangular fire-pit measured 3 feet 2 inches along the side and 2 feet 10 inches across the back. It opened to the west. Part of the north side is now missing. A solid stone deflector, according to a working drawing, was found to the front or west of the firepit opening.

Aside from the two-course-high veneer along the east floor of the kiva and firepit, there are no other features mentioned or now visible in the open kiva. It had a sipapu similar in location to those found during excavations of other valley floor kivas. Post molds of two upright posts appear to have been found southeast of the firepit. No mention is made of these in notes, but they do appear on the working drawing of the kiva floor plan. In other kivas in the valley, either post molds or flat stones have been found where uprights had been. In the case of one kiva in Tyuonyi the large charred end of one upright support post was found which gave a tree-ring date of A.D. 1513 (Hendron 1946: 53).

More artifacts came from Kiva 1 excavations than from any room. These included: 7 axes, 5 anvils, 24 manos, 6 floor polishers, 4 rubbing stones, 1 hammerstone, 2 griddle fragments, and 10 worked sherds.

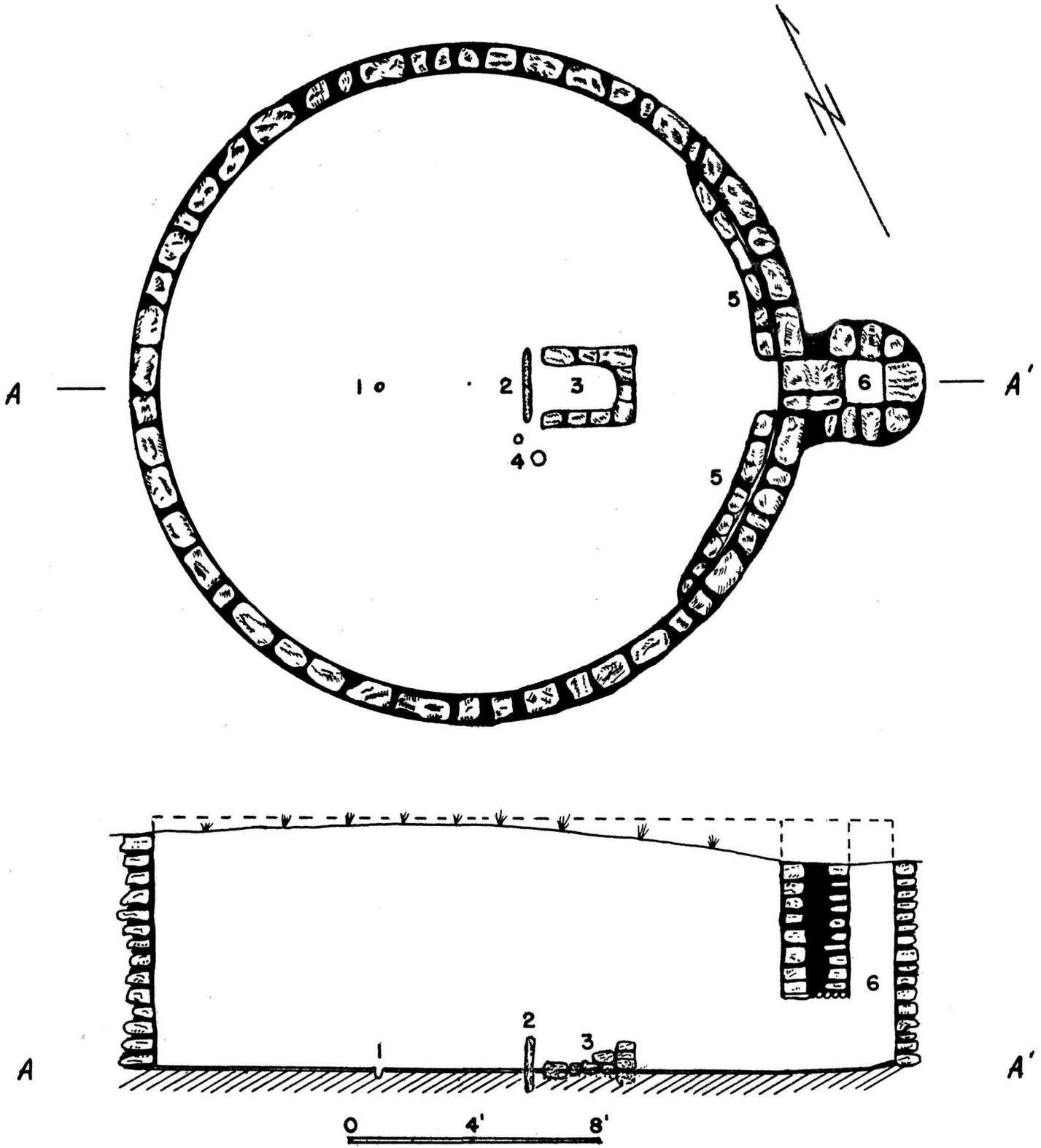


Fig. 7. Kiva 1: 1. Sipapu, 2. Deflector, 3. Firepit, 4. Postholes, purpose unknown, 5. Veneer bench, two courses in height, 6. Ventilator shaft.

CHRONOLOGIC EVIDENCE

Tree-Ring Dates

During the past 60 years there have been many excavations in the northern Rio Grande area. Much of the work has remained unreported, or only partially reported. Collections, notes, and manuscripts have sometimes been misplaced, lost, or, if available, the provenience of some of the material is unknown.

By 1930 A. E. Douglass recognized that tree-ring specimens from the Rio Grande area differed from those obtained from the Western Pueblo region. Through Douglass' efforts the Rio Grande area was made the object of special studies by W. D. Stallings from 1931 through 1940 at the Laboratory of Anthropology (Stallings 1937). Beginning in 1948, and still in progress, the project was reactivated by the Laboratory of Tree-Ring Research at Tucson. A restudy of all Rio Grande specimens from the Laboratory was made and additional collections from the Museum of Northern Arizona and elsewhere were studied. A beginning step out of the dilemma of the Rio Grande area and its glaze paint potteries are two publications: one by Stallings in 1937 and a second by Terah L. Smiley, Stanley A. Stubbs, and Bryant Bannister in 1953. This uniform collecting and compilation of previous studies and new specimens resulted in a much better understanding of the relationship between dates and pottery types. The following table from the latter publication (Smiley, Stubbs, and Bannister 1953: 19-21, 24, 26, 28, fig. 1) shows dates for this region.

LA:47	Puyé	(3)	1527-1562
LA:78	Frijolito	(3)	1431-1447
LA:82	Tyuonyi	(16)	1383-1466
LA:170	Tshirege	(7)	1422-1581
LA:217	Rainbow House	(20)	1421-1453
Group M,	Bandelier	(1)	1493

(NOTE: The figure in parentheses before dates represents the number of tree-ring dates obtained.)

Admittedly the number of tree-ring dates is small for some of the larger sites, but at least there are dates. Rainbow House with 20 dated pieces and Tyuonyi with 16 give a fairly well rounded picture of the chronological evidence from tree-ring dates for the Cañon de los Frijoles. Unfortunately, provenience of the charcoal specimens used from Rainbow House is unknown, as they came from unmarked bags.

Structural Sequence

As stated in a previous section, a study of wall abutments indicated that the northeast area of the pueblo probably was the oldest, and only two-story section of the pueblo. Since we have no excavation notes, structural sequence cannot be determined with any degree of accuracy.

Sequence of Pottery Types

Voll studied the sherd collections from locations which, in his judgment, should have given the best sequence of pottery types. He made up pottery worksheets for the Strat Trench in the plaza area, Kiva No. 1, and Room 19, all of which had been excavated in 1950 and presented the best possibilities for stratigraphic results. The quantity of sherd material for each of these areas was great, but very poor pottery sequences resulted.

The Strat Trench in the plaza area showed only two levels, 0-26" and 28" to an unstated depth. In this case levels were too great and results showed no definite sequence.

Kiva No. 1 worksheets show a total of 17,262 sherds of which 8,434 were culinary and 8,828 were glazed, Biscuit ware, and other types, or percentages of 48.9 and 51.1. There were five levels complete. The percentages from the various levels are shown under the section on sherd counts (fig. 8). Percentages of the Middle Yellow Glaze and the Middle Red Glaze show larger collections in the earlier or bottom levels. Early glazes are represented by small collections for the five levels, but percentages for Agua Fria Glaze-on-red, San Clemente Glaze Polychrome, and Cieneguilla Glaze-on-yellow do show increases in the two lower levels but not enough to offset the occurrence of the late glazes in those same levels. A number of rim types from the two top levels of Kiva 1 could be identified as possibly belonging to Glaze V, but the line work and glaze application would not place them in the Glaze V classification followed at Pecos. Furthermore, the pottery types which should be associated with Glaze V, Puaray Glaze Polychrome and Sankawi Black-on-cream, were not found in these upper levels. Therefore, taking everything into consideration from the rim studies, it was decided that these rims belong to late Glaze IV and have been classified accordingly.

The pottery worksheets for Room 19 show only three levels, 12"-18", 18"-30", and 30" to the floor. The incomplete levels made it impossible to use the totals and percentages.

Other studies made by the author for Rooms 10, 11, 12, 13, 14, 15, 16, 17, and 18, all Adams State College excavations for the 1950 summer field session, were either incomplete or not indicative of any pottery sequence.

Fig. 8
KIVA 1 SHERD TABULATION

TYPE	LOCATION AND DEPTH										TOTALS %			
	Level 1		Level 2		Level 3		Level 4		Floor				Subfloor	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Plain Culinary	319	38.5	2243	45.8	1883	44.6	1803	46.1	1485	46.3	66	32.5	7799	45.2
Micaceous Culinary	19	2.3	126	2.6	119	2.8	125	3.2	81	2.5	3	1.5	473	2.8
Smearred Corrugated	22	2.7	39	.8	16	.4	30	.8	38	1.2	17	8.4	162	.9
Red Sherds	110	13.3	642	13.1	618	14.5	479	12.3	413	12.9	20	9.8	2282	13.2
White or Yellow Sherds	6	.7	90	1.8	48	1.4	144	3.7	61	1.9	5	2.5	354	2.1
White and Red Sherds					13	.3	15	.4	26	.8			54	.3
Biscuit A	30	3.6	109	2.2	85	2.0	101	2.6	55	1.7	5	2.5	385	2.2
Biscuit B	71	8.6	552	11.3	319	7.6	195	5.0	180	5.6	16	7.9	1333	7.7
Wiyo Black-on-white							1	-					1	-
Potsui'i Incised			1	-	1	-			2	.1			4	-
Agua Fria Glaze-on-red	5	.6	12	.3	8	.2	65	1.7	38	1.2	7	3.4	135	.8
San Clemente Glaze Polychrome	3	.4	4	.1	8	.2	3	.1	8	.2			26	.2
Cieneguilla Glaze-on-yellow	5	.6	15	.3	11	.2	42	1.1	40	1.2	6	2.9	119	.7
Largo Glaze-on-yellow	3	.4	4	.1	13	.3	3	.1	18	.5	5	2.5	46	.3
Espinosa Glaze Polychrome	7	.9	23	.5	7	.1							37	.2
San Lazaro Glaze Polychrome	36	4.4	181	3.7	194	4.6					11	5.4	422	2.4
Middle Yellow Polychrome	30	3.6	116	2.4	126	3.0	119	3.0	95	3.0			486	2.8
Middle Red Polychrome	28	3.4	116	2.4	143	3.4	271	6.9	297	9.3	22	10.8	877	5.1
Glaze-on-red	78	9.4	476	9.7	456	10.8	341	8.7	304	9.5	18	8.9	1673	9.7
Glaze-on-yellow	42	5.1	139	2.8	146	3.4	157	4.0	35	1.1			519	3.0
Santa Fe Black-on-white	8	.8	2	.1	6	.1	13	.3	22	.7	2	1.0	53	.3
Unidentified	6	.7			4	.1	1	-	11	.3			22	.1
Total Culinary	360	43.5	2408	49.2	2018	47.8	1958	50.1	1604	50.0	86	42.4	8434	48.9
Total Decorated	468	56.5	2482	50.8	2206	52.2	1950	49.9	1605	50.0	117	57.6	8828	51.1
Total	828		4890		4224		3908		3209		203		17262	

POTTERY

Glaze Decorated Wares

Study of the glaze decorated wares found at Rainbow House was never made by any of the Adams State archeologists. They did separate and count sherds found during the first two years' surveys and excavations. Results were given in tables as summaries of pottery types for 1948 and 1949. The statement from the 1948 interim report in regard to glaze sherds was, "Potsherds recovered have been counted and identified as to type with the exception of glaze types which will require further study" (Worman 1949: 3). These summaries included all 85 sites at which surveys and excavations had been made. The total number of glaze sherds from Rainbow House for each of these years was not broken down. To this I have added, to the best of my knowledge, the glaze totals for 1950, as follows:

1948, ASC field session	2,631
1949, ASC field session	2,168
1950, ASC field session	1,496
1950, NPS excavation	<u>6,069</u>
Total glaze	12,364

From the above table, a total of 4,799 glaze sherds were recovered from the 1948 and 1949 excavations. Unfortunately, in many instances, these had been removed from the sherd bags and have never come to light for further study. These sherds came from the surface survey collection, 25 test trenches, and 11 rooms. The 1950 total of 7,565 came from five test trenches, Kiva 1, and 31 rooms.

The total sherds collected during the fall of 1950 from Rooms 19 through 45, Kiva 1, and five plaza unit rooms are not complete by levels for any of these rooms. Some of the bags carry the captions, "to 30 inches," "23 inches to floor," "37 inches to floor fill," etc. Another perplexing problem, which resulted from the National Park Service excavations in the fall of 1950, was the bags of sherds from Rooms 3, 4, 5, 6, 7, 8, 9, and 10 carrying captions such as "12 inches to floor fill," "16 inches to floor fill," and "18 inches to floor fill." These may be the sherds collected during excavation of the remaining plaza rooms, since only Rooms 1 and 2 had been excavated in 1949. However, there are 9 plaza rooms and not 10. These sherds have been included in the total sherd count for the National Park Service 1950 excavations as rooms from the plaza unit.

Sherds of early glaze paint types were listed on worksheets as Agua Fria Glaze-on-red, San Clemente Glaze Polychrome, and Cieneguilla Glaze-on-yellow. Bowl rim forms were of the direct variety with both inner and outer surfaces parallel. As far as could be determined from large sherds, bowl and olla shapes were identical to those already described for these types by earlier workers in this field. Bowls were normally decorated only on the inside, but examples were found with

decoration on the outside in the form of simple elements near the rim. These early glaze types occurred in direct association. The same association prevailed at Pottery Mound ruin located some 90 miles south of the Pajarito Plateau (Voll 1961: 49-50).

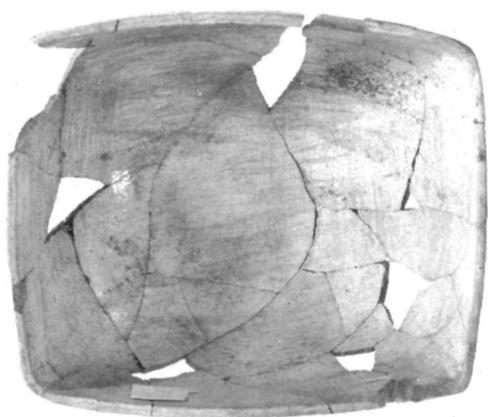
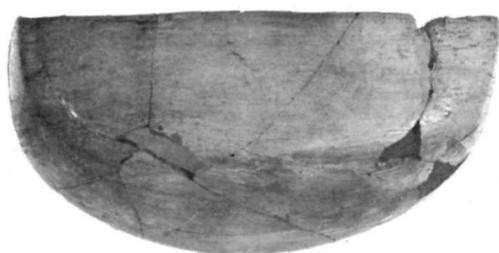
Bowl sherds of San Clemente Glaze Polychrome were common. White or tan slip usually covered only the interior of the bowls, but in some it extended to include the top of the square lips and in others over the bowl lip to the exterior. Occasionally it was difficult to make a clear-cut distinction between San Clemente Glaze Polychrome and Cieneguilla Glaze Polychrome, because the paste, with its tuff tempering, appeared to be identical, and only the solid outside slip of Cieneguilla would be the determining factor. Many of these variants shaded into one type or the other. Three variants of San Clemente have pairs of sloping-dashes decoration in glaze on their exteriors (Kidder and Shepard 1936: Fig. 58, a,b, Fig. 69a,b, Fig. 85a,b,c,d).

Agua Fria Glaze-on-red, San Clemente Glaze Polychrome, and Cieneguilla Glaze-on-yellow have almost identical paste when examined under a microscope. The Agua Fria Glaze-on-red occasionally appears to have a few grains of smooth quartz mixed with crushed cinders and tuff. San Clemente Glaze Polychrome and Cieneguilla Glaze-on-yellow have a paste made up of crushed cinders and tuff. The paste usually is an orange-brown, but varies according to firing from gray to a dull brown. All appear to have been made of local materials.

The remainder of the glaze paint types from Rainbow House all fall into those previously described (Mera 1933: 5-7; Hawley 1936: 84-86) and follow the same sequences (Largo Glaze-on-yellow to Largo Glaze Polychrome, etc.). They were identified by rim forms, paste, and color combinations. They were listed on the worksheets as Largo Glaze-on-yellow, Largo Glaze Polychrome, Espinosa Glaze Polychrome, San Lazaro Glaze Polychrome (Middle Yellow Polychrome), Glaze-on-red, and Middle Red Polychrome. A few Glaze E and F rim types were identified by Dittert. All of these later glaze types have paste similar to that described for the earlier glazes--cinder and tuff, finely crushed, and therefore are of local origin.

Except for a few samples, a study of vessel shapes and vessel decoration could not be made because of lack of restorable vessels. Only partially restored vessels were found in the sherd bags. Of these only three were glaze decorated. Parts of an extremely interesting Espinosa Glaze Polychrome bowl (Cat. No. B1302) were encountered in Rooms 10, 11, 12, and 41 (plate IVb). Almost half of another small Espinosa Glaze Polychrome bowl (Cat. No. B1319) came from Room 15 (plate IVc). The bowl had at least one and possibly two large beaked bird figures on the outside. The one complete figure was perched on a square of red decoration outlined in glaze. Its triangular body, single leg, and curved head were also red outlined in glaze (fig. 9). A third glaze bowl (Cat. No. B1313) of Middle Red Polychrome had previously been partly restored but was not complete. The designs consisted of two simple flying birds opposite each other on the interior; a series of X's appear on the exterior (fig. 10 and cover).

PLATE IV



b

a



c

d

Rainbow House pottery. a. Rectangular plain white bowl. b. Espinosa glaze polychrome bowl with X design. c. Small Espinosa glaze polychrome bowl. d. Portion of Biscuit ware B bowl.

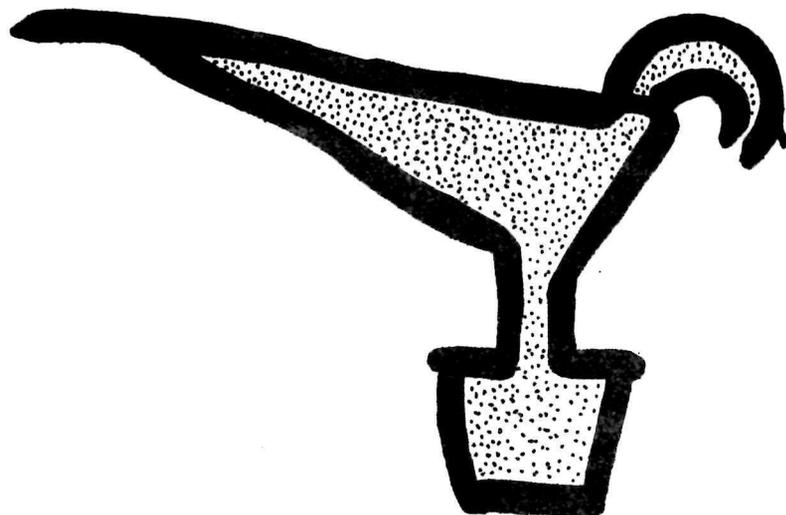
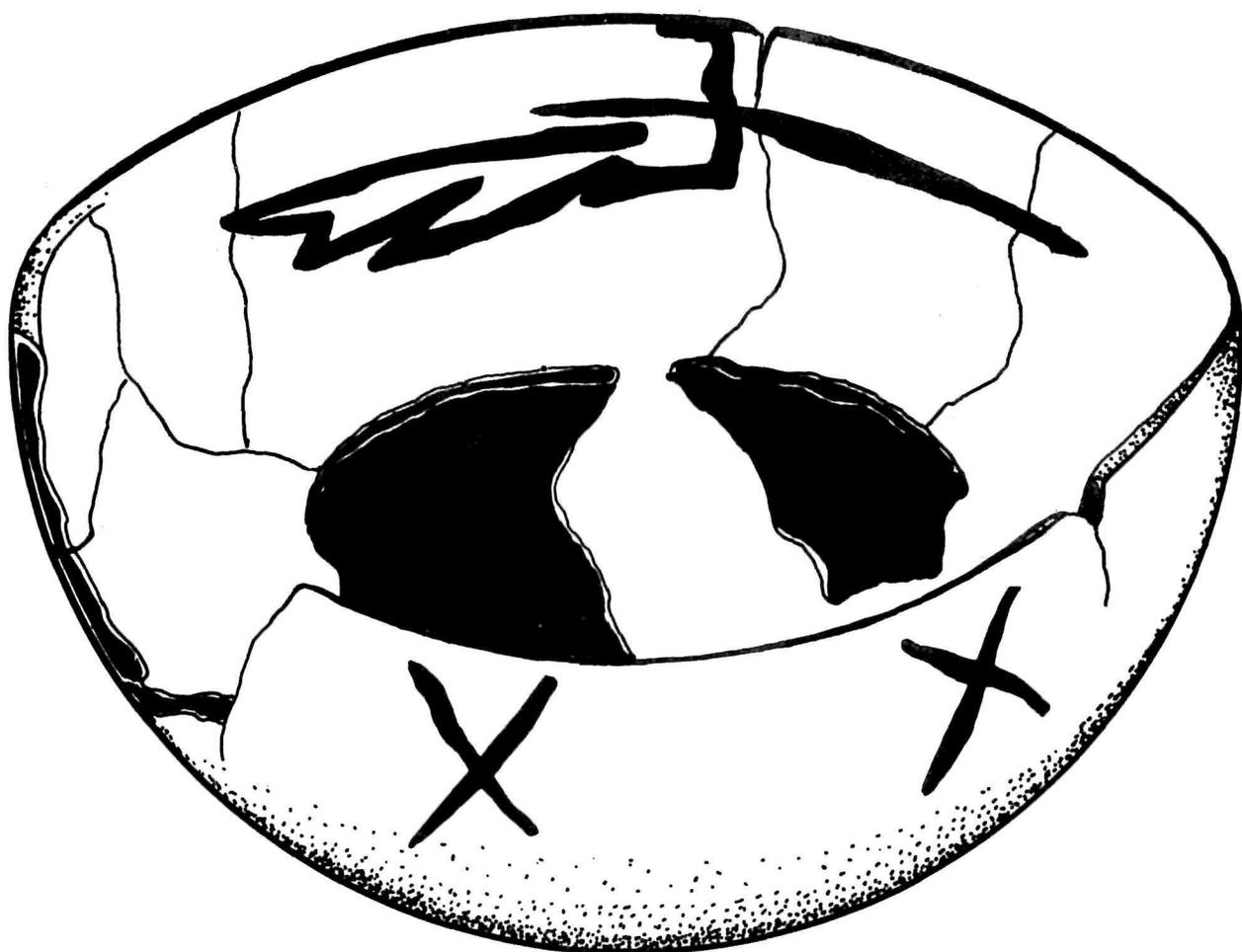
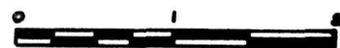


FIGURE 9. BIRD DESIGN FROM EXTERIOR OF SMALL
GLAZE BOWL. STIPPLED AREA IS RED.



B 1313



Scale in inches

FIGURE 10. RED GLAZE BOWL SHOWING FLYING BIRD
DESIGN ON INTERIOR.

Biscuit and Other Decorated Wares

Biscuit ware was found in every section of Rainbow House. As noted in the tabulation of Rainbow House sherd counts other than glaze, both Biscuit A and B were found in much greater quantities than any of the other non-glaze decorated wares. Percentagewise, about the same relationship between Biscuit A and B appears on the Ceramic Correlation Charts for Bandelier (Hendron 1940).

Although Biscuit ware has been found in olla, bowl, and jar shapes in other ruins, only bowl sherds were found at Rainbow House. Two partly restored bowls, one Biscuit B (plate IVd), the other probably Sankawi Black-on-cream (plate Va), came from the pottery collections.

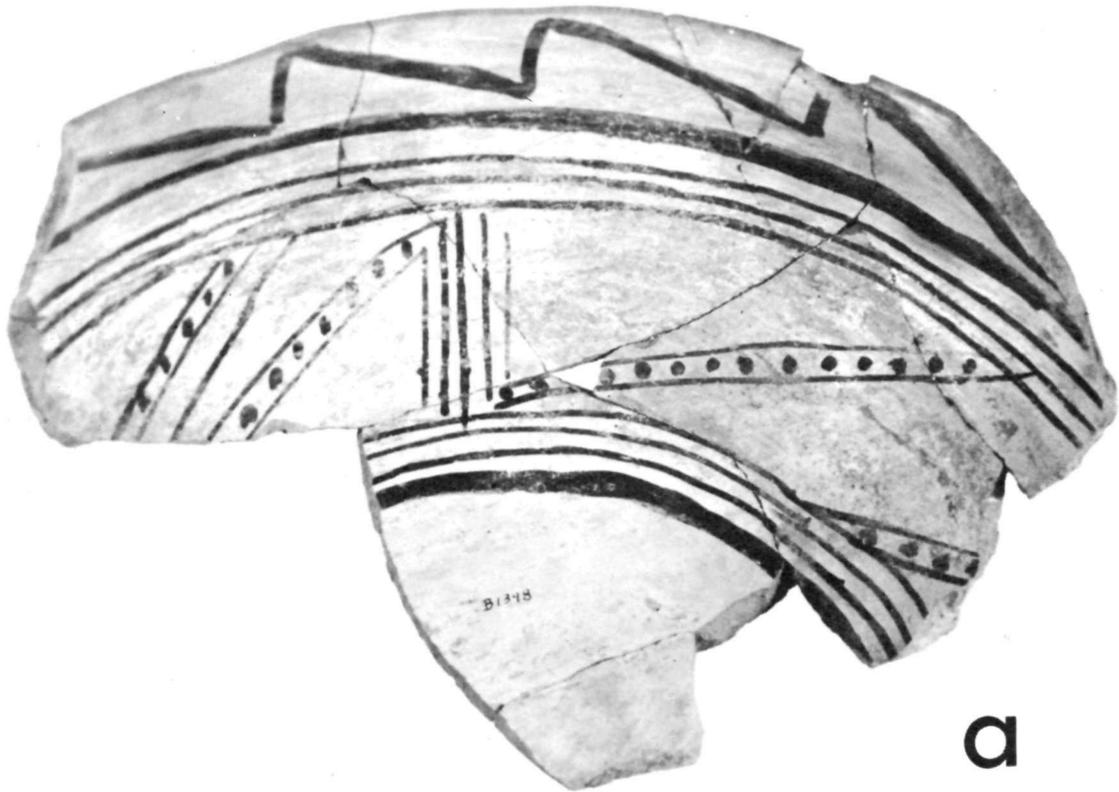
A wide range of variations of black-on-white pottery at Rainbow House has brought on the realization of the complexity of this problem in the Rio Grande area. Worman recognized the need for a further breakdown of Santa Fe Black-on-white, stating, "So-called Santa Fe variants are too widely scattered and far too numerous to be grouped with the usual Santa Fe Black-on-white as one type" (1949: 7). During the Rainbow House studies I checked some of the Ramon Vigil black-on-white and Rainbow House black-on-white sherds for type of paint, designs, paste and temper. It was difficult, even with type sherds from the study collection at the Southwest Archeological Center, to separate some of the black-on-white types. The sherds are always small and because of this it was almost impossible to determine shapes and design elements.

Potsui'i Incised was found in small amounts over the four years of excavation. Most of the examples show fine workmanship and incising is usually regularly spaced. One sherd shows punched dots along with the incising. All sherds came from small jars and almost all have thin micaceous wash on the exteriors of the vessels. This ware appears not to have been made at Rainbow House but must have been traded from villages to the east where it was plentiful (Jeancon 1923: 54-57). During excavations at Tyuonyi and the Large Kiva, 22 sherds of Potsui'i were found (Hendron 1940: Ceramic Correlation Charts I and III).

Kidder describes this incised ware and shows two examples (1915: 420, plate XVI, figs. 5 and 6) which came from Ojo Caliente and Otowi. Hewett shows one incised ware vessel (Hewett 1906: plate XIV,d) but no provenience is given in the text.

According to some who have studied the distribution and possible origin of Postui'i Incised, its appearance shortly after A.D. 1400 in the Chama Valley and Pajarito Plateau may have been the result of eastern non-Pueblo influences (Wendorf 1954: 213-214). However, others see the possibility that this micaceous incised ware found in Kansas may be the result of trade from the Taos-Picuris region or manufacture by fugitives from Taos and Picuris (Wedel 1959: 593).

PLATE V



a



b

a. Sankawi bowl. b. Pottery mould.

Fig. 11

Tabulation of the various decorated wares found at Rainbow House other than glaze.

Pottery Type	Field Seasons			NPS Exca-	TOTAL
	Adams State College 1948	College 1949	1950	vations 1950	
Santa Fe B/W	131	165	89	83	468
Galisteo B/W	8	3	1	2	14
Wiyó B/W	47	6	11	9	73
Biscuit A	230	127	93	407	857
Biscuit B	358	254	266	1,365	2,243
Sankawi B/C	49	72	21	11	153
Potsui 'i Incised	3	6	7	20	36

Culinary Pottery: No study was made of the culinary types found at Rainbow House. The combined sherd counts of plain, micaceous and smeared ran about 50 percent of the total count in the Kiva 1 sherd tabulation (fig. 8). In sherd count for some rooms the percentage would run as high as almost 70 percent. However, in most instances it was around 50 percent. Unfortunately, no vessels of this type were even partially restorable.

Worman brought up the question as to where to place 609 pieces of culinary ware with slipped interiors of white and red (1949: 7). These sherds appear to have been from vessels in which white and red slip was mixed for slipping vessels.

Pottery moulds: The subject of moulding bottoms of large pottery vessels by using baskets and portions of old bowls and jars has been discussed in the Pecos and Pajarito Plateau pottery studies (Kidder 1915: 426, pl. XIV; 1936: 383-385, fig. 302). Kidder cites S. J. Guernsey, C. E. Guthe, and E. H. Morris as having also noted this method of modeling pottery in Pueblo III (1936: 383, fn. 1, 2, 3, and 4). Kidder states that moulding was common in the large ruins of approximately Glaze IV period on the Pajarito Plateau (ibid.: 383).

Moulds with ash-like linings, to prevent the wet clay from sticking to the mould, were found in one room in Pottery Mound along with potter's tools. This instance would have been from Glaze III or earlier (personal communication, Charles B. Voll). Probably similar moulds have occurred in other Glaze III and IV ruins but have not been recognized as such.

Finding of evidence of pottery moulds at Rainbow House came in Rooms 3, 5, 7, 31, 36, 41, and Plaza Room 2. This consisted of fragments of both bottoms and tops of jars neatly severed by horizontal encircling cuts about midway of the vessel or at the shoulder break if the vessel had been constructed in that manner. The newly made edges had been smoothed. The portions of jars were all from redware vessels. The lining, some still in place and some in fragments not in moulds, appears to be

composed of a mixture of ashes and finely ground tuff. It ranged from one-fourth to five-eighths inch in thickness. One example shows that the lining had been formed over the edge of the mould. It was smoothed and usually showed evidence of having been used in moulding because of a thin slip-like deposit of clay which had adhered to it when the wet clay was pressed to form the base of a vessel. A word of warning might be injected here not to vigorously wash all sherds without first examining them for evidence of food, pigment, and ash linings.

The example shown (plate Vb) was at first thought to be parts of two moulds before being repaired because of two distinct surface colors--reddish-brown and light brown to yellow. However, after gluing together what pieces were available, it was determined there was only one mould. The line of severance had been at the shoulder break.

Surface-finish of the mould appears comparable to Middle Red or Glaze IV polychrome. However, the slip had fired to red on one side of the vessel and yellow on the other. The surface had been smoothed with a pebble polisher. A thinner slip had been applied to the interior of the neck with a similar polish, but more poorly done. The red to tan slip was usually applied to the exterior of Glaze IV jars a little more generously than to the interior neck area.

Since the repaired pottery mould was the only jar-shaped vessel of which enough pieces were found to show the shape and design, drawings have been made to give more detailed information (fig.12). A diagrammatic cross section of how the mould was used is found in Kidder and Shepard (1936: 383). The vessel as shown in the upper part of figure 12 would have been inverted. The neck would have been filled with a section of broken sherd and a lining of ash and tuff added before the mould was ready for use.

Ornamentation consisted of crude brown glaze lines forming separate neck and body bands without the red-filled designs usually found on Glaze IV jars. The field of design on the pottery mould extends from the rim of the vessel to the point of widest diameter at the shoulder break. It is composed of two encircling bands, neck and shoulder, each divided into four compartments by vertical lines. The quality of the line work could have been better. The neck band is broken. Top framing line breaks and band breaks appear to have been common on many vessels of the Rio Grande glaze area, but this particular form of band break was not observed in the available literature.

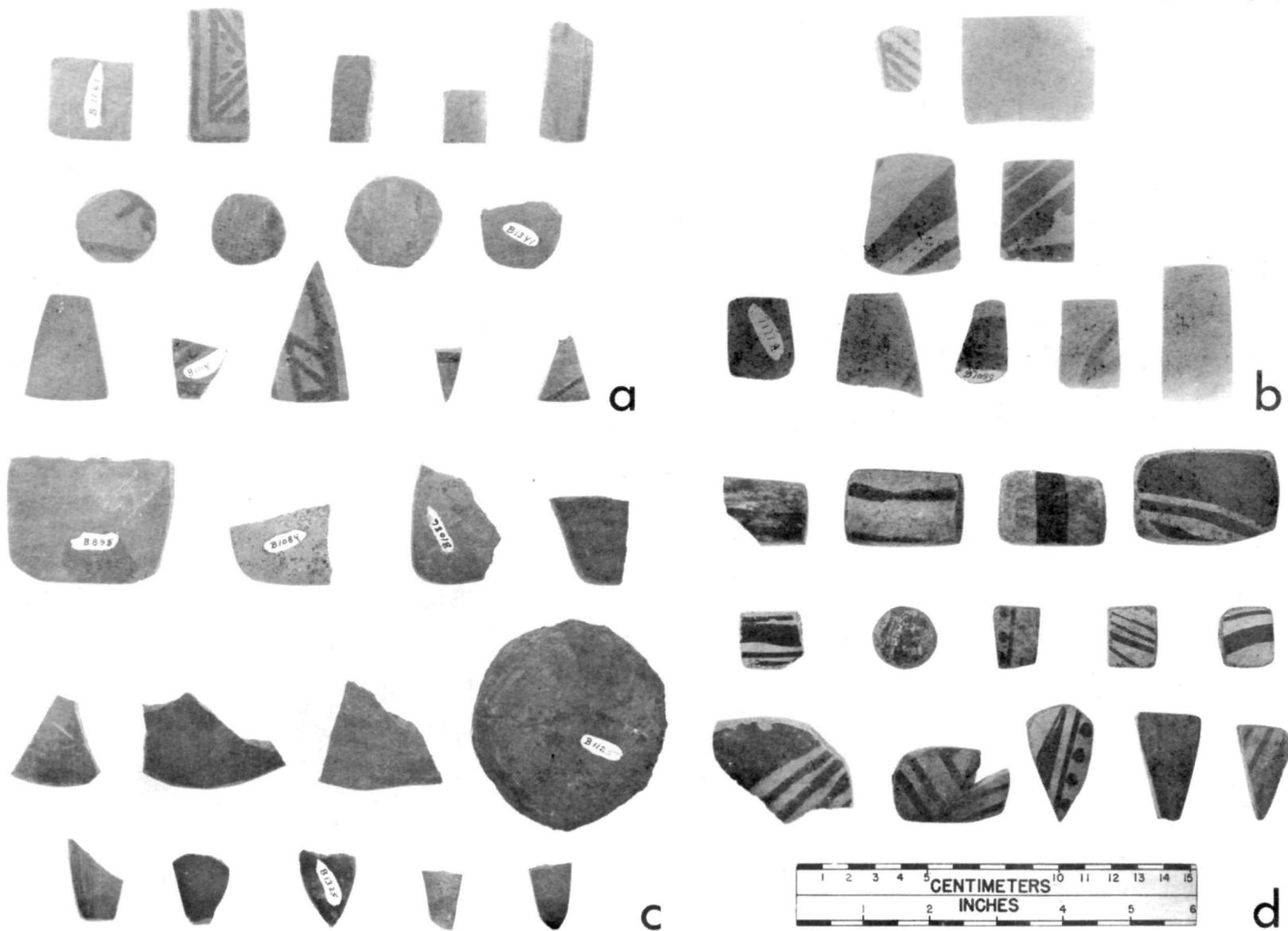
The principal elements of the vessel design consist of birds, opposed solid triangles, and interlocking linear bars. The four bird figures in the neck band are all upright and face the same direction. The compartments are separated by four vertical lines. Each bird figure differs from its neighbor, probably more because of careless work than by intent. The band break occurs between two completed compartments, each ending and beginning with two vertical lines. The shoulder band is composed of two alternate compartments of opposed scalene solid triangles and two compartments of interlocking linear bars. The neck design treatment is somewhat similar to that shown on two jar sherds from Pecos (Kidder and Shepard 1936: Fig. 179, j, m). The bird figures are similar to a series shown on a Glaze IV jar from Pecos (ibid.: fig. 178j).



FIGURE 12

Restored pottery mould showing vessel shape and design.

PLATE VI



Worked sherds. a. Glaze-on-red. b. Glaze-on-yellow.
c. Plain red ware. d. Biscuit ware.

Except for the rim and the lack of red-filled designs, this vessel would fall into Glaze IV. However, from body, neck, and rim shape, and from lack of polychrome treatment, it has been classified as Glaze-on-red and probably would fall into late Glaze III.

Worked Sherds

Sherds which had been altered by grinding the edges were common in all levels. They included most of the pottery types found in the pueblo (plate VI), in various shapes. The shapes into which they were divided included round, rectangular with rounded corners, oval, keystone or triangular, and miscellaneous. None of the sherds were worked into effigies.

In workmanship and appearance they are identical to those illustrated for Pecos (Kidder 1932: 145-151). Of the almost 100 specimens found at Rainbow House only two show use as rubbing tools. None of the round sherds were drilled for possible use as spindle whorls or ornaments nor show wear from use as gaming pieces.

Pipes

The few clay pipe specimens from Rainbow House all appear to have been made on the Pajarito Plateau. All have tuff in their walls similar to the red glaze pottery. One complete pipe (Cat. No. B1005), and six fragments (plate VII), were all that were found. None show evidence of decoration.

The complete specimen appears to have been made from the same mixture of clay and tuff as was used for Espinosa Glaze Polychrome. It had a polished red surface. In the field accession book it was called a cloud blower. The body of the pipe is slightly oval and tapers to a flattened mouthpiece. The fragment (Cat. No. B1405) appears to have the same style of mouthpiece.

Two sections, apparently fragments of different pipes, are oval in cross section and have a polished brown exterior. The diameters of the holes are different. Both came from Sector C of the ruin.*

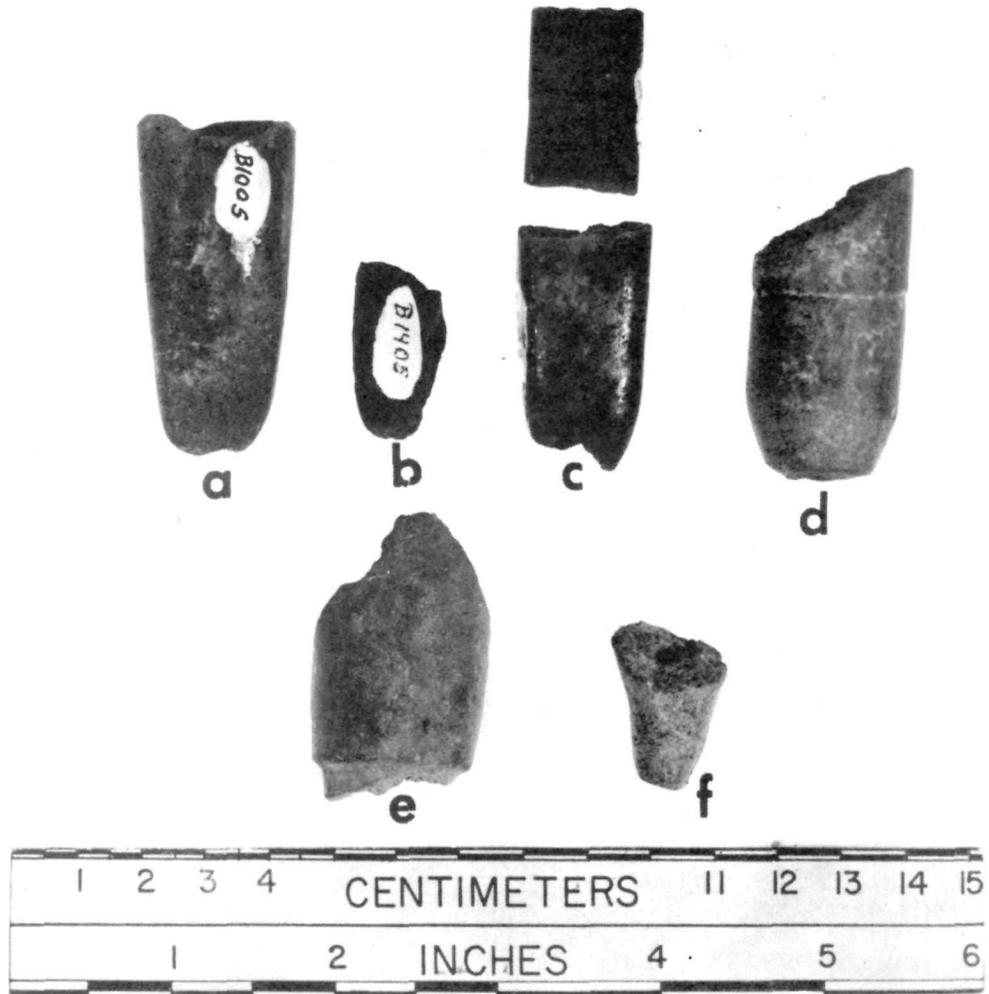
Two other fragments of clay pipes (plate VII d,e) appear to have been round. The one marked "d" has an incised line around the body. The other marked "e" was shouldered and may have had a "fishtail" mouthpiece.

The remaining clay pipe marked "f" was crudely made of clay similar to that used in culinary pottery.

Three fragments of stone pipe were also found. These were too small to attempt any comments as to what shape the original pipes may have had.

* The location of Sector C is not known.

PLATE VII



Clay pipe fragments.

Miniature Vessels

Included in this category are all fragments of pottery vessels which appear to be below normal size. One complete specimen was found. The classification of miniature vessels used in the Pecos study (Kidder 1932: 134-137) has been followed. Kidder mentions that "there occur some very fine examples of the usual wares" but he fails to further describe or illustrate any of these. I have separated the vessels into crude and glazed as follows:

	<u>Crude</u>	<u>Glazed</u>	<u>Total</u>
Bowls	26	31	57
Jars	4	6	10
Ladles	1		1
Total	31	37	68

The crude bowls ranged in shape from very shallow to deep, approximately 1/2 inch to 2 1/2 inches. The diameters varied from 1 inch to possibly as much as 4 1/2 inches. One bowl was of the rectangular variety.

The crude jars appeared similar to culinary ware. However, some had been built up by coiling and others had been made by hand from a lump of clay. One example shows the corrugations only partly obliterated.

Glazed bowls were well finished, slipped, polished, and pleasingly decorated in most instances. Seven were of the rectangular shape. Ten were shouldered. They were made in redware, glaze-on-red, glaze-on-yellow, and two could be identified as Espinosa Glaze Polychrome. Except for one Glaze I fragment all belonged to Glaze III, IV or later. One example had had a horizontal loop handle.

Of the six glazed jars, four were decorated. The workmanship on all glazed jar miniatures was above average.

Miscellaneous

A few specimens which did not readily fall into other categories will be reported under this heading.

Handles: A very few handles were found during the study of Rainbow House pottery. These fell into the following classes:

Lug, on culinary vessels	7
Loop, culinary	2
Rosette applique	1
Loop, black-on-white	2
Loop, redware	1
Hollow, black-on-white	1
Ladle handles	2

Fired clay balls: Two of these were found which resemble old clay marbles.

Effigies: One animal head and one animal body without legs or head were found.

OTHER ARTIFACTS

Objects of Stone

The inhabitants of the Pajarito Plateau had an abundant supply of hard volcanic rocks available for the manufacture of stone artifacts. Thousands of flakes and chips of obsidian and fine-grained basalt attest to use of materials found in nearby deposits and as river-worn nodules in the streambed of the Rito de los Frijoles. Agate, mostly of poor quality, and chalcedony appear occasionally in the form of flakes and artifacts. Objects made of petrified wood, jasper, selenite, schist, and fibrolite could have arrived by trade or from the erosional gravel deposits in the canyons of the Rio Grande and its tributaries, which carry almost every conceivable type of rock.

From the great number of flakes and chips of local stone found and saved during the excavations, implements were relatively scarce. Possibly the local inhabitants acted as traders for both local raw stone materials and manufactured objects. It seems strange that with such a wealth of raw materials and such a mass of chips and flakes, so few finished chipped stone artifacts were found.

Excavations in Tyuonyi produced few stone tools (Onstott 1948: 6, plate VI and VII). Onstott states that stone tools were generally crude. The same trend appears in other Rio Grande glaze sites as noted in reports on the area (Jeancon 1923: 17; Reiter 1938: 161-162; Wendorf 1953: 24).

In general the natives at Rainbow House selected natural stones which could be shaped with a minimum of effort into implements necessary for their everyday life. Except for a few examples there is hardly a tool but whose natural form predetermined the use to which it was put. This lack of uniformity led to the various shapes and sizes of tools, mostly discarded, which were found during the excavations.

For convenience in comparative studies, the descriptions of chipped stone work follow closely the general arrangements used in Kidder's "Artifacts of Pecos."

Chipped Stone

I.	Implements with secondary chipping on all major faces	26
A.	Projectile points and knives without stems	4
1.	Leaf-shaped	2
2.	Triangular	2
B.	Projectile points and knives with stems	19
C.	Drills	2
D.	Odd forms - Sandia point (?)	1
II.	Implements with no secondary chipping on one or more major faces	29
A.	End scrapers	2
B.	Side scrapers	18
C.	Choppers	9

The number of complete projectile points was not great. All that were recognizable as to shape have been illustrated (plate VIIIa,b). The top row of points was all obsidian and all side-notched. In the second row there is one leaf-shaped and one triangular, both of obsidian. The first of the three white points is white agate with black specks. The second is chalcedony with finely serrated edges. The third is white agate with red bands. Parts of two other agate points were found and part of one large chalcedony knife.

In the basalt group all specimens illustrated show some degree of secondary chipping on one or both sides. A is complete; E is a very well made drill. (Only one other drill was found, made of obsidian, and broken.) F and G are projectile points; F is side-notched and G is triangular. H appears much older and better made than other projectile points from Rainbow House. It possibly belongs to an earlier period and was brought to the pueblo by one of the occupants.

The remaining objects in plate VIII, I to R, are all of basalt and show working. Some could be knives and others scrapers.

Ground and Pecked Stone

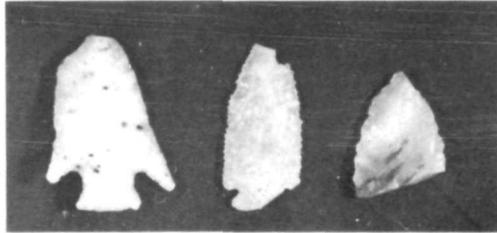
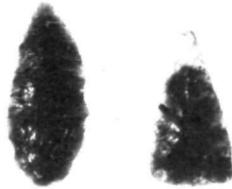
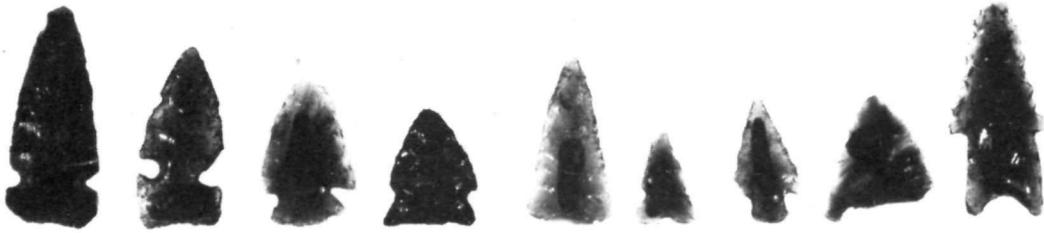
General: Not too many tools of this classification were found at Rainbow House. However, all such tools will be listed even though only partially pecked or grooved. The grooves on some of the tools found were produced by striking (percussion) and later finished by pecking and polishing or by pecking only. In some instances the groove was not pecked at all. The latter are described in the section under Notched and Grooved Implements.

Axes: Grooves on the few axes found were spiral except in the cases of poorly finished axes, picks, etc. Grooved and polished axes were of fine-grained diorite, basalt, and fibrolite. All appear to have been made of river-worn pebbles or larger pieces which were about the shape of the object to be made. No three-quarter grooved axes were found.

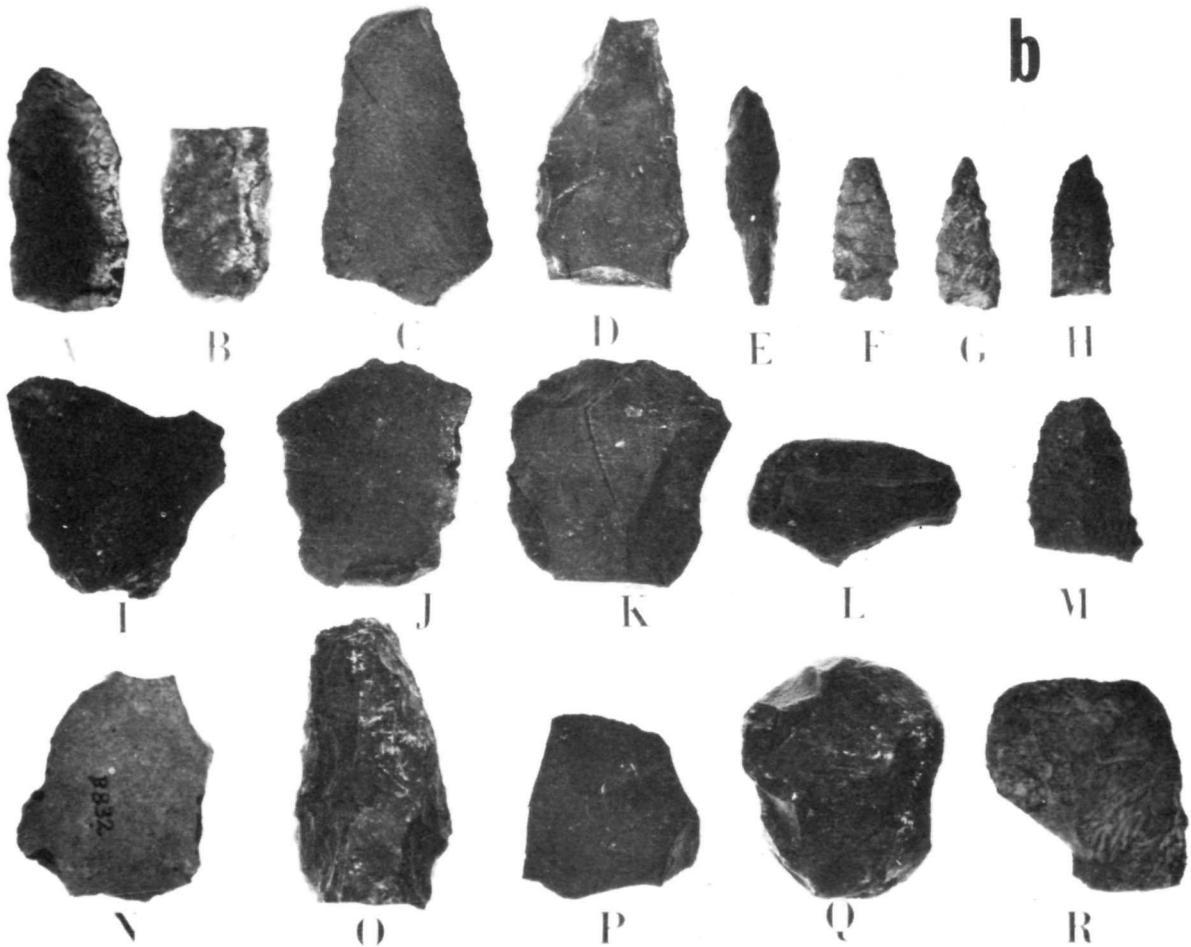
Nineteen axes of the grooved and polished type were found (plate IXa). Three are badly broken and the remainder so battered that it is doubtful they could have been used for chopping. The edges had been so blunted that it is probable they were being used as mauls for shaping building stones or other rough work. All except one show they had been made with oblique notches for spiral wrappings.

Six specimens of fibrolite axes have been classified and illustrated together because no other objects of fibrolite were found. Five of these were made for spiral wrapping. B (plate IXb) was used as a hand axe; it is possible it was intended to be notched but was never completed. The two smaller specimens, E and F, were very well made and highly polished. E was of a grayish green fibrolite and came from the floor fill of Room 9. The upper groove was for spiral wrapping. Below was another groove which appears to have been used when the axe was longer. F was of a reddish-brown color with black specks similar in shape and color to one illustrated in the Wheeler Report (Putnam 1879: plate XVII). Both specimens had been

PLATE VIII



a



b

a. Projectile points. b. Basalt implements.

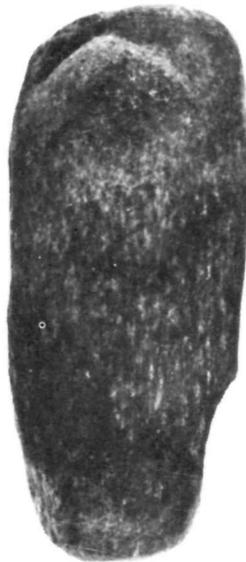
PLATE IX



a



A



B



C



E



F



D



b

a. Grooved and polished axes. b. Fibrolite axes.

sharpened to a fine edge, which they still retain. D had notched side grooves but shows no evidence as to exactly how it was hafted. It was a rough river cobble on which little work had been done. Although these fibrolite axes from Rainbow House had not been as well finished as specimens figured in the Wheeler report (Putnam 1879: plates XVII, XVIII, and XIX) they show careful workmanship and much use. In 1874 Dr. H. C. Yarrow (M.D.) made a collection of axes from the New Mexico pueblos. He found that the fibrolite axes were no longer in use and were not being made at that time. Those obtained had been handed down, and the Indians were loath to part with them (ibid.: 376-380).

Fibrolite was much prized by the inhabitants of this region because of its distinctive appearance after polishing, extreme hardness, and attractive and varied coloring. More than 150 were found at Pecos (Kidder 1932: 50) with their highly specialized type of grooving. The source of fibrolite was discovered in the high mountain sites in the Sangre de Cristo Range (Montgomery 1963: fig.6).

Kiva Bell: (plate X). This ground and polished object came from one of the rooms in Rainbow House. It was donated to the National Park Service in 1962 after passing from the individual who procured it to another living in Hatch, New Mexico.

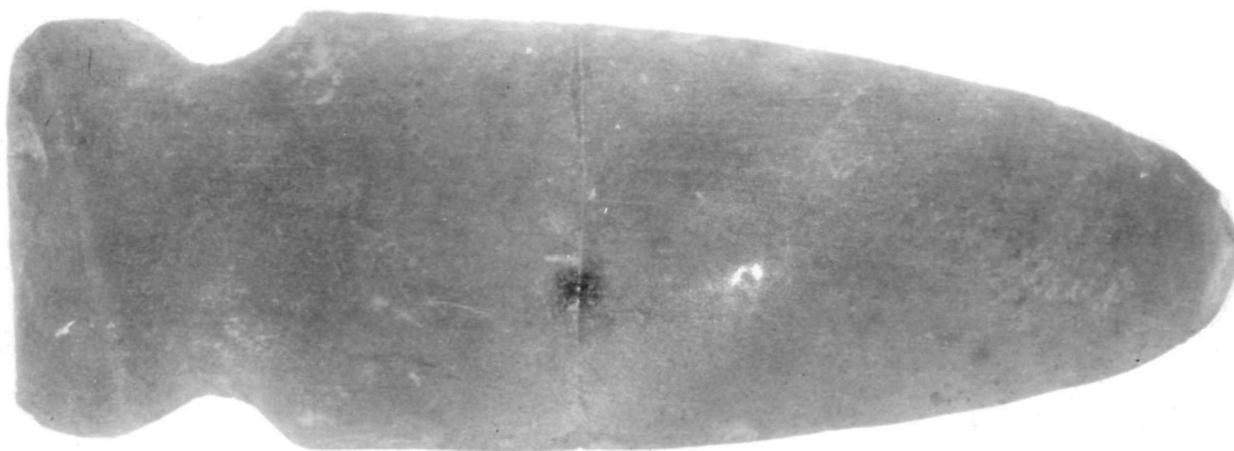
The following information was written by David M. Brugge and is herewith included as a matter of record.

The writer recently observed in a private collection an artifact that is of interest because it has been identified as a kiva bell, an object occasionally found archaeologically and still used by the modern Pueblo Indians.

The artifact was found on the site of Rainbow House, Bandelier National Monument, New Mexico. It resembles a blade, being tapered and rounded on one end, squared on the other, with two notches set toward the squared end. It was apparently first percussion chipped and then polished on both sides, without any attempt being made to eliminate all traces of the chipping around the edges. The material is a fine-grained black basalt. It is broken across the middle, but this is reported to have occurred after it was found. The dimensions are: length - 24.5 cm., width - 8.8 cm., and thickness - about 1.3 cm.

The identification was made by a Cochiti Indian who said that there are others similar to it in use at Cochiti today. These are made of various kinds of rock and the best tone is obtained by striking each with a material of the same kind as the bell. They are said to be very old and according to tradition were found at places where lightning had struck. The association of such artifacts with thunderbolts is a widespread belief, but usually refers to projectile points.

PLATE X



Kiva bell.

Further evidence of the ceremonial nature of its use can be seen in the artifact itself. It is too thin and fragile a piece to have withstood any rough utilitarian use and compared with the usual rough workmanship of the Anasazi is too well made to have been intended for any short-lived purpose. There are no signs of use on the edges or surface. The chips missing along the edges are obviously left from the manufacturing process and most are located toward the squared end, which would be the least likely to receive damage in any work done with it.

It differs in form from any other kiva bells which the writer has seen, all of which have been somewhat cylindrical. The artifact it most closely resembles is the Tchamahia of the San Juan area, which is usually considered merely a "ceremonial object." That the tchamahia served as a kiva bell cannot be shown by an artifact so far removed in time and space and it probably did not. However, it is a possibility worthy of consideration since little is known about either class of artifacts.

The possibility of this object having been used as a kiva bell is worthy of consideration, and this bit of research by Brugge appeared at the appropriate time to be included in this report. Coincidentally, the lower portion of a similar object (Cat. No. B1020) was found in the floor fill of Room 21. It is identical in shape and size, but was made from a flat thin piece of gray basalt less than one-quarter of an inch in thickness. It had not been polished. The break in this specimen occurs just above where the break is seen in plate X.

Both the kiva bell described by Brugge and the fragment from Room 21 give a bell-like tone when struck.

Tools for Pounding, Pecking, and Rubbing

Notched or Grooved Implements: A number of crudely shaped stone tools of fine-grained igneous rock were put into this class. All were notched near one end by percussion flaking with pecking to smooth and finish the groove. These tools (plate XI) all show considerable wear as though they had been used for shaping building stones. However, in their original state they could have been much sharper and used as axes. The largest one (lower left in plate IX) was a heroic sized axe which weighed 15 pounds 1 ounce and probably had been used by one of the prehistoric giants about whom we often hear.

Hand Picks, Mauls, Hoes, etc.: Seventeen ungrooved, unnotched, but much used stones fall into this classification. Again, their use is uncertain, but they definitely filled a need around the pueblo. They were hand held and could have been used for shaping building stones, since the pointed ends show they were struck against other stones.

Hammerstones: Artifacts were found which might be called hammerstones. Again, these had been gathered from streambeds and probably used for pounding or pecking on other stones such as pecking axes and axe grooves into their desired shapes.

PLATE XI



a



b

Notched and grooved stone tools.

Pottery Polishers (plate XIIIa): Thirty-three smooth pebbles, some of black, fine-grained basalt and others of waterworn obsidian, were undoubtedly used as pottery polishers. The shape of some specimens showed one or more gently curved faces with beautiful glossy finishes. Many were used only on one surface. They ranged in size from less than 1 inch in diameter to almost 3 inches in length. Some of them must have been treasured heirlooms (because of their high glossy finish and much worn surfaces) passed down from one pottery maker to another.

Floor Polishers (plate XIIb): Thirty-seven larger polishing stones than the pottery polishers were undoubtedly used to finish the surfaces of floors. Many were shaped by pecking into round or oval forms and had two parallel polishing surfaces. Others were river-worn pebbles with one or two polishing surfaces not always parallel. Of the 37 floor polishers, 27 were basalt, 7 quartzite, 2 sandstone, and 1 of hard tuff.

The finding of smoothed floors in the rooms of Rainbow House is proof of common use of these stones for that purpose. The use of such stones in modern pueblos has been previously described (Jeancon 1923: 21; Stubbs and Stallings 1953: 112).

Shaftsmoothers and Pigment Dishes: Eight references were made in the accession books to "shaft straighteners," "shaft polishers," and combination "pigment dish-arrow straightener." However, none of these specimens were located for cataloging. One spherical pigment dish (Cat. No. B945) was found similar to one from Awatovi (Woodbury 1954: fig. 13e). It would be of interest to see the combination dish and straightener specimens. A list of artifacts from Otowi notes five fragmentary arrowshaft straighteners (Lister 1940: 272-277).

Miscellaneous Objects of Worked Stone

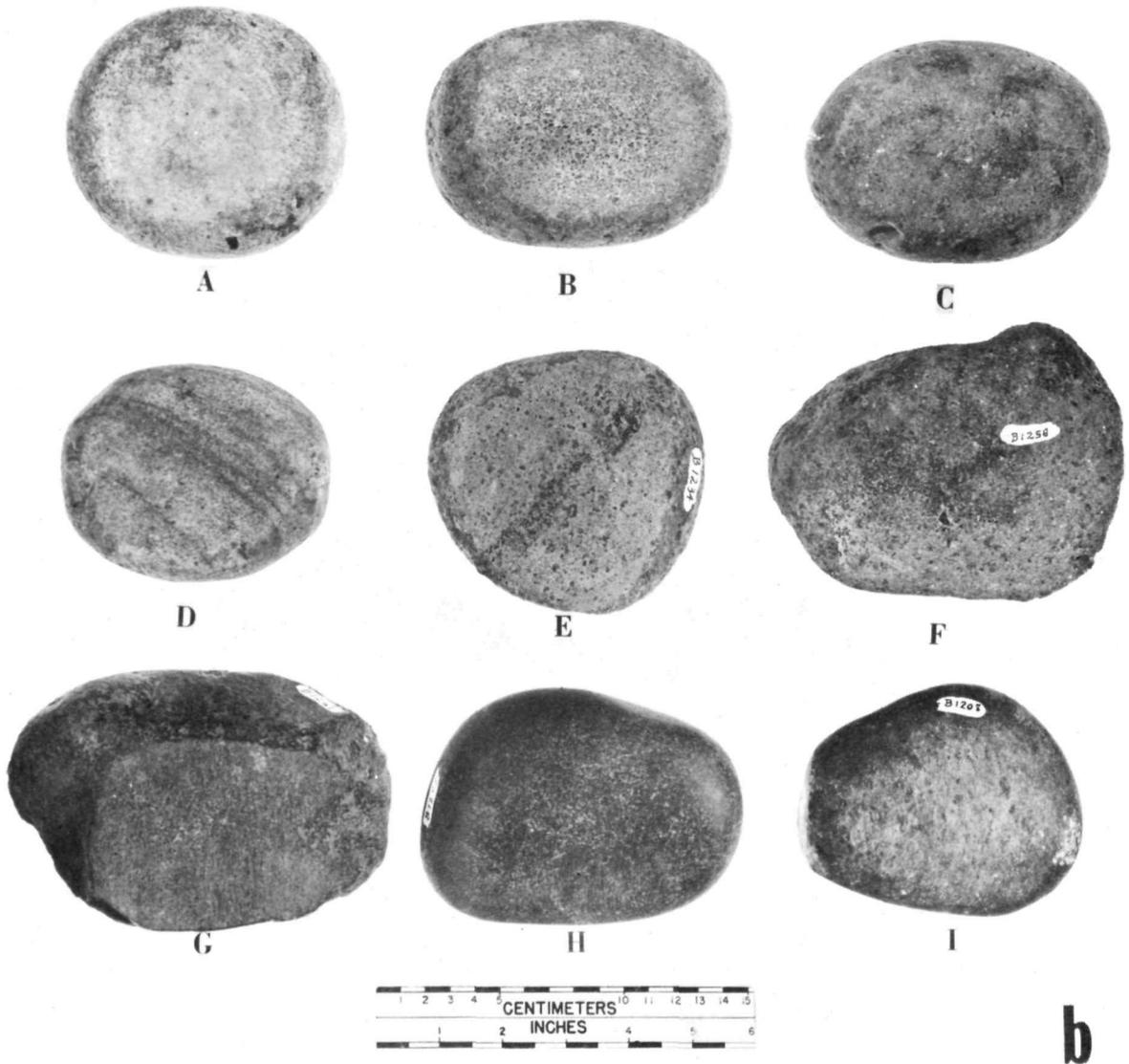
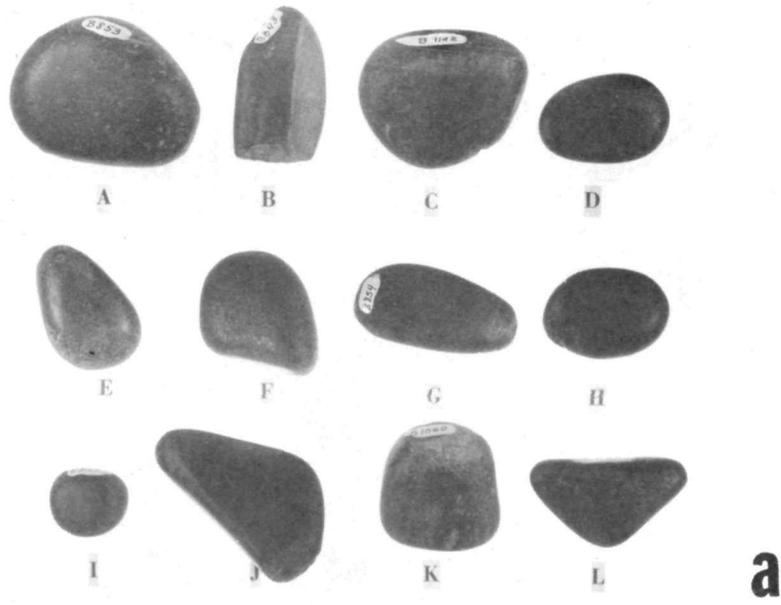
Three small worked stone objects might be classified as stones of possible ceremonial use. Each was carefully made.

One stone (Cat. No. B922) was made of a dark red hematite in the shape of a cylinder measuring 2 1/8 inches in length by 3/4 inch in diameter. This specimen is similar to one found at Pecos (Kidder 1932: fig. 68, f). The remaining two stones are similar to others found in the Rio Grande area. One (Cat. No. B1333) is similar to the "medicine rod" from Pindi, except that it is made of schist (Stubbs and Stallings 1953: plate 27, f), and the third (Cat. No. B1061) was made of a flat section of dark gray shale with notches on opposite sides near one end.

Metates (plate XIII)

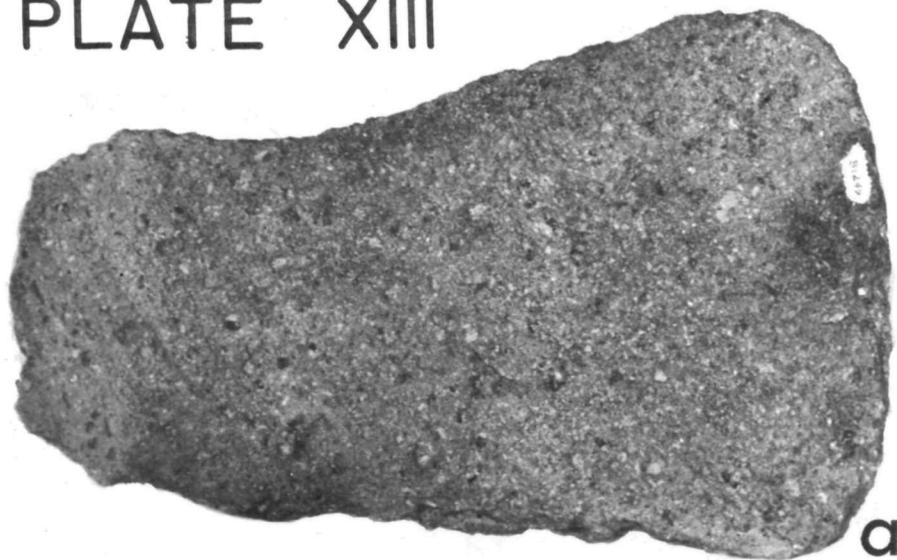
According to the accession books, other records, and the number of metates actually located and cataloged, there appear to have been at least 42 excavated from the ruin during the three years' work, 22 complete and 20 incomplete. Of these only 9 were located and cataloged. Broken down, according to years, they are as follows:

PLATE XII

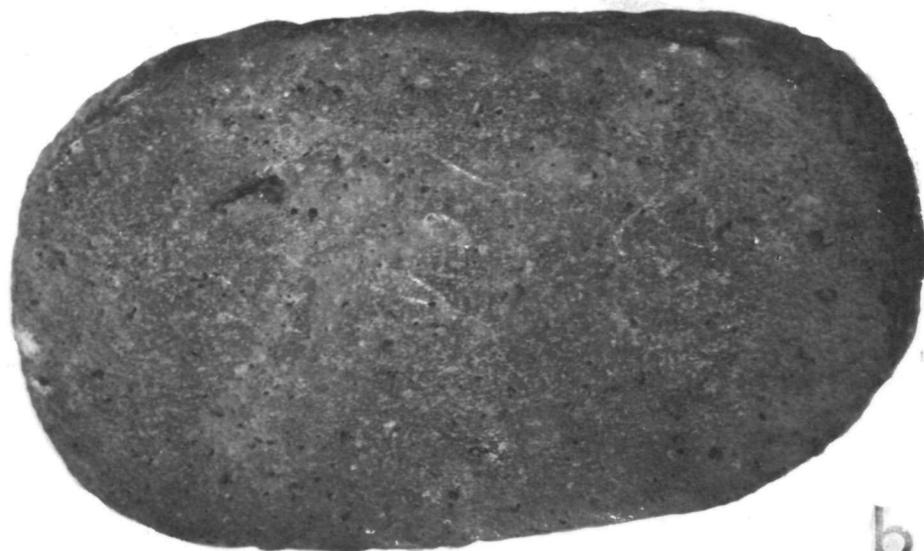


a. Pottery polishers. b. Floor polishers.

PLATE XIII



a



b



c



d



Flat-surfaced concave metates.

	<u>Recorded</u>	<u>Cataloged</u>	<u>Not Found</u>
1948 ASC	11	1	10
1949 ASC	5	0	5
1950 ASC	19	1	18
1950 NPS	7	7	0
	<hr/>	<hr/>	<hr/>
	42	9	33

In checking over previous work at Bandelier very little mention has been made of the finding of metates, although they must have been found in large numbers. Photographs (Bandelier Nos. 9361, 9365, and 1373) made during the stabilization of five rooms in Group M show two metates, apparently in place, one in Room 4 and the other in Room 5. Five are mentioned in the text by Hendron, three plain-surfaced and two partially troughed (Hendron 1943).

Such a dearth of specimens at Rainbow House does not give a representative collection on which to base any conclusions. Of the nine cataloged metates, only three are complete specimens. Four were made from basalt and five were sandstone. All were flat-surfaced and concave lengthwise. Catalog No. B837 (plate XIIIc) was used as a slab metate on one side and as a basin metate on the other side.

The shape of the metates would indicate that they could have been used in metate bins. However, there was no indication in any records or in photographs of rooms that such was the case. In fact, there seems to be no reference to metate bins in any of the Pueblo IV ruins of the Pajarito Plateau (Kidder 1958: 139). Typical concave, flat-surfaced metates with manos are shown by Hewett as coming from the Jemez Plateau (Hewett 1906: plate XII, e,f), but nothing in the text would indicate provenience.

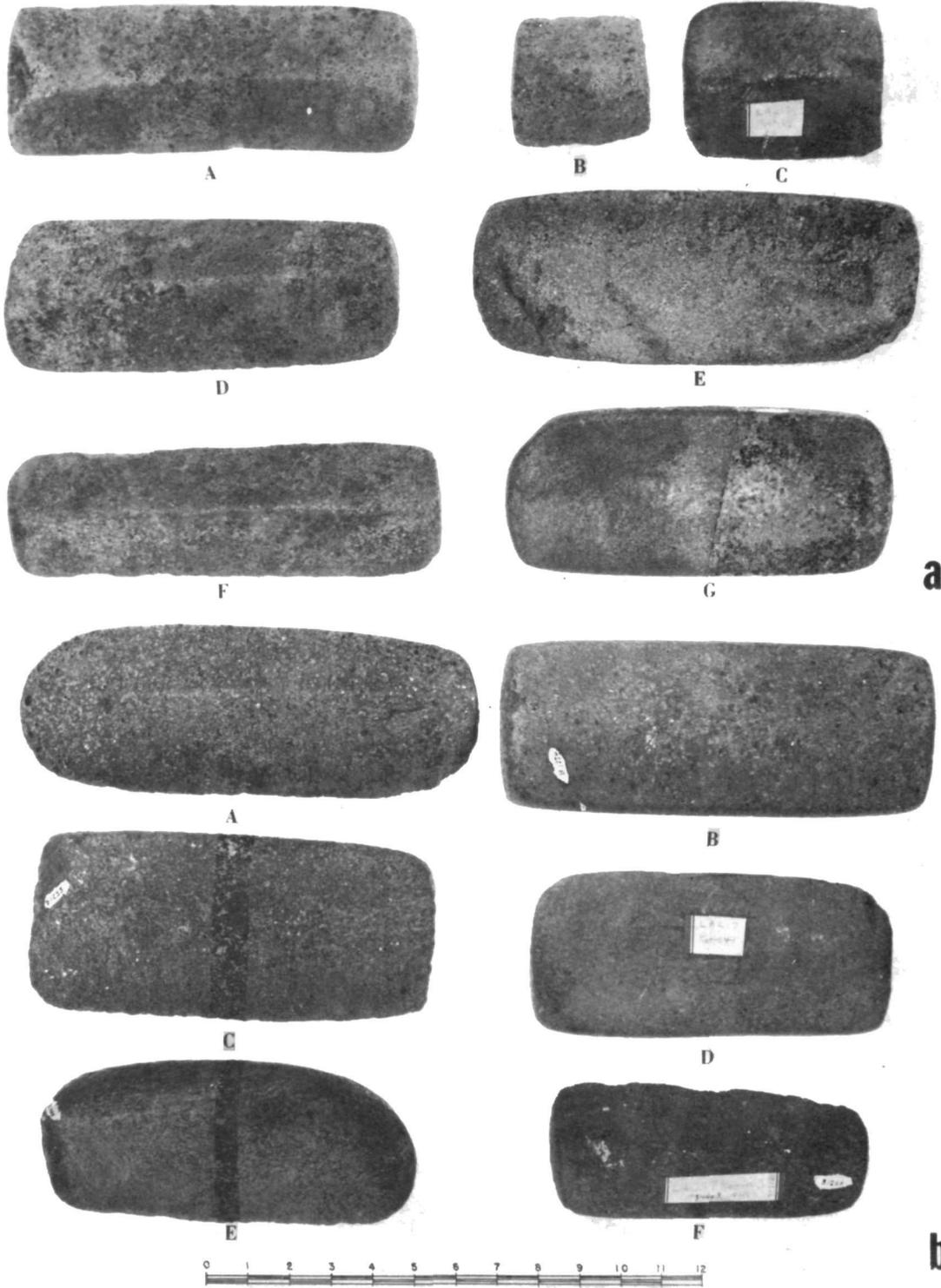
Manos (plate XIV)

The study of manos from Rainbow House was not satisfactory since so many which had been recorded and accessioned were not found. A total of 122 manos was recorded from the excavations and accession books, but of these only 67 were found and cataloged. The tally appears as follows:

	<u>Recorded</u>	<u>Cataloged</u>	<u>Not Found</u>
1948 ASC	24	3	21
1949 ASC	11	2	9
1950 ASC	26	1	25
1950 NPS	61	61	0
	<hr/>	<hr/>	<hr/>
	122	67	55

The manos from Pecos were separated into two classes, those with a single grinding surface and those with two or more grinding surfaces. All Pecos manos were of sandstone (Kidder 1932: 69-71). At Rainbow House the same classification could well hold true except for the diversified kinds of rock used by the inhabitants. The single-surfaced manos were almost all of basalt, ranging from fine- to coarse-grained. Those with

PLATE XIV



a. Manos with two or more grinding surfaces.
b. Basalt manos.

two or more grinding surfaces had been made from a variety of stones-- quartzite, basalt, sandstone, diorite, andesite, and rhyolite (plate XIVa).

The excavations at Tyuonyi produced four types of manos (Onstott 1948: plate VI) according to the classification used. These were listed as rectangle, loaf, wedge, and rhomboid. At the Pindi excavations the manos were classified under two general types: Type I--loaf-shaped and flat; Type II--wedge-shaped, triangular, and diamond-shaped (Stubbs and Stallings 1953: 114-115).

The study made by Woodbury on stone implements of northeastern Arizona gives a detailed classification of manos of that area (Woodbury 1954: 66-84), which was also usable for the Rainbow House manos. The result showed that manos with two grinding surfaces adjoining on the same face were most common. None of the Rainbow House manos had finger grips. The multisurfaced manos all had to be pecked to give them the desired roughened surface necessary for grinding. This trait, in an area noted for its infinite variety of fine- to coarse-grained basalt, seems very odd. It would appear that the inhabitants came from an area blessed with a plentiful supply of sandstone. Since the sandstone supply here was limited, they used similar available stone material. Then, in order to obtain the desired grinding surfaces, manos had to be continually pecked to produce a rough surface.

Eight manos, two multisurfaced and six single-surfaced, were concave rather than convex, which would suggest the use of a grinding bin in connection with a conventional flat-surfaced or convex metate. None of the metates matched any of the concave manos.

Of the 122 manos found, 25 came from Kiva 1, and 5 from a storage pit in Room 44.

Grinding Slabs

A number of irregular-shaped stones with grinding surfaces, which were not flat but convex, have been put into this classification. They could have served for many purposes, some as pigment grinders, grinding down bone tools (a white residue in the stone interstices appeared to be bone dust), grinding and smoothing wooden objects, and arrowshaft smoothers. These convex slabs were usually of rather coarse textured basalt, stream-worn. One was of sandstone and the remaining six were basalt.

No regularly made shaft smoothers were found, but three triangular-shaped manos had very smooth grooves in one edge as though they had been used for this purpose.

Anvils

Twenty-four stones with flat surfaces showed evidence of having been used as anvils or working slabs. These were mostly of very fine-grained, extremely hard basalt. They were apparently used as working stones around the pueblo, much as we have workbenches today.

Griddles

Fifteen fragments of griddles or flat cooking stones were cataloged. All showed evidence of having been used over cooking fires. Each had one smooth cooking surface and one sooty surface which had been next to the flames of the fire. They were supported by firedogs found in a number of firepits.

Firedogs (fig. 6a)

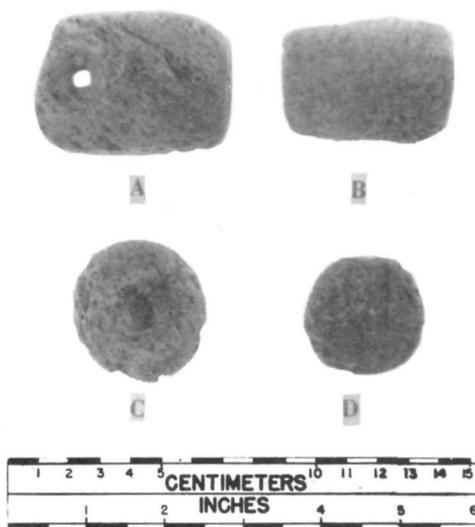
In the accession books are found a number of listings such as fireplace stones, firepit rock, firestone, and pit bars. These probably all refer to what are called firedogs. These have been previously noted in figure 6a, Room 5. Sixteen references were made to such objects in the accession records. However, only seven were actually cataloged as firedogs. They were undoubtedly used for supporting pots and possibly other objects in firepits. Those cataloged show signs of burning on one end and are sooty and grease-laden. They are long ovate stones which had rested upright with the lower ends buried along the inner edge of the firepit (plate IIc, d). Such stones have been found at other ruins in New Mexico (Vivian 1964: 42; Reiter 1938: 49; Toulouse and Stephenson 1960: 15; Morley 1919: 10, plates III and IV). Firedogs were for the support of stone griddles, to which a number of fragments have already been referred to. The best description of the fireplace and firedogs is from Morley's 1910 account of the excavation of the South House at Puyé. This is given complete as the source is now rather hard to find:

"Perhaps the most interesting feature of the South House rooms is the fire-place, the chief use of which doubtless was for cooking. There are three essential parts to the fire-place, as it is found at Puyé: (1) the stone andirons or "fire-dogs," (2) a stone against the back of the fire-place of the same height as the "fire-dogs," and (3) a screen built upon the sides of the fire-place nearest the doorway. The fire-places are all of one type, differing only in detail such as the number of 'fire-dogs,' either two or three, and the character of the screen. In Plate III there is figured the commoner type of fire-place, with two 'fire-dogs.' Against the back may be seen the stone mentioned above. This latter, with the two 'fire-dogs' in front formed a three-legged support upon which the cooking stone rested. The fire was built below it, and the tortillas and other cooked dishes of the Pajaritans prepared on top of it."

The arrangement described above as illustrated in Morley's plate III is almost identical to that found in Room 5 of Rainbow House (plate IID).

Objects of Tuff (plate XV)

Nineteen worked objects fashioned from tuff have been placed in this category rather than under subject headings because of the material from which they were made. The four objects in plate XVa consist of: A, flat pendant of lightweight tuff; B, pestle (?) of heavyweight tuff; C, spherical object drilled from both sides; and D, ball. Vent plugs in plate XVb are shown, left to right, small end up, side view and top view.



a



b

a. Small tuff objects. b. Tuff vent plugs.

In addition to those illustrated there were five worked tuff blocks, one two-sided oval grinder, one floor polisher, two abraders, one possible mortar, one small metate, and one pot cover.

Miscellaneous Mineral Specimens and Unworked Stone

Of the thousands of chips and flakes found during the excavations there were very few varieties--obsidian and basalt in about equal quantities, some moss agate, and chalcedony. One piece of gypsum crystal was the only "specimen" from Rainbow House. There were two fragments of turquoise, one ground and partly drilled.

Minerals for pigments included hematite, yellow ocher, and copper carbonate. One piece of geode contained red color. A clump of red pigment appears to have been ground and packed into a perishable container, possibly bark.

No fossils of any kind appeared in the material studied. Only one piece of unworked, petrified wood was found.

OBJECTS OF PERISHABLE MATERIALS

Perishable materials included one-half of a small peach seed pit from Room 15, 6"-12", seeds (Chereopodium sp.) from Room 8, 30" to 36", and numerous charred corncobs and husks, all from the floor fill of various rooms.

The charred cobs were not in good condition. One specimen, which measured $1\frac{1}{2}$ inches in length and $1/2$ inch in diameter, appeared to be complete. The remaining specimens were all broken from being placed in bags with other materials.

A total of 55 charred corncob specimens were sent to the Botanical Museum at Harvard University for study. The report on these cobs was submitted by Drs. Mangelsdorf and Galinat. It is included as an Appendix to this report.

The corncob study identifies the great majority of cobs as Chapalote. However, some, especially those from on and near the floor level of Room 12, were the most primitive and are designated as early or pre-Chapalote. According to Mangelsdorf this is the only collection of cobs from the American Southwest which has a preponderance of cobs of this race (personal communication, November 8, 1965).

Some few cobs, two from Room 5, two from Room 6, and one from Room 10, are either Harinoso de Ocho or show some influence of this race.

The occurrence of the pre-Chapalote in the area of Rooms 5, 6, and 10 might possibly indicate a sequence in the construction activities of Rainbow House. These could be the early nucleus of the first building of the pueblo followed by the rooms in which Chapalote cobs were found, as indicated in the Appendix.

Except for charred bark and wood fragments, there were no other perishable materials such as matting, basketry, cordage, or cloth found.

BONE AND ANTLER STUDIES

Of the more than 1500 worked and unworked bones found during the four excavation seasons, 77 bone and 4 antler specimens were considered artifacts. The greater number were bird bones and of these turkey bones (*Meleagris gallopavo*) probably account for about 95 percent. Lyndon L. Hargrave, Collaborator in ornithology and archeology, kindly made identifications of bird bones. Thomas W. Mathews, Archeologist, worked hard to determine identification of the few mammal bones that could be identified. The worked bone and antler artifacts (excepting proximal and distal ends of turkey bones) are as follows:

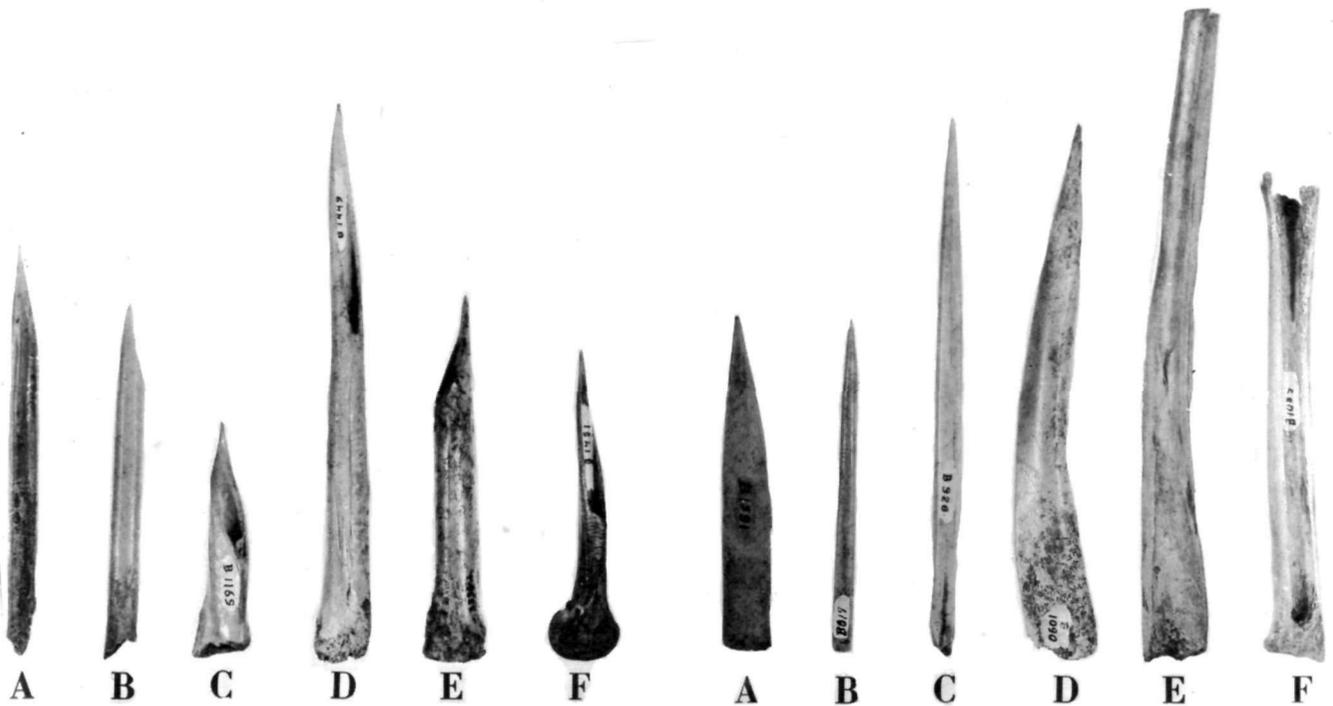
Implements - - - - -	53
Awls (turkey tibiotarsi)- - - - -	26
Awls (turkey tarsometatarsi)- - - - -	2
Awls (bird, unidentified) - - - - -	3
Awls (mammal) - - - - -	22
Deer - - - - -	1
Unidentified - - - - -	21
Tubes, beads, musical instruments- - - - -	15
Tubes and beads (all turkey)- - - - -	11
Whistles- - - - -	3
Possible flute- - - - -	1
Other worked mammal bone - - - - -	9
Weaving shuttle - - - - -	1
Bison scapula disc- - - - -	3
Deer scapula sounding rasp- - - - -	2
Miscellaneous - - - - -	3
Antler - - - - -	4
Total Artifacts	81

No painted, carved, or incised bone artifacts were found. No gaming bones were found.

It is interesting to note that inhabitants of Rainbow House had selected certain bones for alteration into specific tools. For example, of the 28 awls made from turkey bones, 26 were made from tibiotarsi and only two from tarsometatarsi. Of the 26 tibiotarsi awls, 11 were right elements and 15 were left elements. Of the two tarsometatarsi awls, one was left and one right. Plate XVIa illustrates the various forms of awls made from turkey tibiotarsi.

Of the total of 5 awls, including fragments, which retained enough of their original form, shape, and texture to be separated, bird from mammal, 70 percent were made from turkey bones (plate XVIa). This is in complete contrast to findings at some excavations in the Rio Grande area. At Pecos fully nine-tenths of the identifiable awls were made from deer metapodials (Kidder 1932: 203). At Hawikuh, although not enumerated, about the same ratio appears to have prevailed. At Pindi, like Rainbow House, turkey bones comprised the bulk of the bone material found (Stubbs and Stallings 1953: 126).

PLATE XVI



a. Awls made from turkey tibiotarsi.

b. Awls and implements made from mammal bones.



c. Musical instruments and bone tubes.



d. Discarded ends from turkey long bones.

Of the 22 awls made from mammal bones (plate XVIb) only one, D, was identified as probably being made from the right tibia of Odocoileus (?). The remaining 20 had been altered too much for species identification. E in plate XVI appears to have been some form of spatulate. F was worked, but its use is not known. It was identified as a right metacarpal of an immature deer (Odocoileus hemionus).

Other worked mammal bones included one possible broken weaving shuttle (Cat. No. B1530, length - 3 7/8 inches), one centrally perforated bison scapula disc measuring 3 7/8 inches by 2 9/10 inches (two fragments were also found of a similar disc), and one sounding rasp fragment made from a notched deer scapula found in Kiva 1. Fragments of another notched deer scapula sounding rasp were found. Similar notched scapulae were found at Pecos (Kidder 1932: 252, fig. 212a,b), and at Hawikuh (Hodge 1920: 137-8, plates XLII and XLIII).

There were four worked antler tools, none of which could be positively identified. All appear to have been used as flakers.

The musical instruments are similar to those found in many other ruins of this region. To distinguish between a whistle and a flute--the whistle has one hole, the flute has more. In plate XVIc, A,B, and E would be considered whistles. Specimen C with several holes might be called a flute. A and B were made from the left ulnae of turkey, C from the left femur of a turkey, and E from the right ulna of a large Canada goose (Branta canadensis). A whistle measuring 8 1/16 inches long was found in Room 2, Group M, by Hendron in 1943 made from the left ulna of a Sandhill Crane (Grus canadensis tabida) (Turney 1948: 36, plate IXa). D is a tube made from the left humerus of an adult turkey with two holes opposite each other; its use unknown except that it may have been suspended on a cord going through the two holes.

Of the 10 tubular beads, 4 of which are shown in plate XVIc, all that could be identified had been cut from turkey bones--humerus (1), ulnae (2), radius (1), femur (1), and tibiotarsi (2).

Eight worked bones, discarded ends from long turkey bones, are shown in plate XVIId, identified as follows: A,C,D,E, and G are cut from right humeri; B from a left humerus, proximal end; F from a left femur, proximal end; and H from a right tarsometatarsus. With five ends cut from humeri only one object, the two-holed bone tube, had been made from such a bone. It would appear that a number of long bone ends would have resulted from the 26 tibiotarsi awls, but none were found.

Previous bone studies for Bandelier National Monument were made by Hendron and Turney and appear to be the only record, so far as can be determined, of archeological bones from the Pajarito Plateau. The occasion for this study resulted from a small excavation and ruins stabilization project done by Hendron in the summer of 1943. As Hendron did not complete the archeological study resulting from this work, the project was finished in 1948 by Turney. Identifications of 132 bones were made by Dr. W. H. Burt, Curator of Mammals, University of Michigan. Dr. Burt was unable to identify 102 fragments sent him. Of those

identified, only five were bird bones made into artifacts. Eleven species of mammals and three of birds were identified from the lot sent to Dr. Burt. The mammal species included the following (Turney 1948: 39-40):

1. Mule Deer (Odocoileus hemionus)
2. American Bison (Bison bison)
3. Ground Squirrel (Citellus variegatus)
4. Bobcat (Lynx rufus)
5. Beaver (Castor canadensis)
6. Bear (Urus sp.)
7. Packrat (Neotoma sp.)
8. Jackrabbit (Lepus sp.)
9. Cottontail Rabbit (Sylvilagus sp.)
10. Pocket Gopher (Thomomys sp.)
11. Tree Squirrel (Sciurus sp.)

Preliminary examination at Southwest Archeological Center of a small collection of mammal bones salvaged from Rainbow House itself produced the following additions to the above mammal list.

- Audubon's Cottontail (Sylvilagus auduboni)
- Zuni Prairie Dog (Cynomys gunnisoni cf. zuniensis)
- Procupine (Erethizon dorsatum)
- Dog (Canis familiaris)
- Coyote (Canis latrans)
- Badger (Taxidea taxus)
- Bighorn (Ovis canadensis)

A more intensive study at some future date will, undoubtedly, produce more precise information and probably additional faunal forms.

Although incomplete the bird bone studies for Rainbow House include the following species:

1. White Pelican (Pelecanus erythrorhynchus)
2. Canada Goose (Branta canadensis)
3. Mallard or Mexican Duck (Anas platyrhynchos) or (Anas diazi)
4. cf. Pintail (Anas acuta)
5. cf. Red-tailed Hawk (Buteo jamaicensis)
6. Marsh Hawk (Circus cyaneus)
7. Prairie Falcon (Falco mexicanus)
8. Grouse (Tetraonidae)
9. Quail (Odontophorinae)
10. Turkey (Meleagris gallopavo)
11. Sandhill Crane (Grus canadensis)
12. Great Horned Owl (Bubo virginianus)
13. Common Nighthawk (Chordeiles minor)
14. Common Raven (Corvus corax)

Fish Bones

A number of fish bones were found during the excavations of levels 2 and 3 in Kiva 1. Some of these were separated out in the earlier bone studies by Turney and Hargrave. Hargrave was curious as to what kind of

bones these were and sent them off to Drs. Frederick R. Gehlbach and Robert R. Miller in 1959, who were then making a study of food habits and environment of prehistoric peoples. They were identified as a complete urohyal bone and a broken, incomplete Weberian apparatus, including the first two vertebrae of the blue sucker, Cycleptus elongatus Lesueur (Gehlbach and Miller 1961: 5 and Fig. 2).

Five additional fish bones were later found while separating more bones from levels 2 and 3 in Kiva 1. These were also identified by Miller as blue sucker (personal correspondence, Jun 9, 1965). They included four parts of basiptyrgium halves (pelvic girdles) and one ventral part of lateral ethmoid (skull bone).

From their studies of archeological and present day fish use, Gehlbach and Miller concluded the blue sucker was a source of food supply for Indians in various sections of the United States and Mexico.

Association with the inhabitants of Rainbow House indicated that blue suckers once occurred in the Upper Rio Grande basin. They may have been caught in an annual spring spawning migration at the base of the lower falls in the Rito de los Frijoles or in the nearby Rio Grande, a distance of over a mile and a half from Rainbow House. Collections made by Miller, et al., in White Rock Canyon in 1960 failed to produce evidence of this species nor did local inhabitants have any knowledge of its existence at the present time (ibid.: 6).

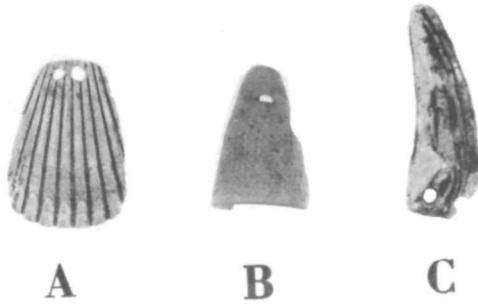
The blue sucker apparently preferred large, clear, fairly deep stable streams, and the authors believe that the Rio Grande has changed in the last century. At the present time the blue sucker does not occur farther upstream than the vicinity of Big Bend National Park but does occur in the lower Pecos River where it is rare. Evidently favorable conditions in the local rivers would indicate that this species did occur prior to A.D. 1400.

SHELL

Since shell material was so scarce, all pieces were cataloged regardless of whether they were worked or unworked. Identification of the non-marine mollusks was made by Dr. Leo G. Hertlein, California Academy of Sciences, San Francisco.

Three shell pendants were the only artifacts encountered. A two-hole, oval pendant had been made from the center section of "Pecten circularis Sowerby" (plate XVIIa). Another two-hole, oval pendant had been made from a section of non-marine mollusk belonging to the Unionidae but too small to identify as to genus (plate XVIIc). These two-hole, oval pendants are similar to those illustrated and described from Pecos (Kidder 1932: 192-3, figs. 164 and 165). The third artifact was a conus shell tinkler, Conus perplexus Sowerby (plate XVIIb). Fragments of shell not made into artifacts included one piece of abalone (Haliotis sp.). One piece of non-marine mollusk was identified as belonging to the genus Quadrula now living in the rivers of Texas and in the Red River in Oklahoma. Other pieces of non-marine mollusk were too small to be identified, but possibly may belong to the genus Margaritifera.

PLATE XVII



Shell jewelry.

DISCUSSION

Worman, in 1947, proposed archeological survey and excavation work on government lands on the Pajarito Plateau which, had they been culminated, may have added much to the knowledge of the area. This work was to be done by Adams State College to study the material culture, human remains, and architecture of the ancient inhabitants to assist in the interpretative program of the National Park Service and to train students. On the whole, the program did add to the archeological knowledge of Bandelier National Monument and vicinity and helped to start some students in the fields of their choice. On the other hand, only a few widely separated human bones were recovered, so nothing was added in this field.

Tree-ring dates resulting from the Rainbow House work show that construction dates of some rooms fell between A.D. 1421 and A.D. 1453. Although these dates come from 20 samples, they probably are not representative of the time span of the pueblo. Reuse of timbers for later occupancy is a possibility for such a short construction period.

Pottery studies at Rainbow House gave a much greater possibility of a long sequence, except for the fact that no stratigraphy could be worked out from the excavations. This seems to have been the same problem with excavations at Tyuonyi, the Large Kiva, the Long House, and the Ceremonial Cave, as worked out by Hendron in 1940. The sherd count for these excavations was admittedly small as compared to Rainbow House. However, Hendron worked out long sequences in each instance and showed the period of growth and greatest activity (Hendron 1940: Ceramic Correlation Charts I, II, III, and IV) as coming between A.D. 1400 and A.D. 1600 with abandonment shortly thereafter. According to this chronology the period of growth and greatest activity for Rainbow House would probably fall between A.D. 1400 to A.D. 1500.

Pottery studies based on rim shape and outside appearance leave much to be desired. Binocular microscopic studies would give more scientific results. The technological approach used by Shepard some 20 years ago on the Rio Grande Glaze paint ware (1942) would produce more answers to the problems of pottery distribution. However, such an approach is highly specialized and costly and probably will not be undertaken in the near future.

Rainbow House and nearby Frijolito probably were sister pueblos--each with 40 to 50 rooms and one kiva. They both belonged to the early Glaze period of the Pajarito plateau. Frijolito appears to have been abandoned in early Glaze C times (Mera 1934: 7), while Rainbow House continued in use to a later date.

Architecturally, Rainbow House falls into the same pattern of room types and room features as other ruins in the canyon. The Plaza unit appears to have been the latest addition to the pueblo. The kiva had two interesting details not found in other kivas--a two-course-high veneer added on either side of the ventilator shaft and a solid stone deflector to the west or front of the fireplace rather than between the ventilator and the fireplace.

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APPENDIX

Description of Burned Corncobs
by
Mangelsdorf and Galinat

Explanation of columns:

1. The number of kernel rows.
2. The length of an intact kernel row divided by the number of kernels which the row once bore.
3. Kernel thickness, derived from No. 2.
4. Diameter of the rachis.
5. Diameter of the rachis times pi, divided by row number = amount of space available at the surface of the rachis for each kernel.

Note: All measurements in mm.

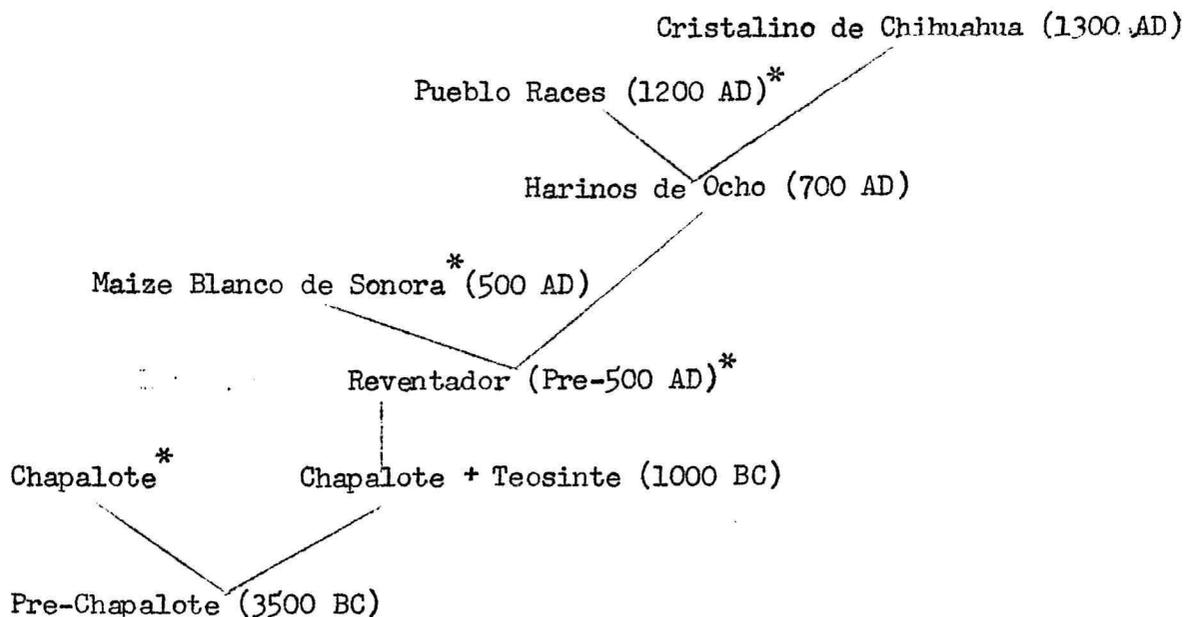
Provenience	1	2	3	4	5	Race	Notes
Room 1, 12-18" cont'd. to floor 28"	12	15/4	3.8	15	3.9	Chapalote	
Room 1, 32-38" on north wall	10	21/7	3.0	8	2.5	Chapalote	
	10	18/6	3.0	9	2.8	Chapalote	
Room 1, 38-44" room fill	12	19/6	3.2	12	3.1	Chapalote	
	10	19/7	2.7	9	2.8	Chapalote	
	12	11/4	2.8	8	2.1	Chapalote	
	12	15/4	3.8	8	2.1	Chapalote	
<u>Average, Room 1</u>	<u>11.5</u>		<u>3.1</u>	<u>9.3</u>	<u>2.5</u>		
Room 5, 24-30"	6		3.1	12.0	6.3	Harinoso de Ocho	Photo
	10		3.0	9.0	2.3		
	8		3.1	11.0	4.3	Harinoso de Ocho	Photo
<u>Average, Rm. 5</u>	<u>8</u>		<u>3.1</u>	<u>10.7</u>	<u>4.3</u>		
Room 6, 30-36" floor	8		4.0	10.0	3.9	(Chapalote?)	F ₁ ?
	10		4.5	14.?	4.4	(Chapalote?)	F ₁ ?
<u>Average, Rm. 6</u>	<u>9.0</u>		<u>4.5</u>	<u>12.0</u>	<u>4.2</u>		
Room 7, shelled, corn crib	14	33/10	3.3	13.0	3.1	Chapalote	

Provenience	1	2	3	4	5	Race	Notes	
Room 9, 24-30"	16		3.1	13.0	2.6	Chapalote	Flattened	
	10		3.1	10.0	3.1	Chapalote		
	12		4.0	10.0	2.6	Chapalote		
	12		3.5	13.0	3.4	Chapalote		
	<u>Average</u>	12.5		3.4	11.5	2.9		
Room 9, 30-36"	12	22/6	3.7	10.0	2.6	Chapalote		
	10	16/4	4.0	11.0	3.5	Chapalote		
	12	15/4	3.8	12.0	3.1	Chapalote		
	10	13/4	3.3	9.0	2.8	Chapalote		
	<u>Average</u>	11.0		3.7	10.5	3.0		
Room 9, 36-42", floor	12	24/8	3.0	12.0	3.1	Chapalote		
	16	22/6	3.7	10.0	2.0	Chapalote		
	16	22/6	3.7	11.0	2.2	Chapalote		
	10	24/6	4.0	10.0	3.1	Chapalote		
	14	21/7	3.0	12.0	2.7	Chapalote		
	12	21/6	3.5	10.0	2.6	Chapalote		
	10	21/6	3.5	10.0	3.1	Chapalote		
	12	15/5	3.0	10.0	2.6	Chapalote		
	14	6/3	2.0	10.0	2.2	Chapalote		
	<u>Average</u>	12.9		3.3	10.6	2.6		
Room 10, floor fill	12	18/6	3.0	7	1.8	Chapalote		
	10	17/7	2.4	6	1.9	Chapalote		
	10	14/4	3.5	8	2.5	Chapalote		
	12	11/5	2.2	frag.		Harinoso de Ocho influencia		
	12	10/3	3.3	7	1.8	Chapalote		
	<u>Average</u>	11.2		2.9	7.0	2.0		
Room 10, floor fill	10		3.0	11.0	3.5	Chapalote		
	12		3.2	10.0	2.6	Chapalote		
	12		2.5	9.0	2.4			
	10		3.3	13.0	4.1	Chapalote		
	10		3.0	9.0	2.9	Chapalote		
	12		3.0	11.0	2.9	Chapalote		
	<u>Average</u>	11.0		3.0	10.5	2.7		
	Room 10, 36" floor fill	10	29/8	3.6	11.0	3.5		Chapalote
12		24/8	3.0	9.0	2.4	Chapalote		
10		19/7	2.7	9.0	2.8	Chapalote		
10		17/6	2.8	11.0	3.5	Chapalote		
12		15/5	3.0	11.0	2.9	Chapalote		
<u>Average</u>		10.8		3.0	10.2	3.0		

Provenience	1	2	3	4	5	Race	Notes
Room 11	10		3.3	12.0	3.8	Chapalote	
Room 12, floor fill	12		2.5	8.0	2.1	Early Chapalote	(slender)
	10		2.7	8.0	2.5	Early Chapalote	(slender)
	10		3.0	7.0	2.2	Early Chapalote	(slender)
	12		3.0	8.0	2.1	Early Chapalote	(slender)
	12		3.1	11.5	3.1	Chapalote	
	10		3.0	12.0	3.8	Chapalote	
	10		2.8	11.0	3.5	Chapalote	
Average	10.9		2.9	9.4	2.8		
Room 12, 48" - floor	10	21/7	3.0	8.5	2.7	Chapalote	
	14	21/7	3.0	9.0	2.0	Chapalote	
	10	16/6	2.7	8.0	2.5	Chapalote	
	8	17/6	2.8	7.5	2.9	Early Chapl.	Long upper glumes
	10	16/5	3.2	9.0	2.8	Early Chapalote	
	12	18/6	3.0	10.0	2.6	Early Chapalote	
	10	14/5	2.8	7.0	2.2	Early Chap.	Long upper glumes
	12	12/4	3.0	10.0	2.6	Early Chapalote	
	10	9/3	3.0	8.0	2.5	Early Chapalote	
	12	13/4	3.3	6.0	1.6	Early Chapalote	
	8	8/3	2.7	6.0	2.4	Early Chapalote	
	8	10/3	3.3	10.0	3.9	Early Chapalote	
	8	9/3	3.0	8.0	3.1	Early Chapalote	
	10	9/3	3.0	9.0	2.8	Early Chap.	Long upper glumes
	10	9/3	3.0	8.0	2.5	Early Chapalote	
	10	6/2	3.0	8.0	2.5	Early Chapalote	
	12	12/3	4.0	10.0	2.6	Chapalote	
Average	10.2		3.0	8.4	2.6		
Room 15, 42-48"	12	10/4		8.0	2.1	Chapalote	
Room 24	8		3.7	10.0	3.9	Chapalote	
Room 26, 47" to floor	12	13/5		frag.		Chapalote	
Room 36	12		2.5	7.5	2.0	Early Chapalote	Flattened
Room 37	12	24/9		12.0	3.1	Chapalote	
Room 40	8-10		2.2	9.0	3.5) 2.8)	Chapalote	No hairs?
Room 43	10		3.0	12.0	3.8	Chapalote	
Trench, NW corner block	12		2.5	12.0	3.1	Chapalote	

Provenience	1	2	3	4	5	Race	Notes
Trench N73L, block I, 24-30"	12		3.2	16	4.2	?	
	10		3.4	14	4.4	?	
Average	11.0		3.3	15.0	4.3		
Square N4E1, Block 1	8	33/10	3.3	9	2.5	Chapalote	
	10	22/6	3.7	8	2.5	Chapalote	
	16	15/5	3.0	10	2.0	Chapalote	
	12	16/7	2.3	7	1.8	Chapalote	
Average	11.5		3.1	8.5	2.2		

RACES OF CORN IN THE SOUTHWEST



* Exists now or during contact period.
 Dates are from earliest known appearance of race.

