MUSEUM OF NORTHERN ARIZONA
Bulletin 23

NALAKIHU

Excavations at a Pueblo III Site on Wupatki National Monument, Arizona

by
DALE S. KING

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WITH APPENDICES

REPORT OF VEGETAL MATERIAL
by Volney H. Jones

ARCHEOLOGICAL SURVEY, CITADEL DISTRICT
by
Charlie R. Steen, Robert S. Harris and Dale S. King

Published by the Northern Arizona Society of Science and Art, Flagstaff, Arizona, in cooperation with the Southwestern Monuments Association, Santa Fe, N.M.
FLAGSTAFF, ARIZONA, , 1949

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FOREWORD

F-68 C W A Work Project No. 4 had been planned in Washington. Orders called for a survey of sites and restoration of cliff dwellings in Walnut Canyon National Monument at an elevation of 6,500 feet, 11 miles east of Flagstaff, Arizona. The project was one of several administered by the late Superintendent Frank Pinkley, of the former Southwestern National Monuments Headquarters, National Park Service, Coolidge, Arizona. Scientific supervision was by Dr. Harold S. Colton, Director of the Museum of Northern Arizona, Flagstaff, Arizona, then custodian of Wupatki and Walnut Canyon National Monuments.

Plans had not taken into consideration the Flagstaff winter climate which is usually severe with much snow and zero weather; work in the Canyon would have been dangerous and restoration activities impossible. With these conditions in mind Dr. Colton asked and was granted permission to transfer the project to a lower altitude, and Nalakihu, a small ruin on Wupatki National Monument, 36 miles northeast of Flagstaff, at an elevation of 5,390 feet and normally free from snow, was selected.

The project consisted of 2 parts: (1) the preparation of a detailed contour map of 20 quarter sections comprising the Citadel portion of Wupatki National Monument and surrounding regions, to include all prehistoric sites and geological features; and (2) the excavation and partial reconstruction of Nalakihu. The ruin was chosen because its small size lay within capabilities of a 4-man crew. Also it was possible to reconstruct 2 rooms of the dwelling to serve as registration rooms and to furnish shelter for monument visitors.

Work on Nalakihu started December 27, 1933, and ended April 12, 1934. The survey party began January 2 and finished April 7, 1934; they helped with excavation and backfilling the last 5 days.

Initial personnel consisted of 1 foreman and archeologist, Dale S. King; 2 skilled surveyors, Robert S. Harris, instrument man, and Jim Ross, temporary rodman; 2 semi-skilled laborers, Ross Sansom and Leslie Smithson; and 1 laborer, Jack Fuss. Charlie R. Steen arrived January 10 and replaced Ross, acting as archeologist and rodman. Walter Hyde succeeded Fuss January 2, and William Sansom provided additional help during the latter 2 weeks of March. (Fig. 4)

Until February 15 personnel were quartered and messed at Wupatki Pueblo with CWA Work Project No. 10, which was excavating there at the same time. Water and tools were hauled each day the 9 miles to Nalakihu in a rented truck. On the date mentioned camp was established at Nalakihu in portable tent cabins loaned by the Museum of Northern Arizona, —an arrangement that proved more convenient and efficient. Location of the cab-

ins, by the way, accounts for the curiously shaped unexcavated areas to be noted in the excavation map (Fig. 11).

Laboratory work and preparation and writing of preliminary and final reports were accomplished partly on the job and in the museum of Northern Arizona, or at the residence of the writer on contributed time after premature closing of the project.

Acknowledgements

Appreciation is expressed here for identification of bone material by Carl B. Koford and Chandler P. North of the Museum of Vertebrate Zoology of the University of California, Berkeley, California; vegetal items by Volney H. Jones of the University of Michigan; skeletal measurements by Miss Katharine Bartlett of the Museum of Northern Arizona; identification of basketry and textile fragments by Earl H. Morris and Kate Peck Kent, respectively; of minerals by John Anthony of the Arizona Bureau of Mines; and duplication of photographic prints, stenographic assistance and general cooperation by the National Park Service, Department of the Interior.

Lyndon L. Hargrave first initiated the writer into the intricacies of Flagstaff area material culture and allowed him to find out for himself that a complex situation cannot be described adequately by over-simplified classification.

The members of a loyal crew, notably Robert Harris and Charlie R. Steen, gave many evening and weekend hours to tasks not included in their duty. The whole crew contributed, after the project closed, a day of hard shoveling to complete backfilling a pit area.

The Museum of Northern Arizona is primarily concerned with problems which include this small item of research, yet the Museum's staff, Dr. Harold S. Colton, Dr. John C. McGregor, Miss Katharine Bartlett, Mr. Virgil Hubert, Mr. Jeff Ferris, Mr. Alfred F. Whiting, and Dr. Allan R. Phillips, went in their friendly cooperation and unfailing assistance far beyond what could have been expected even under the circumstances. The writer is also indebted to Jim Kewanwytewa of the Museum for cheerful aid in numerous particulars, and to Eric Douglas for use of facilities of the Indian Art Department of the Denver Art Museum.

Drawings and snapshots are by the author; all good photographs by Jack Snow.

Dale S. King
Florence, Arizona
July 22, 1948

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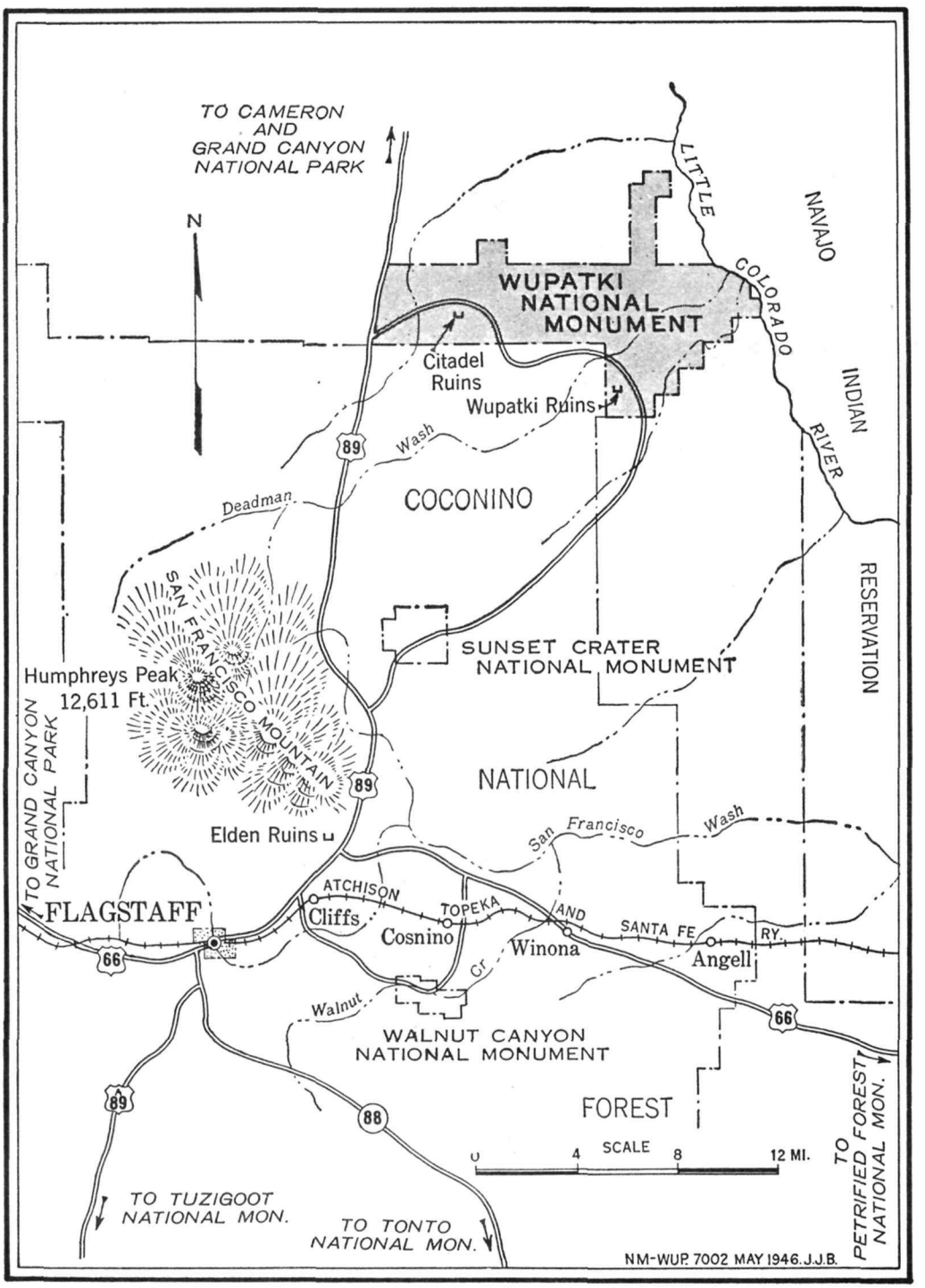


Fig. 1.

Vicinity map: Wupatki, Sunset Crater, and Walnut Canyon National Monuments, Arizona.



Fig. 2.

Citadel Ruin covers the top of a circular basalt butte.



Fig. 3.

At the edge of an extraordinary sink in the Kaibab limestone (looking southwest from the ruin.)

Nalakihu, "The Lone House," is a small red masonry pueblo ruin located at the foot of Citadel Butte on Wupatki National Monument, Coconino County, Arizona. It lies in township 25, range 9 east, section 7, Gila and Salt River Meridian.

The Citadel vicinity has been described by Fewkes,[1] Barrett,[2] and Colton;[3] consequently only a brief recapitulation will be given here.

Dominating the skyline of the north central Arizona plateau are the San Francisco Peaks, elevation 12,700 feet, rising above a volcanic field[4] in size second in the country only to the Columbia River manifestation. During various periods of activity fingers of lava tentacled out from fissures and craters; some flowed down into the valley of the Little Colorado River to the east and northeast.

Structure of the earth under the flows determined in many respects where ancient inhabitants could have obtained water, and, hence, been able to live. Much of the underlying rock is Kaibab limestone, sandy, much fractured, and unable to hold water, as is the case with the Coconino sandstone below it. But above the Kaibab in certain places the Moenkopi red sandstone and shales remain where not stripped off in process of erosion. These are impervious and give rise to the only springs north of the Peaks.

On the steppe forming the western portion of the Painted Desert along the eroded edge of 1 of these basaltic lava flows, probably of the first period of eruption of the San Francisco volcanic field, occur 2 extraordinary sinks (Fig. 3) about 2 miles apart, around which are clustered many prehistoric Indian dwellings. Although both sinks seem to be on fault lines, their geological origin is not clear.

In each sink the lava lies on a thin bed of Moenkopi sandstone underneath which the Kaibab limestone is exposed for 50 feet or more.

On the northeast rim of the northern sink, spectacular Citadel Ruin (Fig. 2) covers the top of a circular basalt butte, once part of the lava flow, which as a landmark commands the whole odd region of black and red mesas, waterless grass lands, land-locked drainages, shallow canyons, and

(1) Fewkes, 1904b, p. 43.
(2) Barrett, 1926, p. 9 ff.
(3) Colton, 1932, p. 33 ff.
(4) Robinson, 1913.

deep fissures[5] in the limestone. It frowns down on the huge, gaping sink, a hole approximately 400 feet in diameter with its flat, red silt bottom 170 feet below the basalt caprock.

The Citadel has perhaps 30 rooms in its ground plan. Its external walls - one 12 feet high - angle and curve with inequalities of the butte's rim, and are pierced by strategically placed loopholes. In the patio is a depression which may be a kiva. Most of the Citadel Butte slopes seem covered with man's handiwork: stone circles of unknown use can be noticed and 3 major terraces stairstep down the north declivity.

At the foot of the butte stand Nalakihu (NA 358) and NA 357, a sprawling "E" of tumbled malpais boulders, 120 feet to the east. At least 3 small rings of basalt representing 1-room structures dot the flat to the north of the 2 ruins.

If the visitor carefully scans the surrounding countryside, he sees numerous little pueblos topping the mesas, and can distinguish the inconspicuous low mounds of basalt ruins in the grass-covered flats in the distance. (Fig. 4).

ENVIRONMENT

Vegetation in the western portion of Wupatki National Monument immediately surrounding Nalakihu fits Shreve's[6] description of Desert-grassland Transition type, which is found in the drainage of the Little Colorado River in Apache, Navajo and Coconino counties, with other large areas in Yavapai, Graham, and Cochise counties, Arizona. Nichol[7] pointed out that such areas are semidesert and called them "Highland Grass type." An open stand of *Juniperus monosperma* is scattered through the typical perennial grasses, which commonly occur as separate bunches with intervening bare ground.

Elevation at Nalakihu is 5,390 feet above sea level; mean average rainfall is 6.72 inches per year. Low ranges of temperatures exclude a great majority of desert plants. Soil varies from considerable depth in "prairies" and washes to almost none on limestone mesas and lava flows.

(5) Gordon, 1935, p. 159.
(6) Shreve, 1942, p. 17.
(7) Nichol, 1937, p. 195.



Fig. 4.

North and east from the Citadel extends an odd region of black lava mesas and juniper-dotted grasslands, broken by fissures and shallow canyons in Kaibab limestone.



Fig. 5.

At the foot of Citadel Butte is Nalakihu (NA 358), the "Lone House," a small prehistoric pueblo. Tent cabins were quarters for the excavation and survey crew.



Fig. 6.

The field party: left to right, Smithson and Sansom, laborers; Harris, survey instrument man; King, foreman and archeologist; Steen, survey archeologist and rodman; and Hyde, laborer.

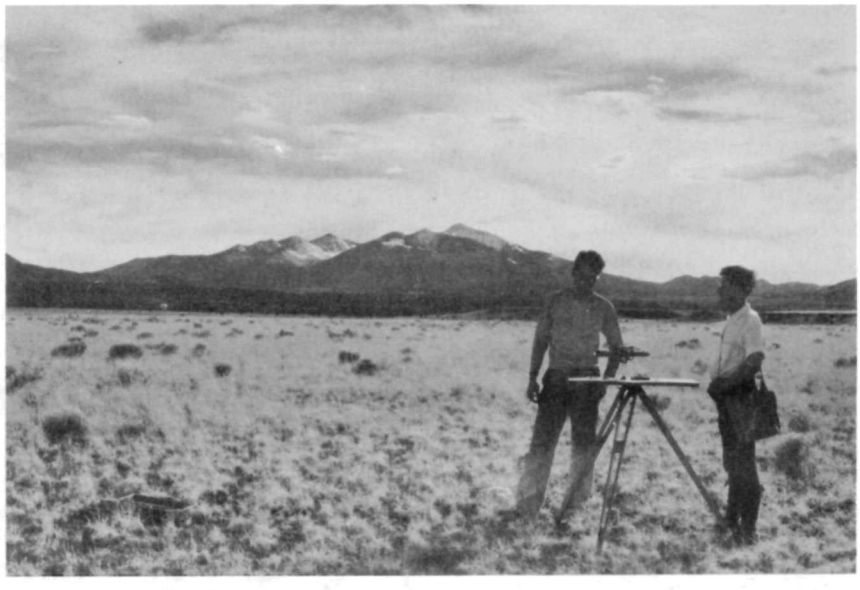


Fig. 7.

Steen and Harris completed an intensive archeological survey of 20 quarter sections and helped with excavation of Nalakihu.

Dominant grasses are species of *Bouteloua, Sporobolus, Aristida, Muhlenbergia, Hilaria,* and *Stipa,* with *Hilaria jamesii* (galleta) and *Sporobolus* forming a considerable growth particularly on Antelope Prairie. (Fig. 3.) Associated with the grasses are numerous root perennials and a few annuals, with shrubs sporadically distributed, usually in restricted localities in washes.

Black cinders from the Sunset Crater eruption still cover parts of the terrain in irregular patches and alter the environmental relationships; in general, displacing life zones downward by acting as a moisture-conserving mulch and enabling plants to live at elevations 1,000 feet lower than normally. Nichol[8] commented on the unusual prevalence of black grama *(Bouteloua eriopoda)* over blue grama *(B. gracilis),* a condition possibly brought about by the cinder mulch holding enough wetness to meet the heavier water requirements of the former grass.

As the monument area drops down to the east into the valley of the Little Colorado River, the grassland changes into the Great Basin Microphyll Desert[9] type of vegetation, varying considerably with soil and exposure conditions, but often characterized by bare earth and rock surfaces alternating with hummocks created by colonies of *Ephedra, Atriplex, Chrysothamnus, Yucca, Opuntia,* or *Lycium,* with scattered grasses. Willows and cottonwoods grow sparsely along the river.

An incomplete listing[10] from the herbarium of Wupatki National Monument will nevertheless give the most important plants growing at the present time within the former foraging range of the prehistoric inhabitants of Nalakihu:

ANACARDIACEAE (Cashew family)

Rhus trilobata Nutt., Squawbush

APOCYNACEAE (Dogbane family)

Amsonia peeblesii Woodson

ASCLEPIADACEAE (Milkweed family)

Asclepias latifolia (Torr.) Ref., Milkweed

ASTERACEAE (COMPOSITAE)

Aplopappus heterophyllus (Gray) Blake, Jimmyweed, Rayless goldenrod

(8) Nichol, 1939, p. 1.

(9) Shreve, 1942, p. 15.

(10) Whiting, 1941.

Artemisia carruthii Wood
Artemisia dracunouloides Pursh, False-tarragon
Artemisia filifolia, Sand sagebrush
Artemisia ludoviciana Nutt.
Artemisia tridentata Nutt., Big sagebrush
Aster leucanthemifolius Greene
Brickellia linifolia D. C. Eaton
Brickellia californica (T. & G.) Gray (called pachaba by Hopi)
Bahia dissecta (Gray) Britton
Chrysothamnus nauseosus (Pall.) Britton, var. *bigelovii* (Gray), H. M. Hall, Rabbitbrush
Chrysothamnus nauseosus var. *graveolens* (Nutt.), H. M. Hall, Rabbitbrush
Franseria acanthicarpa (Hook.) Coville, Bur-sage
Gutierrezia lucida Greene, Snakeweed
Gutierrezia sarothrae (Pursh) Britt. & Rusby, Snakeweed
Helianthus petiolaris Nutt. Sunflower
Lygodesmia grandiflora (Nutt.) Torr. & Gray
Senecio longilobus Benth., Threadleaf grounsel
Stephanomeria pauciflora (Torr.) A. Nels
Tetradymia canescens var. *inermis* (Nutt.) A. Gray, Horsebrush
Xanthium saccharatum, Cocklebur
Zinnia grandiflora Nutt.

BORAGINACEAE (Borage family)
Cryptantha jamesii (Torr.) Payson
Cryptantha pterocarya (Torr.) Greene
Heliotropium curassavicum L. var. *oculatum* (Heller) Johnst.
Lappula redowskii (Hornem.) Greene var. *desertorum* (Greene) Johnst., Stickseed

BRASSICACEAE
Descurainia pinnata (Walt.) Britton Benson, Tansymustard
Stanleya pinnata (Pursh) Britt., Desertplume

CACTACEAE
Opuntia hystricina Engelm.
Opuntia whipplei Engelm. & Bigel.

CAPPARIDACEAE (Caper family)
Polanisia trachysperma Torr. & Gray, Clammyweed

CHENOPODIACEAE
Atriplex canescens (Pursh) Nutt., Fourwing saltbush
Chenopodium incanum (Wats.) Heller, Goosefoot, Lamb's Quarters

Eurotia lanata (Pursh) Moq., Winterfat
Sarcobatus vermiculatus (Hook.) Torr., Greasewood
CUCURBITACEAE (Gourd family)
Cucurbita foetidissima H. B. K., Buffalo-gourd, calabazilla
EUPHORBIACEAE (Spurge family)
Croton texensis (Klotzsch) Muell., Doveweed
FABACEAE (Caesalpinaceae)
Astragulus macdougali Sheldon, Blue loco
Astragulus pattersonii A. Gray
Astragulus wootoni Sheldon
Parryella filifolia T. & G.
Phaseolus angustissimus Gray var. *latus* M. E. Jones
GNETACEAE (Jointfir family)
Ephedra cutleri Peebles
Ephedra torreyana S. Wats.
HYDROPHYLIACEAE (Waterleaf family)
Phacelia, numerous species, particularly in cinders.
JUGLANDACEAE (Walnut family)
Juglans rupestris var. *major* Torr., Arizona walnut
LILIACEAE
Yucca baileyi Woot. & Standl.
LOASACEAE (Loasa family)
Mentzelia albicaulis Dougl.
Mentzelia pumila (Nutt.) T. & G., Blazing-star
MALVACEAE (Mallow family)
Abutilon parvulum Gray, Indian Mallow
Sphaeralcea parvifolia N. Nels., Globemallow
Poliomintha incana (Torr.) Gray
NYCTAGINACEAE (Four-o'-clock family)
Quamoclidion multiflorum Torr.
OLEACEAE (Olive family)
Forestiera neomexicana Gray, New Mexico locust
ONAGRACEAE (Evening-primrose family)
Oenothera runcinata (Engelm.) Munz
PINACEAE (Pine family)
Juniperus monosperma (Engelm.) Sarg., Oneseed juniper
Pinus edulis Engelm., Pinyon pine
Pinus ponderosa, yellow pine
Pseudotsuga taxifolia, Douglas fir

POACEAE (Gramineae) (Grass family)
Andropogon halli Hack.
Andropogon scoparius Michx., Bluestem
Bouteloua curtipendula (Michx.) Torr., Sideoats grama
Bouteloua eriopoda Torr.
Bouteloua gracilis (H. B. K.), Blue grama
Hilaria jamesii (Torr.) Benth., galleta
Muhlenbergia porteri Scribn., Muhly.
Oryzopsis hymenoides (Roem. and Schult.), Indian ricegrass
Phragmites communis Trin., Common reed, carrizo
Sporobolus airoides Torr., Alkali sacaton
Stipa neomexicana (Thurb.) Scribn., Needlegrass
POLEMONIACEAE (Phlox family)
Gilia inconspicua (J. E. Smith) Dougl.
POLYGONACEAE (Buckwheat family)
Eriogonum, numerous species
PORTULACACEAE (Portulaca family)
Portulaca retusa Engelm.
ROSACEAE (Rose family)
Fallugia paradoxa (D. Don) Endl., Apache-plume
SALICACEAE (Willow family)
Populus fremontii S. Wats., Cottonwood
SAXIFRAGACEAE (Saxifrage family)
Ribes inebrians Lindl., Squaw currant
SOLANACEAE (Potato family)
Chamaesaracha coronopus (Dunal) A. Gray
Datura meteloides DC, Sacred datura
Lycium andersonii A. Gray
Lycium pallidum Miers
Nicotiana attenuata Torr.
Nicotiana trigonophylla Dunal
Physalis fendleri Gray, Groundcherry
Solanum eleagnifolium Cav., White horsenettle, bullnettle
VERBENACEAE (Vervain family)
Verbena wrightii A. Gray

National Park Service custodians and rangers at Wupatki have kept observation records on animals and recorded the following information (U-uncommon, R-recorded, C-common): Mule deer, U; Pronghorn, U (6-10 in

in summer, 15-25 in winter); Badger, U; Coyote, C; Bobcat, C; Porcupine, U; Spotted shunk, R; Raccoon, U; Texas jackrabbit, C; Cedar belt cottontail, C; Antelope ground squirrel, C; Rock squirrel, U; Grasshopper mouse, R; Tawny deer mouse, C; Arizona bushy tailed woodrat, C; Kangaroo rat, R; Sooty pocket mouse, R on lava areas. Venomous snakes are uncommon, but nonvenomous species are seen more often. The Western spadefoot and Great Basin short-horned horned toads have been identified, as have the Western earless and collared, and Desert scaly lizards.

Of the San Francisco Mountain raptorian birds listed by Phillips,[11] the following are found in the Wupatki region:[12]

Western turkey vulture
Hawks - Accipitrine: Sharp-shinned, Cooper's, Eastern goshawk
- Buteonine: Western red-tailed
- Falcons: Prairie, Western and Richardson pigeon hawks, Desert sparrow hawk

Golden Eagle
Owls - Long-eared, Western and Pacific horned

Of the more than 80 passerine species recorded on the monument mention should be made of the American raven and Western mourning dove. Both Scaled and Gambel quail were introduced in the early '30's; only the former are surviving.

METHODS

Trenching

Dotting on the excavation map (Fig. 11) represents the area tested. Pits 2 feet square and 4 feet apart were sunk to undisturbed clay in the area 25 feet east of the ruin. These tests encountered no remains; therefore dirt excavated from rooms was dumped there. With discovery of the first outlying cist, the flat ground farther out was investigated more thoroughly by trenches 4 feet wide and 6 inches apart, kept with clean bottoms, but backfilled as the workmen went along. Future research at Nalakihu should include complete trenching immediately adjacent to the ruin.

(11) Phillips, 1947.
(12) Hargrave, 1935.

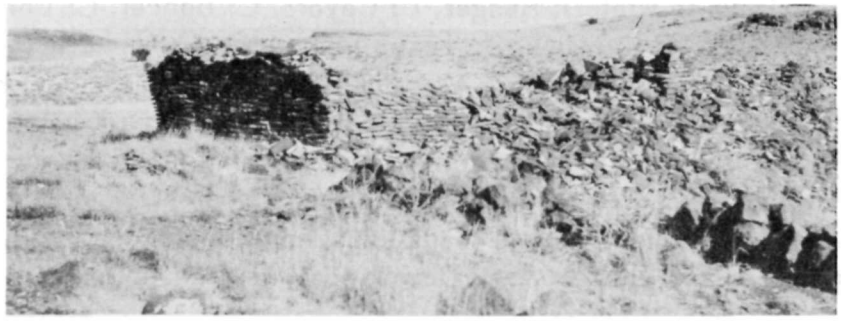


Fig. 8.

Nalakihu (NA 358) from the south, before excavation.



Fig. 9.

During excavation and reconstruction.



Fig. 10.

After termination of project.

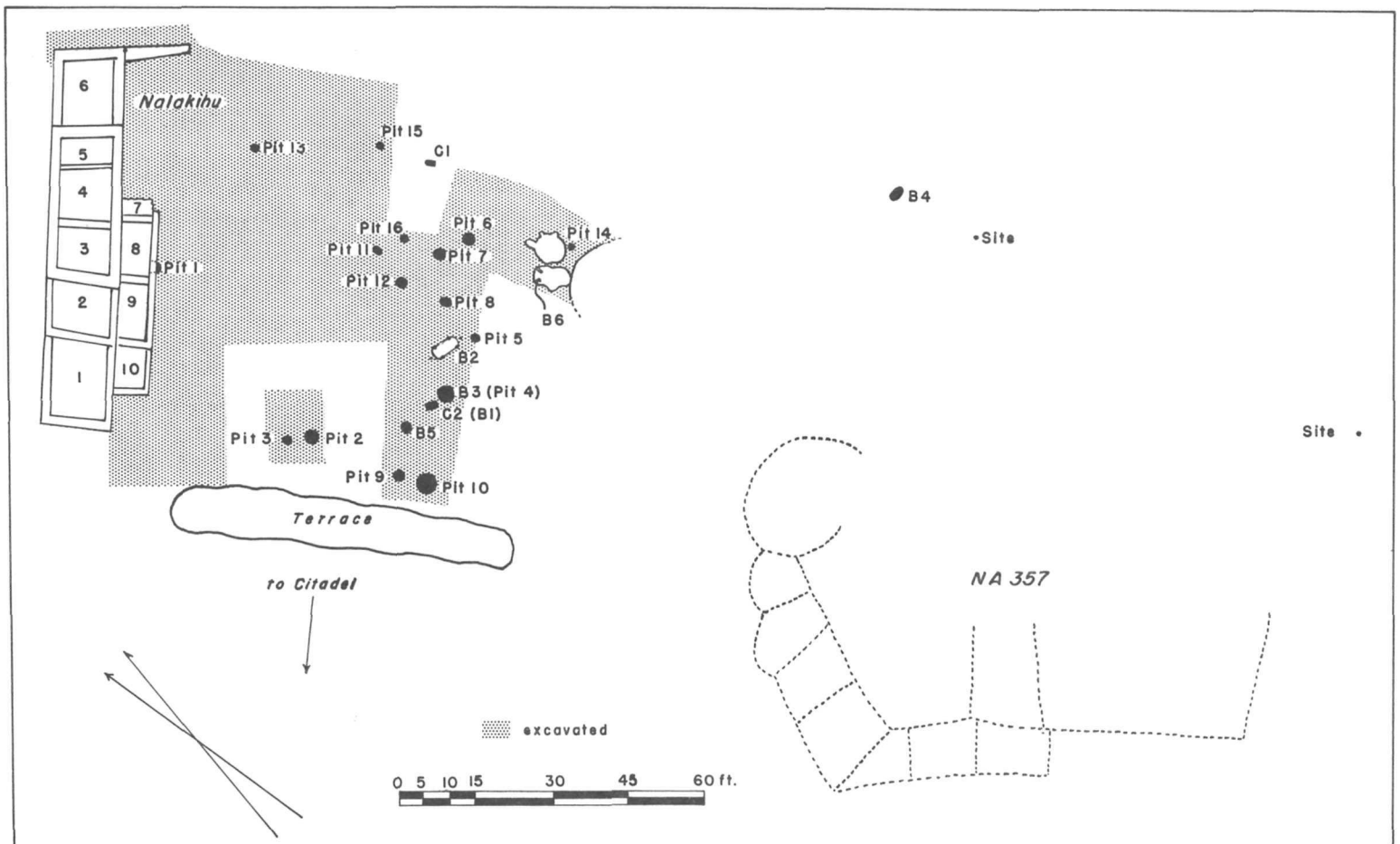


Fig. 11.

Map of area excavated between Nalakihu and NA 357.

Rooms

Each room was cleared of loose surface rock, which was stacked in ricks. Rubble was spread evenly on previously tested ground and covered with dirt, which was kept separate from stone to facilitate screening and handling. A stratigraphic pier was left in the center of each room to insure identification of collapsed roofs, but as none showed significant change in material culture from bottom to top they were cleared as each room was excavated.

As roof adobe was discovered, an amount was troweled sufficient to determine how the roof had been constructed, why it fell, and its position in relation to the room in general.

Ordinarily, debris was taken out to the first story roof, the top of which usually was about 6 inches above the floor. Then this was troweled off, the floor swept, and the room photographed. Rooms were backfilled to protect them after test pits had been put through the floors at opposite corners.

Photographs were taken at all important stages of digging.

Reconstruction

Although reconstruction at Nalakihu does not accord with National Park Service ruins stabilization policies later codified, it must be remembered that at the time the work was justified and approved to provide shelter and registration for numerous visitors unwilling to brave the bad road into Wupatki ranger station. It has functioned well as such since 1934.

The writer was filled with awe at tampering with a ruin on a national monument; he made certain to disturb no stone in situ, copied original masonry as closely as possible, and wasted a lot of time with concealed corner bonds, keys in butt joints, and cross ties through wall cores. Under the few heightened walls, Nalakihu remains as it was before the excavation and could be returned to its original condition if so desired.

Pits and Burials

Each pit was troweled, shovels being used only to remove loose troweled material. Depths and positions of artifacts, ash layers, etc., were noted while excavation was in progress. Burials were uncovered with

trowels, whiskbrooms, bent awls, etc. All dirt was screened for small objects.

Measurements

The Alidade and steel tape were used for overall measurements, orientation, and spotting of isolated features.

Care of Finds

Artifacts were cleaned, repaired, and given catalog numbers according to the system of the Museum of Northern Arizona. They were deposited with the Museum until such time as proper facilities for storage and display are available at the monument.

HOUSE REMAINS

Capt. L. Sitgreaves[13] in 1853 was the first white man to mention Wupatki, while Fewkes,[14] Barrett,[15] and Colton,[16] described Nalakihu ruin, Fewkes listing it as Ruin A in Group A, Barrett calling it No. 7 Rectangular Building, and Colton designating it NA 358 in the numbering system[17] of the Museum of Northern Arizona archeological survey. During excavation Jimmy Kewanwytewa, Hopi Indian employee of the Museum, named it Nalakihu, "The House Outside the Village" or "The Lone House," due to its relation to large Citadel Ruin on the top of the nearby butte. The word is accented on the second syllable. (Fig. 8)

Barrett thought the house consisted of a separate room connected to 3 others by a kind of court, but Colton correctly estimated 10 rooms in the ground plan. Excavation proved 3 or 4 additional rooms had formed a second story above the central portion of the dwelling.

(13) Sitgreaves, 1853, p. 9.
(14) Fewkes, 1904, p. 43.
(15) Barrett, 1926, pp. 18, 24-5.
(16) Colton, 1931; 1932b, pp. 4-6.
(17) Colton, 1932, pp. 34-5.

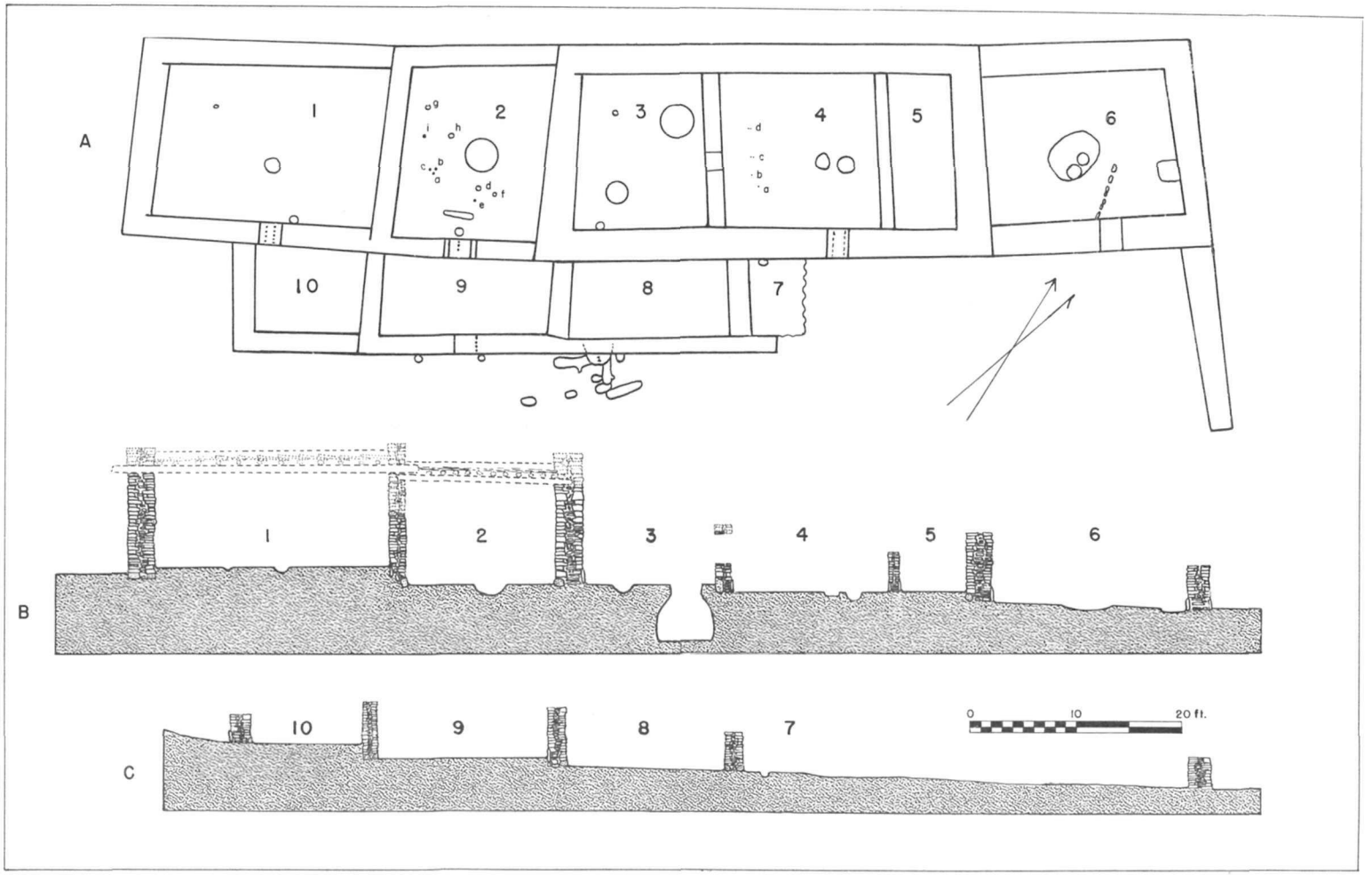


Fig. 12.
Ground plan of and sections through Nalakihu.

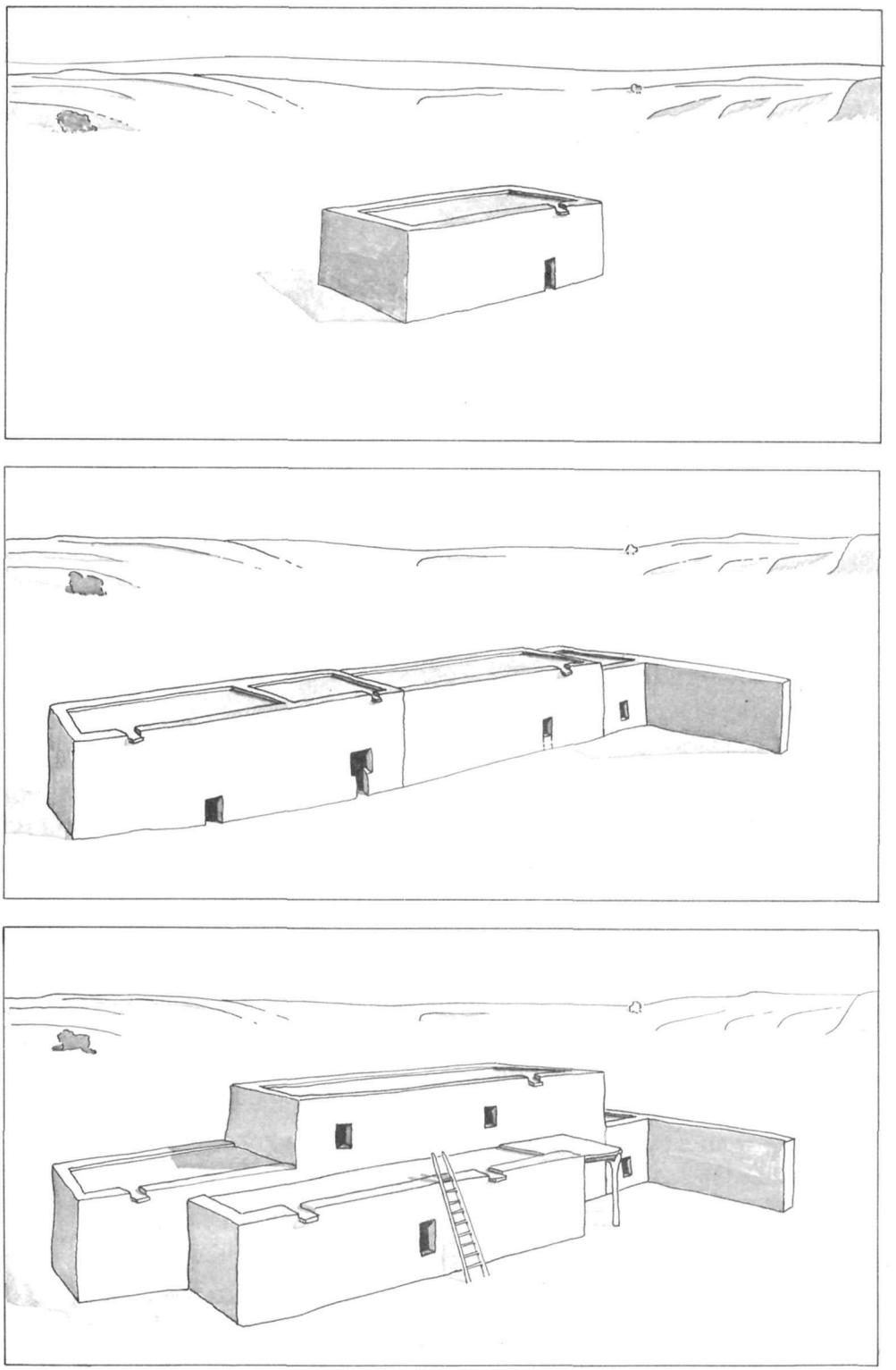


Fig. 13.

Three possible constructional stages through which Nalakihu may have passed. (Hatchways are omitted.)

Examination of wall junctures and masonry types showed Nalakihu had grown through at least 3 periods of constructional activity (Fig. 13):

1. Originally its builders had constructed 2 large rooms, quasi-rectangular in shape, sub-dividing the larger by a partition which formed a granary in one end.

2. They added 1 room to the east end of the block and 2 more at the west end. Against the northeast corner of the pueblo they abutted a typical "shelter" wall.

3. Then they augmented floor space by 4 small rooms on the front or east side of the dwelling and built second-story rooms over the 4 central rooms of the main block.

Analysis revealed little or no evidence as to how long separated these constructional periods were.

In the following description of house remains the long axis of Rooms 1-6 is presumed to point north, although the true direction is more nearly northeast.

ROOM 1

Largest and most southerly of the 10 ground floor rooms of Nalakihu, quadrilateral with 2 equal sides and almost certainly only 1 story in height. Built at the same time as Room 2 and forming a unit which abuts against Room 3 which is a part of the oldest block of rooms.

Masonry

Material. Red Moenkopi sandstone pieces having a smooth straight edge horizontally coursed in adobe mortar. This stone outcrops in places around Citadel Sink, the deposit on the sink's northeastern rim showing evidence of having been quarried. It has been cut back farther than could be expected from natural cleavage until now the layer is covered by a heavy overburden.

Stone generally smaller than that used at Wupatki, for example. Pieces averaged 8 to 14 inches long and 1¼ to 3½ inches thick.

Condition. Walls in fair condition, but corners broken loose, allowing walls to lean outward. At the southwest corner, the walls split slightly, allowing both vertical halves to lean away from each other. See elevations for height of vestigial walls.

Construction. Walls relatively thin with interiors filled with adobe and rubble. Throughout the site they classify as "Fine Unbanded with Incidental Core," expressed in Hawley's[18] terminology. They had been laid up course by course, keeping a constant level inside and outside. Pieces placed closely end-to-end, no space being left for mortar, if possible. Small, thin pieces used occasionally to chink or to block up the end of a stone to make it level.

See floor plan (Fig. 12) for detail of corner jointing. Only the southwest corner showed much evidence of bonding, and this probably was as much unintentional as planned.

The north wall extends 9 inches below floor line; the east wall the same. Lowest course in both cases of uneven basalt rocks.

Wall Features. No indication of viga sockets or windows.

Midway in the east wall is an old doorway, later walled up and converted into a ventilator about 6 inches square. Entry after construction of Room 10 must have been through the roof.

Two courses of basalt rock separated by a single course of sandstone in the south wall. These provide the unusual features of the masonry. Those in the south wall in perfect condition, and although the north wall was more disintegrated, 2 basalt boulders remain in place there, providing the conclusion that the walls were symmetrically decorated. It must have been decoration, for such amorphous rocks weaken the wall, yet the supply of sandstone was ample. Twenty-three similar basalt rocks in debris of the north wall provide additional evidence for postulation of a double course. This number would have been sufficient for the double course.

Measurements of original courses in south wall:

	At west corner		*At east corner*	
	Feet	*Inches*	*Feet*	*Inches*
Bottom of lower stone from floor	3	½	2	10½
Top of lower stone from floor	3	7	3	3½
One intervening sandstone course.				
Bottom of upper stone from floor	3	9	3	7
Top of lower stone from floor	4	1½	4	1½

(18) Hawley, 1938.

Such basalt courses are rather common in the district, being found at Citadel, Wupatki and elsewhere,[19] but rarely is their function so clearly ornamental.

Plaster. Small patches of gray plaster, showing no trace of burning, adhered to north and east walls near the floor.

Stratigraphy

A small pit, dug by a pothunter, in the southwest corner, had failed to disturb the room's contents greatly.

Fill ranged from 3 feet deep in the southwest corner to 4 feet, 6 inches, in the southeast corner. Composed of stone fallen from walls and roof, washed and blown material, very little cinders or ash, with no visible strata. Room had not drained well, becoming wet during rains, which compacted its contents.

Adobe and rock composed the upper 6 inches of fill; roof adobe occupied the 6 inches above the floor..

Roof indications. No imprints in the dissolved roof adobe to indicate how the room was roofed.

Test Pit. Sunk in the northeast corner, disclosing 3 inches of floor, then 6 inches of compact black earth, then undisturbed white clay.

Floor

Of badly weathered reddish clay, the same color as mortar. Apparently once well smoothed, curving up slightly at wall line to form a rounded corner rather than a right angle.[20]

Floor Features. (See Appendix No. 1, Table 14, for measurements.)

1. Not far from the southwest corner a small hole which proved to be a rodent burrow, also appearing along the south wall in the east corner.
2. Shallow hole, probably for storage of small objects.
3. Small hole near doorway in east wall. Had been filled with plaster.
4. Small, unlined circular firepit almost directly out from ventilator. No ash.

(19) Barrett, 1926, p. 33.

(20) McGregor, 1937, p. 20.

Finds

1. Standing on end against the east wall north of the ventilator a deep-troughed metate of basalt and near it a mano of the same material.

2. Farther to the north about 11 inches a slightly curved metate of basalt, placed upside down on floor.

3. Near the southeast corner a shallow-troughed metate of gray sandstone resting on collapsed roof adobe. (Fig. 14).

4. A flat gray sandstone metate face down on the floor near the ventilator. (See Fig. 15 for arrangement of these objects.)

5. Near southwest corner, a bone awl (catalog number.1) and two manos.

6. In northwest corner, the following scattered finds: shale spindle whorl (.5), two bone awls (.2, .3), and one pottery pipe (.6).

7. Leaning in northeast corner a rectangular slab of shaped sandstone of correct size to have fitted the door as a cover before the door was walled up.



Fig. 14

Metate on collapsed roof adobe of Room 1.



Fig. 15

Arrangement of metates and manos near ventilator of Room 1.

ROOM 2

Room 2 architecturally the most elaborate in the dwelling; it displayed features which hint strongly the room had once been used as a kiva: e.g., firepit, hole for deflector, hole possibly for ladder base, and possible sipapu. Other floor features exist, but it is significant that the above named, and those only, were plastered over, presumably when a second story was added and Room 2 was converted into a storeroom.

Masonry

Material. Similar to Room 1 with 2 exceptions: (1) use of basalt was asymmetric, and (2) the north wall, which is the outside wall of the earlier block of rooms, has different masonry. Erratic basalt rocks show in all walls; and there are 2 incomplete double courses and 2 incomplete single courses in the south wall, as well as a similar single course in east and west walls, respectively. Decorative intent is doubtful.

The north wall exhibits frequent utilization of thick sandstone, sometimes 6 inches thick and 18 inches long, which occasioned the doubling or splitting of courses.

Condition. The north wall stands to a considerable height, but others had collapsed so thoroughly Barrett[21] failed to note the room's existence.

Construction. The lowest course, which extends 3 inches below floor line, of basalt rocks.

Red shale-like material 14 inches below the floor.

Wall Features. No viga sockets or windows.

Midway in the east wall a symmetrical T-doorway with unusually deep lower portion extending to floor line. The occupants remodeled the door by walling it up 16 inches, but leaving a ventilator about 8 inches square, and plastering the new sill. Then, probably when Room 9 was built, outside courses were removed and the wall reconstructed so that the ventilator now extends only half way through the wall and is not visible from Room 9. (Fig. 17)



Fig. 16

Looking east across floor of Room 2.

Plaster. Small patches on bases of north and west walls. Gray, but much like that of Room 1.

(21) Barrett, 1926, p. 33.



Fig. 17

T-doorway and partially walled-up ventilator in east wall of Room 2.

Stratigraphy

Fill. Averaged 4 feet in depth.

Traces of fire particularly in the western half of the room, but they had not changed appreciably the appearance of adobe in the plastered-over holes in the floor.

The first story roof, about 6 inches thick, had collapsed directly on the floor; the second story roof fell much later, for 18 inches of blown material intervened between the two.

The upper 2 feet of fill wind-blown and in some places very compact as if water washed.

Roof Indications. First story roof clay included several imprints of poles about 3 inches in diameter, but they were too shattered to tell in which direction these rafters, which must have been supported by a main viga, ran. Many good impressions proved that shakes[22] had formed a layer at right angles over rafter poles, and reeds (Reed Grass (?),

(22) McGregor, 1937, pp. 9, 22.

Phragmites communis)[23] in turn, were laid side by side across the shakes. No grass used over the reeds. Adobe about 4 inches thick above the uppermost reeds.

The second story roof badly dissolved by water action but imprints of shakes and reeds discernible.

Test Pits. Pits 2 feet deep in northeast and northwest corners disclosed the floor was plastered on original clay, leveled off and smoothed.

Floor

Hard, gray, and in good condition. Cove-molded at walls. The plaster in the firepit and some other floor holes of reddish color, however.

Floor Features. (Figs. 16, 17, 18)

1. Shallow pit in front of doorway---might have been for butt of notched pole ladder, but only an inch and a half deep. The Padre Focus example at Winona Village[24] was of the double pole and rung type. The pit was filled with reddish plaster.

2. Narrow deep hole out from ventilator---probably once held deflector stone. Plastered over.

3. Three holes (d, e, f) east of firepit---in (d), the deepest, were found a small perforated shell pendant and a portion of a smoothed stone disk.

4. Large, deep, circular firepit almost in center of floor. Compact, gray ash containing potsherds filled it to a depth of 5 inches. Plaster had been poured over the ash and leveled off flush with the floor.

5. Three small holes (a, b, c) south of firepit---no finds, no indication of use, unless to store small objects.

6. Three holes southwest of firepit. A stone lid covered (g), and plaster filled (h), providing clues that either may have served as a sipapu. Neither, however, is as deep or narrow as would be expected if such use had had been made. No significant features were possessed by (i).

Finds

From fill: 1. Miscellaneous potsherds. 2. Two basalt cylinders (.31, .32). 3. Two hammerstones (.33, .35). 4. Half of red quartzite river pebble (.34). 5. Chalcedony flake (.36). 6. Wood fragment.

(23) McGregor, 1941, p. 261.

(24) McGregor, 1937, p. 20; 1941, p. 125.

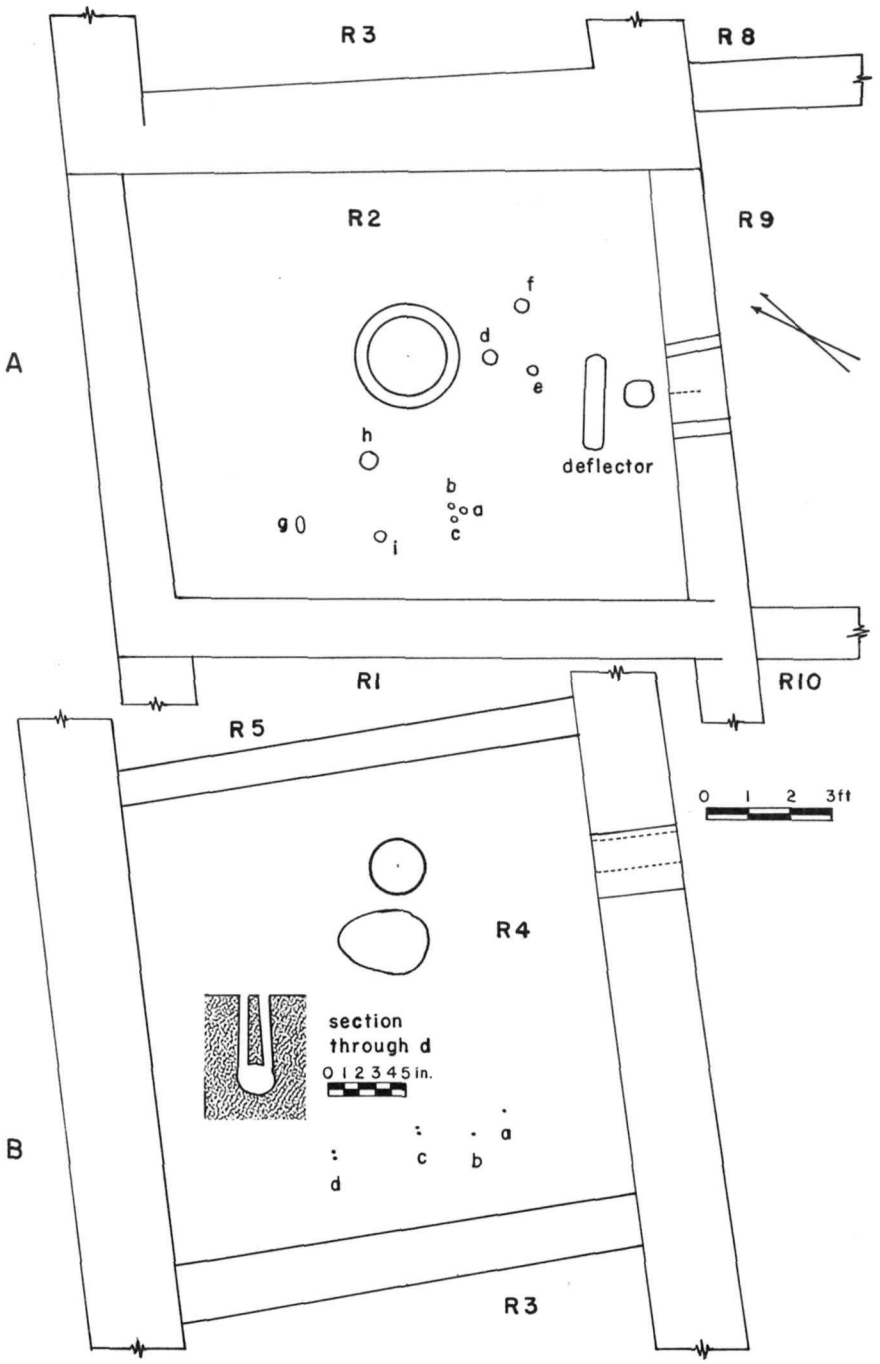


Fig. 18

A - Floor plan Room 2. Note possible deflector hole and ladder rest. Hole g or h could have been a sipapu.

B - Floor plan Room 4. Holes a-d probably served to anchor a loom.

From above second story floor: 1. Two crushed Verde Black-on-gray jars. 2. Two sandstone pot lids (.37, .38). 3. Crushed Walnut Black-on-white jars 4. Two small unworked malachite fragments. 5. Uniface obsidian flake (.41). 6. Sandstone arrow shaft polisher, reverse side used as a tool sharpener, possibly for awls. (.42) 7. Basalt cylinder (.43). 8. Blunt awl of jack rabbit femur. (.44)

On floor: 1. Miscellaneous sherds. 2. Bone weaving (?) tool (.45).

In hole (d): 1. Perforated shell pendant (.46). 2. Smoothed sandstone fragment (.47).

ROOM 3

This room constitutes the southernmost portion of the oldest part of the ruin. Its north wall, an abutting partition, is believed to have been an integral part of the original construction, and not added in some subsequent period.

Masonry

Material. Although outside courses of the tier formed by Rooms 3, 4, and 5 contain large rocks, the inside courses closely resemble those of Room 1. Stones of the east wall of Room 3, however, average larger than those of the other 3 walls.

Except for an abortive basalt course in the north wall, there is no other basalt used, save the bottom course of the north wall, and a few stones for chinking between upright sandstone slabs which form the lowest members of other walls.

The malpais course in the north wall, approximately 10 inches thick, extends from the east wall to the doorway. Its top is flush with the lintel.

Condition. North and east walls disintegrated the most, the former leaning somewhat inward.

Construction. Similar to Room 1. West and south walls originate at floor line, but north and west walls extend below it 9 and 2 inches, respectively.

Wall Features. No indication of viga sockets or windows.

Midway in the north wall a rectangular doorway, originally possessing 2 stones as lintels, of which the one on the Room 4 side remains intact. The doorway had been walled up so that the sill is now 17 inches from the floor. Outlines of the old doorway can be seen as lines continuing downward, but its original height is not positively ascertainable, for in the alteration stones were patched into courses on either side. The visible line reaches downward 10 inches on the left side, almost to the floor on the right.

Plaster. No traces.

Stratigraphy

Fill. Practically level with north and west walls.

The first story roof fallen on the floor, but little ash or charcoal. Burning was better evidenced in the second story roof, which had not fallen until after about 17 inches of fill had accumulated along the west wall, thinning down toward the east so that the upper roof lay directly on the lower at the east wall.

Roof indications. The first story roof followed the rafter-shake-reed pattern of Room 2, with the exception that in the eastern half of the chamber large sandstone slabs took the place of shakes. (Fig. 21). Reeds large, a half inch in diameter, and adobe varied from 3½ inches to 4. One good imprint made by a shake 2 inches wide.

Makeup of the second story roof paralleled that of the first, but slabs not used. No evidence of grass in either roof.

Test Pits. In southwest and northeast corners, testing revealed, in addition to extension of walls, that the floor is on the layer of whitish clay, with reddish dirt having been used to level the surface in places. Red shale found 10½ inches below floor line.

Floor

Reddish brown, rather badly weathered, cove molded at wall line.

Floor Features. 1. Hemispherical firepit, containing no ash, plastered with an almost completely disintegrated white clay coat approximately ½ inch thick.

2. Jar-shaped pit (Fig. 22). Not plastered over, and was in use when house was occupied; probably for storage of ochre, clay, tools, and other objects.



Fig. 19

Top left - Looking north across Rooms 3, 4, and 5 before excavation.



Fig. 20

Top right - Rooms 4 and 5 after excavation.



Fig. 21

Bottom left - Fallen roof adobe in Room 3; note slabs used instead of shakes.

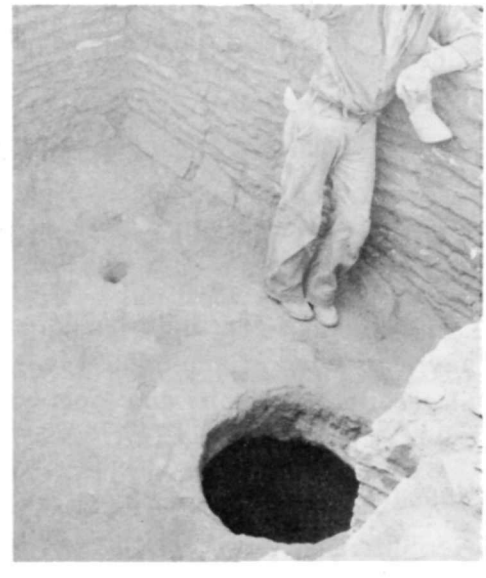


Fig. 22

Bottom right - Storage pit near northwest corner of Room 3.

Similar shaped pits described by Haury[25] from southern Arizona and New Mexico occurred mostly outside houses, were plaster lined and fire hardened, and enlisted the use of hearth stones to bake animal foods. Closer resemblances are to be found with Basket Maker examples[26] in the Kayenta district of Arizona and a more complicated storage chamber on the La Plata figured by Morris.[27]

3. Small hole in floor, possibly for storage of small objects.

4. Small hole, flush with east wall, covered with irregular sandstone slab, but contained nothing.

Finds

From fill: 1. Hammer stone (.102). 2. Two broken sandstone pot lids (.108, .109). 3. Four basalt cylinders (.111-3). 4. Broken projectile point (.115). 5. Obsidian flake (.116).

From above second-story floor: 1. Shale spindle whorl (.94). 2. Two pot lids (.99, .101). 3. Paint palette of sandstone (.106).

On floor: 1. Deer antler (.88) and bone tool fragments. 2. Corn cobs (.89). 3. Three gaming (?) bones (.90-2). 4. Cornmeal in mashed bowl.

In pit: 1. Red and yellow ochre. 2. White clay. 3. Cottontail, Ground squirrel, and Wood rat bones. 4. Broken bone awl (.98).

ROOM 4

Formerly including Room 5, the chamber had been divided by a partition wall.

If Room 2 ever had, but later lost, a kiva function, Room 4 might have preceded or supplanted it, - a possibility suggested by the presence of ventilator, firepit, and loom holes, which traits, however, are not sufficient to establish the fact.

Masonry

Material. Same as Room 3, lacking the basalt.

(25) Haury, 1940, pp. 56-62. See also Jennings, 1940, p. 4.

(26) Guernsey and Kidder, 1921, pp. 5, 9, 12, 18, 20, 22, and Plates 9 and 14.

(27) Morris, 1939, p. 101.

Condition. Very good---plaster adhered to walls where covered by fill. A considerable segment of the west wall of Rooms 3, 4, and 5 fell outward almost as a unit and can be seen lying on the ground with nearly all stones in correct relative position. Extent of the fallen material, as well as other facts, proves the central portion of the structure was two stories high.

Construction. Same as Room 3. Bottom courses of sandstone slabs set on edge at the floor surface.

Wall Features. No indication of viga sockets or windows.

The lintel of the rectangular doorway in the east wall approximately in place although slumped a little. Again occurs the phenomenon of an opening partially walled up to produce a ventilator. The outline of the former opening persists 14 inches below the plastered sill.

The wall underneath the doorway common to Rooms 3 and 4 obliterated by plaster in this room.

Plaster. In excellent state of preservation, especially on west and north walls. In covering up inequalities of masonry it varied from ¼ to 1¼ inches thick. It had been applied with the hands, as shown by its bumpy irregularity, but final finishing was done with a brush or wad of some fiber which left brush-like marks. Its texture and color resembled the ordinary underlying white clay of the area. (See Pit 14C). A razor-cut cross section bore traces of no more than one coat.

Stratigraphy

Fill. Level with vestigial north and west walls.

Roof Indications. The first story roof lay on the floor. Adobe chunks, averaging 4½ inches thick, manifested many excellent casts of reeds and branches about 5/8 of an inch thick, as well as juniper bark and grass.

Reeds and branches aligned in an east-west direction, thus allowing postulation of rafters at right angles, or north-south, although not a single rafter imprint was found. No casts of shakes. A patch of reeds seemed to have been laid closely side by side in what was probably a fairly thick layer, then a patch of branches. Random mixing of the 2 apparently was rare, except at edges of patches.

The second story roof, found 15 inches above the lower one, had been put together in exactly similar manner, except that adobe was only 3

inches thick. Insufficient evidence to guess which way rafters were oriented. Combustible portions of the roof showed only as ash lines under the roof adobe.

Test pits. Red shale 11 inches below floor level.

Floor

Of whitish clay, level and smooth, in good condition. Cove molded at walls.

Floor Features. 1. Circular firepit, plastered carefully, filled with gray ash. It had a slight rim which tapered into the floor about 6 inches from edge of the pit. (Fig. 25).

2. Ash or pot pit. This shallow pit held about ½ inch of ash when it had been plastered. Inside it near the east end another hole, irregular, 4 inches in diameter and 3 inches deep. Its long axis inclined toward the southwest corner of the room. Function unknown. (Fig. 26).

3. Loom holes[28] along south wall. Six small holes roughly in a line about 2 feet from and parallel to the south wall almost surely anchored the lower bar of a vertical loom. Grouped in 2 pairs and 2 singles. (Figs. 18A, 24).

One pair, (c), covered with a thin piece of sandstone. Their structure was investigated by troweling a hole alongside. They were 5/8 of an inch in diameter with their orifices ½ inch apart on a line perpendicular to the south wall. The holes do not descent perpendicularly, but diverge slightly from each other until they are 1½ inches apart when they reach a 2-inch spherical hole, the bottom of which is 6¼ inches from the floor surface.

They had been made by digging a circular hole 2-¾ inches in diameter and 6¼ inches deep into the floor. Then rods or a looped withe were put into position and the hole filled with plaster flush with the floor. If the spherical hole at the bottom once held a "deadman," the latter had completely decomposed.

The 2 holes at (d) probably were constructed in the same manner. Orifices are ¼ inch in diameter and 1½ inches apart. Depth was 6 5/8 inches.

(28) Kidder and Guernsey, 1919, pp. 50, 73.



Fig. 23
Room 4, looking south into Room 3.

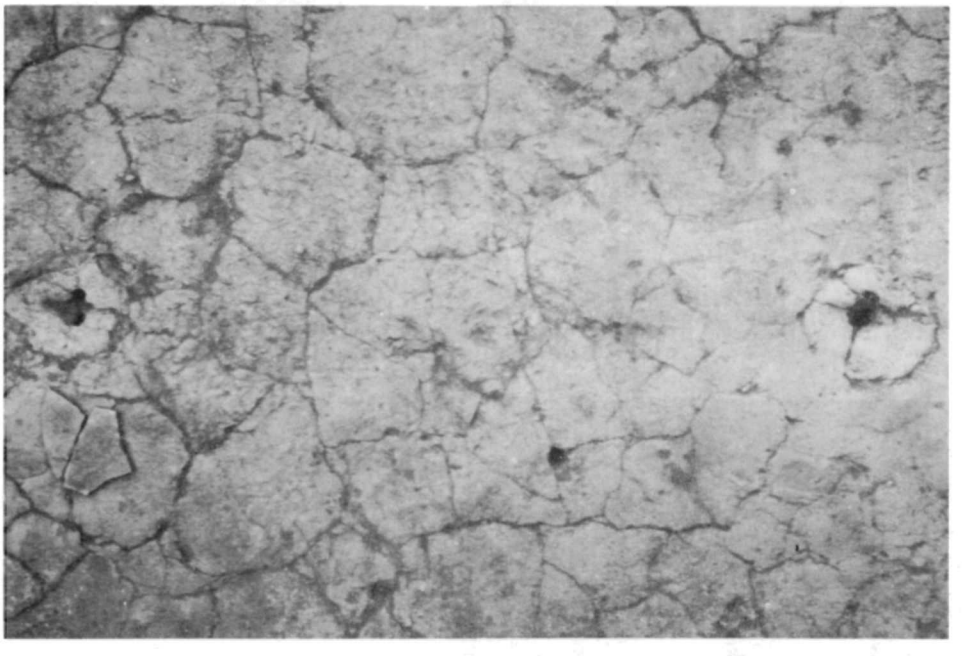


Fig. 24

Looking down at loom holes a, b, and c, Room 4.



Fig. 25

Firepit and ventilator in east doorway of Room 4. The ash or pot pit covered with clay to the right of the firepit.



Fig. 26

Firepit and ash or pot pit, to left, after excavation, Room 4.

Hole (a), ½ inch in diameter and about 6 inches deep, remains in a plaster-filled cavity which was 4 inches across. The hole slants away from the perpendicular at a 15-degree angle toward the west side of the rectangular doorway in the south wall; in other words, at about a 30-degree angle from a loom bar which might be aligned with the pairs of double holes. Conceivably, a peg in this hole would have provided good anchorage for the east end of the loom.

Hole (b) is 5/8 of an inch in diameter and at least 5¾ inches deep. Constructed similarly to (a), hole (b) slants away from the perpendicular at a 35-degree angle toward the south wall, or roughly parallel to the hypothetical loom bar.

Cords tied to wooden pieces in these slanting holes would have given longitudinal stability to the lower part of the loom.

Overall distance from (a) to (d) is 4 feet, 2 inches.

Clearance between wall and loom possibly is sufficient, about 27 inches, for use of the apparatus even before the nearby door was blocked.

References to loom holes in the district are rare. Kidder and Guernsey found one in Olla House in the Laguna Creek drainage near Kayenta, but it held a yucca loop around a cross-stick "deadman" and there were evidences of only 2 other possible holes. The same authors[29] in Ruin 8 in Marsh Pass discovered 2 series of 4 and 3 holes, respectively. A fourth hole may have existed in the second series. Six of the holes contained bent twig loops which may present an analogous situation to Nalakihu, but in the seventh a doubled loop was employed. Both of these finds were in Pueblo III kivas. Near the "Cornfields" on Laguna Creek they describe[30] 5 loom loop holes, 15 inches apart, cut in a sandstone ledge near a ruin, apparently Pueblo III.

Colton[31] enumerates at NA 1814F, a Padre focus deep masonry pithouse or a Klethla focus kiva southwest of Nalakihu, 2 parallel sets of 3 holes each, along a wall, and another hole at the end which may have served as a fourth for either set. Excavation notes inferred some sort of loop attached to a "deadman".

The Nalakihu examples thus seem to compare more closely with those in Marsh Pass.

(29) Kidder and Guernsey, 1919, pp. 59-60.

(30) Kidder and Guernsey, 1919, p. 125.

(31) Colton, 1946, pp. 152-3.

Finds

From fill: 1. Basalt cylinder. 2. Hammerstone.

From above second story floor: 1. Metate. 2. Manos.

From floor: 1. Corn cobs (.125). 2. Eight basalt cylinders (including .126-7). 3. Bone needle (.128). 4. Lignite button (.130). 5. Agatized wood flake (.132). 6. Bone awl (.151). 7. Hematite fragment showing grinding for paint on one edge (.153). 8. Clay pot lid (.161). 9. Manos and metates.

ROOM 5

Room 5 was definitely a storage room---small, and little more than bin-size---yet the wall that partitioned it from Room 4 once reached the ceiling. Fallen wall material was ample for 1 story. Moreover, rafters ran the long way of the room, in contrast to those in Room 4. Entrance was through a doorway now fallen, or through the roof.

Masonry and Plaster. Same description as Room 4. (Fig. 27).

Stratigraphy.

Fill 20 inches thick between collapsed floors; otherwise, the same conditions existed here as in Room 4. Above the second story floor a metate and manos, as if grinding had been done above.

Roof indications. Similar to Room 4 except that reed and branch casts were aligned in a north-south direction.

Test Pits. Bottom of walls at floor level. Red shale about 11 inches below.

Floor. Good condition. Much like that of Room 4. No features.

Finds

From floor: 1. Clay pot lid (.133). 2. Charred corn cobs (.135) and kernels (.134), squash seeds (.142) and pinyon hulls (.143). 3. Wood, basketry (.137) and malachite fragments (.144). 4. Sandstone hoe (.141). 5. Small blue stone (.145).

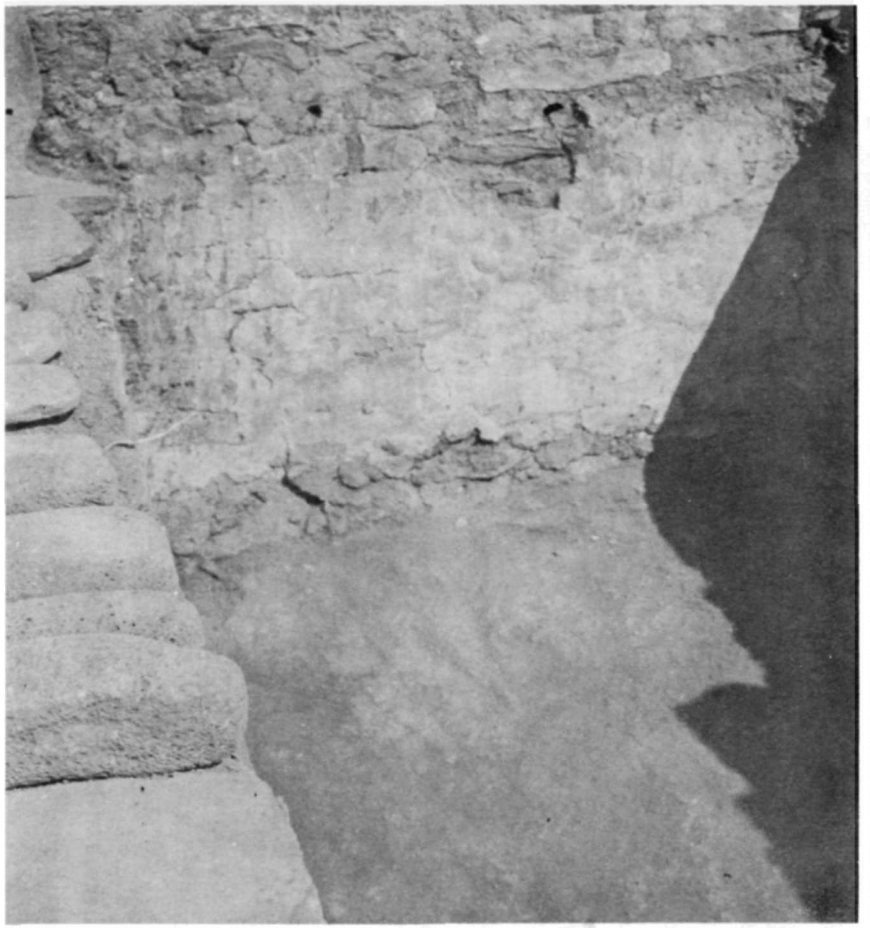


Fig. 27

Room 5, looking west. Note good plaster.



Fig. 28

Charred and fallen main viga's relation to holes and line of stones in Room 6.

ROOM 6

A large 1 story chamber with badly fallen walls, abutting on the oldest block of rooms and built sometime after them.

Masonry

Same general technique of construction, but walls approach the thickness of those of the oldest block of rooms. Thin stones used throughout. The northern corners exhibit adequate, if unintentional, bonding.

Wall Features. Not enough of the doorway in the east wall remains to prove whether it was rectangular or T-shaped, although the former alternative is more likely (Fig. 28). No indication of viga sockets, windows, or plaster.

Stratigraphy

Fill. Water-soaked, for the room was a pond after a rain or when snow melted.

Roof indications. No imprints in adobe. Room had burned; charred main viga, about 6 inches thick, in place on the floor, running east-west about room center (Fig. 28). A rafter, also charred, lay in the southeast corner, parallel to the main timber. Its position in a corner made its original orientation difficult to postulate; it might have twisted crookedly in falling.

Test Pits. Walls rise from floor level.

Floor

Reddish adobe, in poor shape.

Floor Features. 1. Rectangular pit against the north wall had a flat rectangular slab in the bottom, too small to have been a cover.

2. A line of stones set vertically in the floor, with tops protruding 1½ inches above the surface, angled from near the doorway almost past the firepit. Test pits alongside them disclosed no sub-floor structures. How they could have formed the base for some sort of deflector arrangement is conjectural. Their function, if any, is problematical. (Figs. 28, 29).

3. There had been an originally large irregular firepit, plastered over, while it still contained some ash, in such fashion as to produce 2 smaller pits, neither of which appeared to be firepits. (Fig. 30).



Fig. 29

Line of stones and two small holes in Room 6.



Fig. 30

Shallow pit left after irregular firepit was troweled out in Room 6.

Finds

On floor: Fragmentary basalt cylinders (.164). 2. Small basalt sphere (.165).

ROOM 7

There had been a room or porch to the east of Room 4, for burned roof adobe with imprints of branches and twigs and a portion of a floor were found. Also, the east wall of Room 8 protrudes 15 inches. In the southwest corner was a post hole (Fig. 34) and others may have existed at one time, which hints the room possibly was a shelter with pole-supported roof.

The floor had eroded and was traceable only 3 feet, 7 inches, from the south wall.

It is possible the room had walls which were stone robbed for a later dwelling, but the jutting east wall (Fig. 34), although very low, seems to have been square at the end.

The north wall probably was not associated with Room 7: it might have been a wind break or shelter wall. (Fig. 32). Such features are common in the Flagstaff region[32] and particularly on Wupatki National Monument.[33]

In the northwest corner a large inverted basalt metate and a mano. (Fig. 66).

ROOM 8

This nondescript room is part of the eastern tier, 1 story in height, and constructed at the same time as Rooms 7, 9, and 10. It had not burned, apparently. (Fig. 35).

Masonry

Material. Walls of small stones, similar to Room 9, with no large pieces used on outside courses.

Condition. Northeast corner fallen badly.

(32) Colton, 1932, p. 31.

(33) Steen, See Appendix.



Fig. 31

Clearing debris from Room 7.



Fig. 32

Northeast corner of the ruin. The man is standing at about the edge of Room 7 floor. The far wall probably was a windbreak.



Fig. 33

Excavating Rooms 4 and 7.

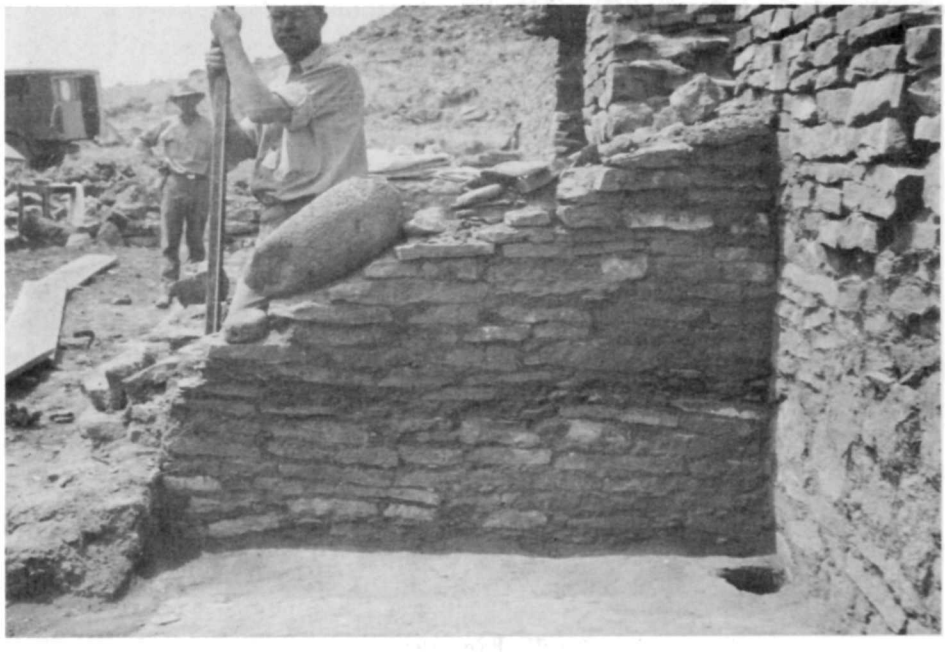


Fig. 34

South wall of Room 7, the post hole at right, and the extended wall at left.

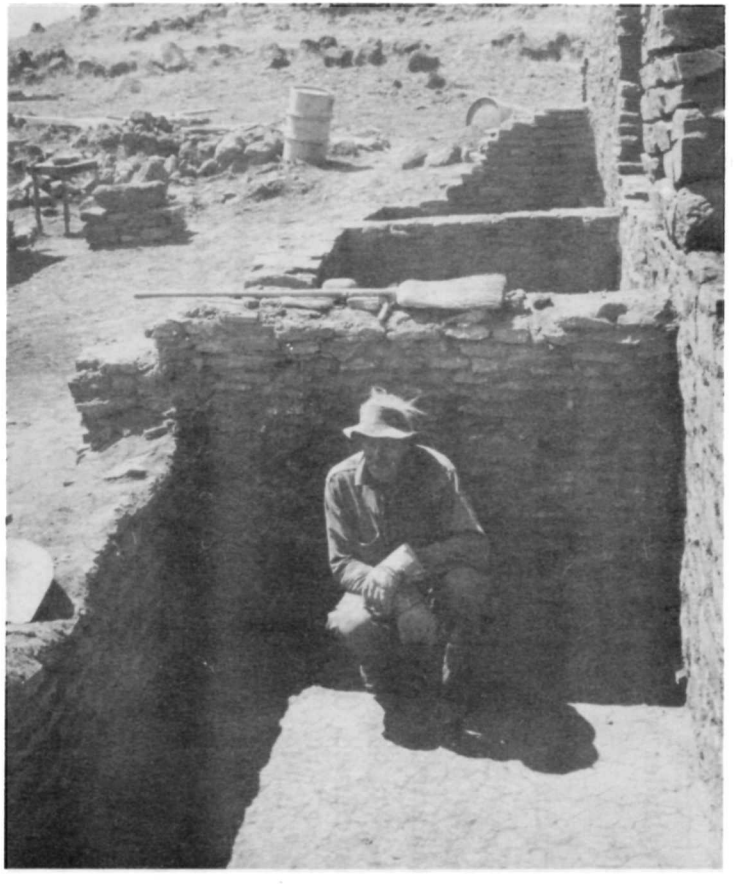


Fig. 35

Man in Room 8. Cross walls in background are those of Rooms 9 and 10.

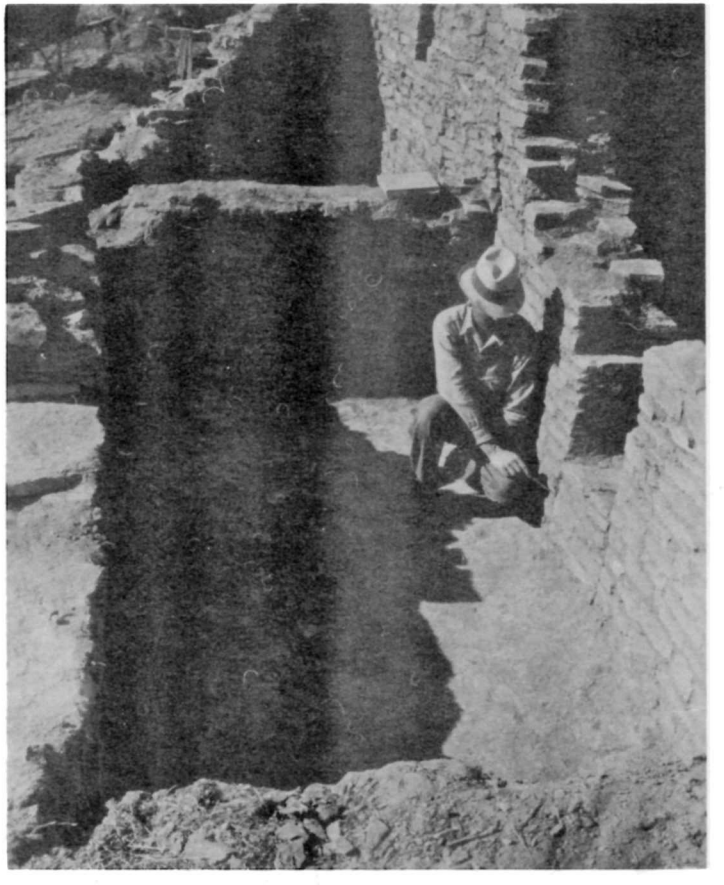


Fig. 36

Room 9 with Room 10 in background. The ventilator which shows on the other side of the doorway does not extend through into Room 9.

Construction. Similar to most other rooms. Laid up course by course. The basal member constituted of small basalt blocks.

Wall Features. Walls disintegrated too far to reveal traces of doors, windows, etc.

Plaster. Gray-white.

Stratigraphy

Fill. Wind-blown and water-washed material and rocks down to the roof adobe, which lay directly on the floor.

Roof Indications. The roof thin: 2 inches of mud was laid on reeds averaging 3/8 of an inch in diameter with no indication of shakes. Imprints show rafters about 3½ inches thick.

Floor

The floor level and in excellent shape, although it displayed water cracks.

The east wall superimposed over Pit 1, which was not excavated for lack of time. (Figs. 39, 40).

Finds

1. Basalt cylinder from fill (.124). 2. Metate and several manos just above roof adobe.

ROOM 9

Constructed after Rooms 1, 2 and 3, at the same time as Room 8, and before Room 10, this chamber also is part of the 1-story addition on the east side. It had burned. (Fig. 36).

Masonry

Material. North and east walls shoddy with small blocks used on inside and large blocks on outside courses. Little attempt to take masonry up course by course. "Splitting" even more noticeable on the outside.

Condition. Poor, but not as bad as Room 10.

Construction. Bottom course of malpais, extending 3 inches past floor surface.

Wall Features. The outside of the doorway in the east wall of Room 2 appears in the west wall of Room 9, but the ventilator had been patched over.

In the east wall the sill and south side of a doorway are visible. The sill is overlapped on the south end by 6 inches of wall. Allowing for the same overlap of the north side, the doorway would have been 18 inches wide.

The outside corner of Room 3 shows up as a vertical line 16 inches from the northwest corner of the west wall.

No vestiges of plaster.

Stratigraphy

Fill. Level with remnant wall heights. Mixed rock and windblown material.

Roof Indications. Roof adobe separated from floor by about 2 inches of wind-blown dust in places, particularly corners. Roof clay 4 inches thick, retaining good casts of shakes, reeds and an occasional pole about 3 inches thick. More small reeds, 1/8 inch in diameter, in this room than any other. No grass.

It was inferred from a section of the east wall that had fallen inward that the roof once was about 6 feet high.

Floor

Cove-molded floor of white clay, fairly smooth, sloping about 2 inches from west to east.

The function of 2 postholes outside the east wall (See Fig. 11) is conjectural, unless they were braces or part of a closure device. They must have been dug after the wall was built, for coincidental juxtaposition would be unlikely.

Finds. 1. Smashed Dogoszhi Black-on-white jar on floor (.51). 2. Bits of wood and charcoal.

ROOM 10

This small room was built in the angle formed by Rooms 1 and 9 and postdates them by an unknown, but probably negligible, period of time. (Fig. 36).

Masonry

Condition. Greatly disintegrated; walls covered by debris.

Construction. Walls thinner than those of Rooms 1 and 2, their lowest courses of basalt and vertical sandstone slabs. Of frequent occurrence are erratic basalt rocks and thick sandstone, occasioning split courses.

Wall Features. The ventilator and doorway outlines into Room 1 appear in the south part of the west wall. No plaster remained.

Stratigraphy

Fill. Strata not visible in rubble and wind-blown material. No roof indications other than about 5 inches of compacted adobe on floor.

Test Pits. Original clay had been leveled and smoothed for floor. Walls rest on floor level. The red shale 17 inches below.

Floor

Weathered to poor condition. It slopes 3 inches downward from west to east. No floor features.

Finds

From floor: 1. Large mano. 2. Portions of Verde Black-on-gray jar.

SUMMARY -- HOUSE REMAINS

Nalakihu emerged from the debris a masonry pueblo of 10 ground-floor rooms, with 3 or 4 others once having formed a second story. In general appearance it is fairly typical of ruins of the same age in Wupatki National Monument or the Flagstaff region, but it yielded a peculiar ceramic complex and possessed a few unusual architectural traits, notably a deflector in a doubtful kiva, a jar-shaped storage pit, ornamental courses of basalt in walls, and loom holes. Structurally, however, the building fits in well with the Elden focus of the Sinagua branch; ceramically and in other objects of material culture the picture is more complex.

Before excavation the ruin was in a fair state of preservation, one wall standing 6 feet, 8 inches, in height and others proving easily traceable in all instances. Red Moenkopi sandstone, in pieces generally smaller than those used in Wupatki, Ruin J (Lomaki), and several other

pueblos on Wupatki National Monument, was the predominant building stone, with erratic occurrence of rough black basalt boulders.

Rooms 3, 4 and 5 constituted the oldest part of the dwelling. Later, Rooms 1 and 2 had been added to the south end and Room 6 to the north, making a long rectangle. Other enlargements were a 1-story tier, Rooms 7 - 10, on the east, and a second story above Rooms 2 - 5. A jutting wall on the structure's northeast corner provided an outdoor work place sheltered from wind.

Masonry

The oldest block of rooms displayed a preponderance of long, thick sandstone pieces. The material becomes progressively thinner and shorter in later additions until small fragments were common in late rooms, Nos. 8, 9 and 10. Technique also deteriorated, less attempt being made to keep courses level or continuous. The supply of desirable sandstone possibly diminished because quarrying operations at the outcrop on the edge of Citadel Sink became more difficult as builders from several contemporaneous nearby settlements pursued the substance under a thickening overburden.

Corners were moderately well bonded, but no attempt was made to tie in partitions or later walls to existing surfaces.

Masonry was non-ashlar, and could be generally described as Fine Unbanded with Incidental Core. Tabular stones having at least one smooth, straight edge were laid in adobe mortar with their ends closely abutting. Interior and exterior faces of walls usually progressed evenly, with courses keeping a constant transverse and longitudinal level. Adobe and rubble filled the wall cores, which, as a rule were narrow.

Walls usually were set on the floor level, rarely extending deeper than the thickness of floor clay. Characteristic of the district was the employment of vertical sandstone slabs or basalt boulders for the basal course.

Double courses of malpais, probably ornamental, projected slightly beyond the presumed plaster line of Room 1, incomplete and asymmetric alignments occurred in Rooms 2 and 3, while single boulders studded other room walls at random.

Of the 6 doorways in evidence 1 was T-shaped, 3 rectangular, and 2 could have been of either type. By the time later increments were constructed high sills became desirable for some reason, e.g., Rooms 6 and 9.

In older rooms (2, 3, 4) remodeling heightened the sills in three instances. In the 2 (Nos. 2 and 4) where air currents from the outside were obtainable, ventilators were left in the lower part of the new masonry, as was the case with the completely obstructed door in Room 1. Only 1 sandstone slab was found which fitted a door opening; other methods of closure are problematical.

Excavations uncovered no trace of outside plaster. Half the rooms bore on their inside walls 1 thickish coat of gray plaster, probably of the underlying white clay of the area. It had been applied by hand, but final smoothing was with a fibrous wad.

Fill

Draining and puddling water had seriously decomposed perishable materials in Rooms 1 and 10 (against the sidehill) and in Room 6. Room 7, on a downhill slope, had suffered considerable erosion. Fill in no room was significantly stratified and test stratigraphic sections revealed little except positional data on roof debris.

The generalized roofing pattern was as follows: a main viga spanned a room's shorter axis across the center; rafter poles spaced at unknown intervals rested on the viga at right angles; then, in turn, shakes and reeds formed successive crosswise layers; finally, about 3 to 4 inches of clay topped the whole structure.

In Room 3 sandstone slabs partially supplanted the shakes, while in Rooms 4 and 5, branches, juniper bark and grass appear. Smaller reeds were used in Room 9 in the eastern tier and clay was thin, as was the case in second story rooms.

Use of shakes is remarkable considering the arduous labor necessary to make them with stone and wooden tools. The widest imprint found was 2 inches, however, and such splints could be split from fairly long log sections to minimize work of cross-cutting.

A rafter height of 6 feet, 8 inches, at least for the western tier, can be inferred from dimensions of the existing south wall of Room 1. Ceilings in the eastern row possibly were lower, in the neighborhood of 6 feet.

Room 7 possibly was a "porch" with Hopi-style shelter roof, supported partially by posts.

Floors

Grayish floors, cove-molded to walls at their peripheries, are most frequent, but reddish mud was used in 3 rooms. All represent a leveling and plastering of the old land surface. Subfloors do not occur.

Firepits are confined to the western tier; 4 were approximately hemispherical and 1 a shallow oval. A rim encircled the Room 2 example. Use of 2 in the central block was discontinued upon advent of the second story. Ventilators are associated with 3, 1 of which possessed a deflector and a possible ladder pit at one time. There is 1 case of an accompanying ash or pot pit.

With no certainty can a sipapu be identified, although properly placed holes in Rooms 1, 2 or 3 could have served as such.

Most of the smaller floor depressions can be lumped as caches for storage of small objects.

Apparently quite rare in houses, the jar-shaped storage pit in Room 3 may have been an integral part of planned construction, or possibly illustrates reutilization of 1 of a number of existing pits, hereinafter described, which happened to be present on the chosen building site. Pit 1 of the cited pit complex definitely underlies Room 8.

Use of the horizontal loom is established by discovery of the quadripartite arrangement of holes in Room 4. Another set is known from the Flagstaff region but morphologically the Nalakihu holes have closest affinity with the Kayenta district.

Traits Conclusively Represented

Disregarding finds in room fill, the following articles definitely were in use during occupation of Nalakihu and were not thrown as trash into the ruin after its desertion:

1. Mixed in ash in the Room 2 firepit, later plastered over: Moenkopi Corrugated, Sunset Red, and Walnut and Flagstaff Black-on-white sherds Negative evidence is thus provided that the firepit pre-dates appearance of the slightly later types, Verde Black-on-gray and Turkey Hill Red. The further assumption can be made that plastering was occasioned by erection of a second story, an addition probably made necessary by population increase. Were the later types traded in, or did newcomers, making or using Verde Black-on-gray and Turkey Hill Red, join the pueblo?

2. Broken or lost in the fire which caused abandonment:

---Crushed Verde Black-on-gray, and Walnut and Dogoszhi Black-on-white jars and a Citadel Polychrome bowl.

---Stone spindle whorls, arrow shaft smoother, paint grinders, cylinders, pot lids, metates, manos, hoes, and a lignite button.

---Bone awls, weaving (?) tool, gaming pieces, needle.

---Basketry fragments, shell pendant, red, yellow, and white ochre.

---Charred corn cobs and kernels, pinyon hulls, squash seeds.
Also corn meal and impressions of beans in a clay pot lid.

Without going into detail here, the site on the basis of above-listed traits shows mixture of (1) Chino focus of Prescott branch, (2) Elden focus of Sinagua branch, and (3) Klethla focus of Kayenta branch.

Room Function

To categorize rooms according to probable function is hazardous because each room may have been the scene of a number of activities. However, a number of inferences can be drawn.

Room 5 was employed almost certainly for storage, and Rooms 8, 9, and 10 may fall in the same class, as well as Room 2, after remodeling, and the room above it. Lack of firepits or other domiciliary features, plus occurrence of storage jars or charred supplies, provide basis for this assumption, although it must be remembered that most could also have been lived in.

Grinding activities, judging from provenience of metates and manos, must have taken place in and on Room 1, in Room 4 and the room above it, outside Room 6 in shelter of the wind break wall, and on the roof of Room 8. All of these locations were well lighted. If basalt cylinders were corn shellers, most of that type of work was performed in Room 4, conveniently near the store room, No. 5.

Spindle whorls came from Rooms 1 and Upper 3, but weaving took place in No. 4.

Exploratory trenches and pits discounted the presence of an underground kiva outside Nalakihu. A ceremonial chamber, if any, was inside. Room 2, before it was altered, possessed 4 possible kiva features; Rooms 4 and 1, three each. It is significant but not conclusive that only kiva features were obliterated when Room 2 was altered, possibly upon construction of the second story.

Such hypothetical formulation would label Rooms 3 and 6 as living chambers, and either Room 4 or 1 as a doubtful kiva, the other being domiciliary. The chambers above Rooms 3 and 4 - 5 probably were also for living purposes.

In summary, at the time of the fire:

Storage and/or living:	Nos. 2, 5 (definitely storage), 8, 9, 10, Upper 2	6
Living:	Nos. 1 or 4, 3, 6, Upper 3, Upper 4-5.	5
Kiva (?)	Nos. 4 or 1.	1
"Porch"	No. 7	1
	Total	13

Cause of Abandonment

The exact history of the fire that drove away Nalakihu's inhabitants presents a major puzzle. Deteriorative processes apparently were such as to cause absorption of ash, so that little was visible; in fact, remaining ashes were so sparse that field notes at first doubted the burning of the first story roof in Rooms 3, 4 and 5. Discovery of crushed pottery and charred items on floors negated these observations.

Flames destroyed roofs of Rooms 2 - 6 in the western tier and 7 and 9 on the east. Clues were not intelligible in Rooms 1, 8, and 10. How a conflagration intense enough to consume all vigas and combustible material except in Room 6 could have failed to raze second-story roofs poses a perplexing question, for the upper roofs did not fall until at least 15 inches of wind-blown fill accumulated over the collapsed lower ones.

The author was acutely aware of the anomalous situation early in the excavations, and personally troweled test piers in room centers, never finding floors of re-occupation and always confirming the time-lapse between breakdown of lower and upper stories. Moreover, although evidence was inconclusive in water-dissolved fill of Room 2, the second-story roofs over the oldest block of rooms had burned as well.

The only tenable conclusion is that fire first gutted almost all ground floor rooms but inexplicably left the topmost roofs intact, or partly so. Then, after Nalakihu stood vacant for a considerable period, another blaze of man-made or natural origin precipitated remaining second story roofs onto a thick layer of fill. Forsaken houses today sometimes meet similar fates at the hands of pyromaniac passersby.

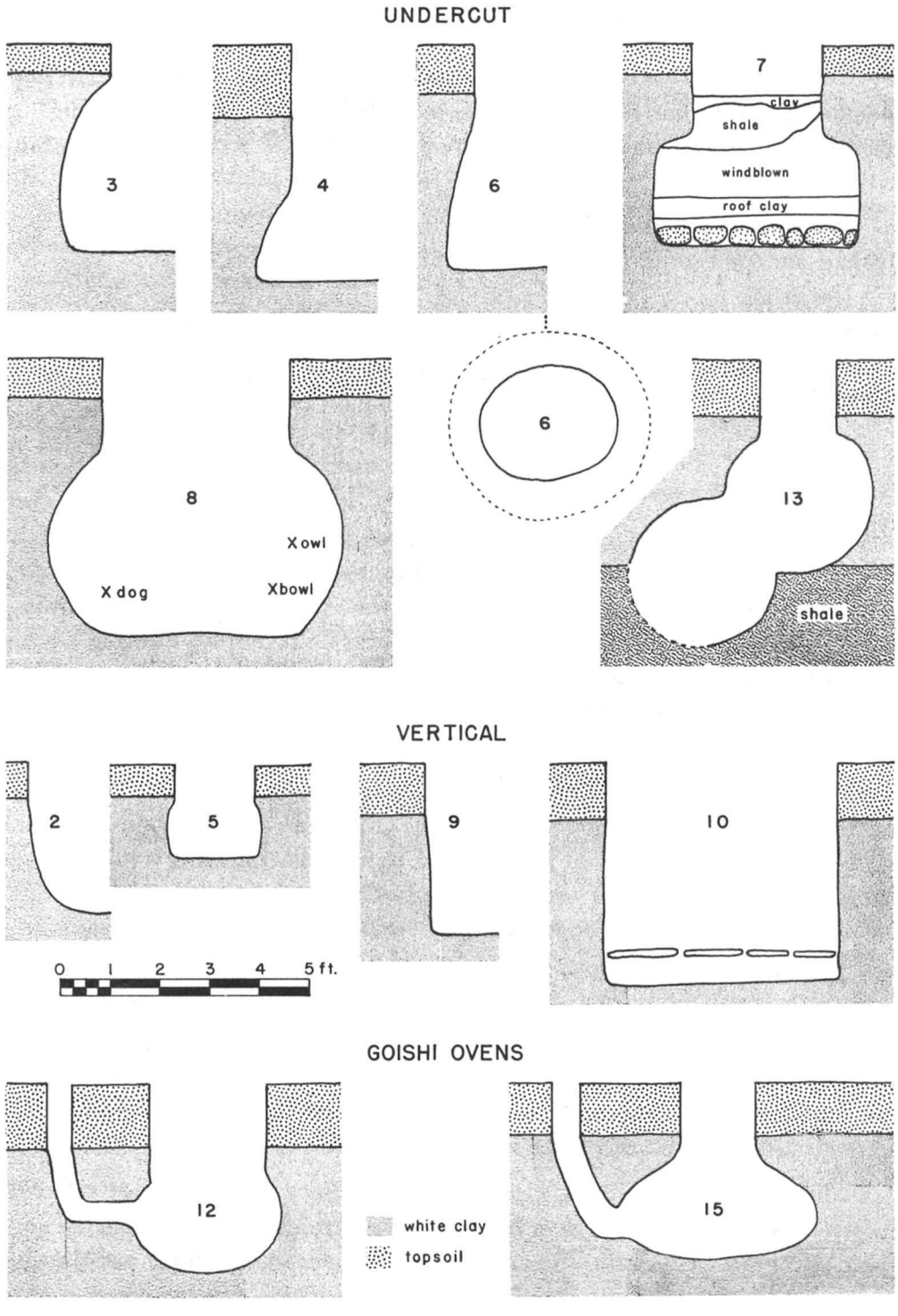


Fig. 37

Pit sections.



Fig. 38

From atop Room 1: the burial ground and pit area.



Fig. 39

Pit 1 and accompanying shallow holes of unknown function.

PITS

A need to spread debris on a flat area, planned as a parking space east of Nalakihu, together with discovery of the top of a slab buried vertically, started a trenching process which yielded 16 pits, 2 cists, and 6 burials.

Dump previously had been effected closer to the ruin on ground tested by holes 2 feet square and 4 feet apart. Probably structures were missed in this area, and future excavators should exhaust its possibilities. Exploration was thorough, however, where pits and burials concentrate (Fig. 11) but work stopped before more than the edge of the complex was disinterred, it is believed. The whole area around Nalakihu, NA 357, and Citadel could prove productive. (Fig. 38).

The depressions divide into 3 classes, (1) pits with undercut sides, or jar-shaped, (2) pits with vertical sides, and (3) pit ovens with flues. (Fig. 37). The first category is believed to be slightly the oldest, but all, on the basis of stratigraphic position and ceramic analysis, antedate arrival of the Chino component at Nalakihu, yet fall within the limits of early Pueblo III.

Nalakihu and its neighboring structures form a closely bunched group of dwellings, mostly contemporaneous; precise relationship between the centrally located cavities and the respective ruins will not appear until the entire area is excavated, and then may tell a complex story, difficult to interpret.

McGregor's[34] vertical- and flaring-walled holes at Winona Village constitute the only known examples in the Flagstaff district. Jar-shaped pits and ovens with flues are hitherto unreported.

Due to the cessation of the CWA program, Pits 1, 11 and 16 were not excavated. (Fig. 50).

PITS WITH UNDERCUT SIDES

Nos. 1, 3, 4, 6, 7, 8, 13 and 14. Total, 8.

These pits exhibited considerable heterogeneity, both in contour and in the variety of cultural items they contained. The category is merely descriptive and possibly not temporally, functionally, or culturally meaningful.

(34) McGregor, 1941, pp. 157-8.

They ranged in depth from 39 to 48 inches, in diameter from 37 to 72 inches. Orifices varied from 18 to 45½ inches.

Hearth or cooking stones nor evidence of intense firing did not occur.

Pit 1

Pit 1, not entirely excavated, had undercut walls and was thus presumably jar-shaped. It extended under the east wall of Room 8. A curious assemblage of shallow holes of unknown use (Figs. 39, 40) accompanied it. These were clearly distinguishable in the whitish clay, displayed distinctive but incomprehensible forms, and must await further excavation for explanation.

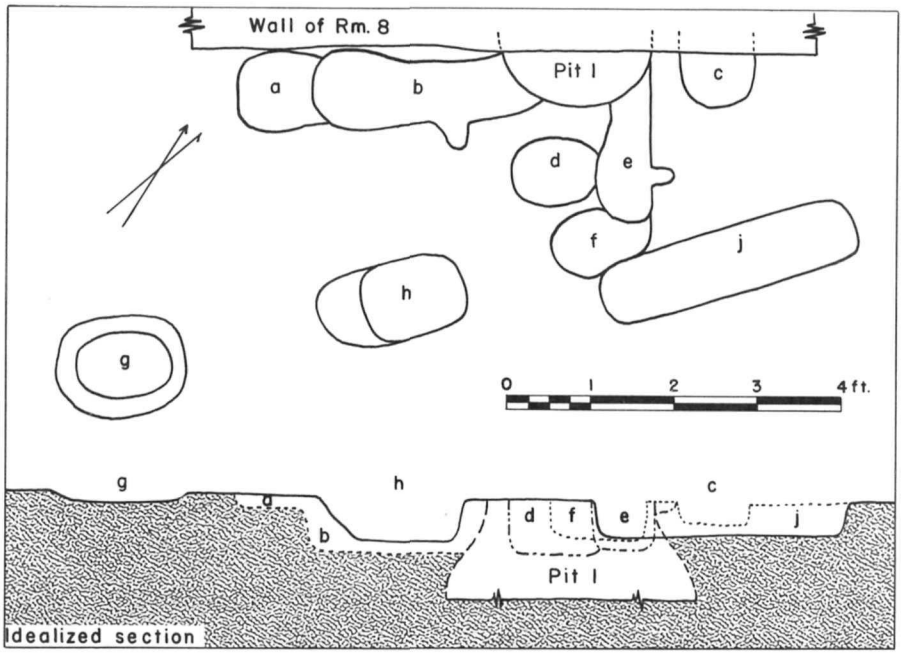


Fig. 40

Plan of and section through Pit 1 and associated holes.

Preliminary troweling in the mouth of Pit 1 brought up burned corn cobs and clay fragments bearing casts of branches and twigs. A prod hit bottom or a hard substance at a depth of 4 feet.

Pits 3 and 7

Clay from these cavities denoted some sort of cover or roof, the only examples other than Pit 1. Molds of branches and a pole, 3½ inches thick,

were found in clay fragments on the floor of No. 3. The clay was about 1 inch thick. At the very bottom of the hole were a few charred corn cobs. Fill was wind-blown and water-washed material. Walls were not baked appreciably.

Unusual stratification occurred in Pit 7 (Fig. 37). At indicated depths downwards from the white clay surface were found: At 6 inches --- uneven stratum, 2 - 6 inches thick, of adobe, water washed.

Below it --- a thick layer, 4 - 12 inches, of clean Moenkopi shale, perhaps intentional fill.

At 21 inches --- ashes and charcoal bits with small fragments of animal and bird bone.

At 30 inches --- collapsed adobe. Adhering to its under surfaces were casts of corn cobs laid on grass, stalks, and ears in husk. A mold of the end of an ear, still in husk, was 2 1/8 inches long and 7/8 of an inch across at the open end. It was cone-shaped. Casts were made when water drained into the pit and melted the adobe, which may have been part of the cover or roof. If so, the cover was thicker than the ones of Pits 1 and 3.

On bottom --- Layer of basalt rocks forming rough floor; too regular, however, to be merely hearth stones.

There were no signs that fire had hardened walls, and there was no flue.

Pit 4

Burial 3, an extended inhumation, was found in this pit. The cavity displayed no unusual structural attributes.

Pits 6 and 8

Deviating from others in that they both possessed elliptical horizontal sections with long axes oriented east-west, these pits differed in shape, Pit 6 flaring in almost straight lines while Pit 8 curved into a quasi-globular body. Both had flat bottoms.

In Pit 6 at a depth of 20 inches below the white clay surface appeared a layer of ash and juniper bark, but no clay attributable to a cover. An inch lower were small bones and at 19 inches larger bones and ash. Bones were identified as those of Jack rabbit, Cottontail rabbit, Pronghorn, and Dog.

Pit 8 had an unusually perpendicular neck with squarish shoulders.

Quantities of bone and sherds were taken from it, and in addition, a Horned owl skeleton (.61), prone, near the east wall and bones of a dog (.62) in the southwest quarter, at depths of 35 and 47 inches respectively (Fig. 37). The dog skeleton was disarticulated: the scapula lay 11 inches to the south away from the vertebrae. Neither looked like ceremonial burials, nor was there evidence they had been used for food. (Figs. 41, 43).

At 46 inches near the northeast wall was a Sunset Red bowl (.59), broken and showing 3 pairs of mending holes. (Fig. 42.)

Fauna represented were Jack rabbit, Cottontail rabbit, Ground squirrel, Prairie dog, Kangaroo rat, Fox, Indian dog, Military macaw, Horned, Burrowing (?), and Long-eared owl,[35] and Black bear.

There is little doubt this pair were refuse or trash pits, and their oval shape conceivably could represent a specialization for this purpose, although no utilitarian reason can be imagined. Only a guess could be made as to whether they ever held maize stores and were reused for other purposes later.

Pit 13

The globular body of this pit had been enlarged by digging another spherical cavity downward at an angle. The opening into the lower pit showed as a 22-inch circle on the north side of the upper. Walls of the lower hole were well defined except for a spot at the bottom in the north side which led into a rough shale-filled crevice yielding only an occasional sherd which may have been carried by rodents. Broken pottery was the only find in either cavity.

Pit 14

So-called Pit 14 in reality consists of a complicated group of holes, some shallow, some deep. (Figs. 44-48).

Holes A and B can be disposed of quickly by describing them as borrow pits or quarries where clay was obtained for construction of nearby dwellings. The west end of (B) held a child burial (B6), placed there because the spot promised easy digging or because the interment party knew of the holes's location. Hole B was not completely excavated.

Consideration of the large central pit (G) leads to the conclusion it was originally a pit with undercut sides. Bottom was deep in Moenkopi shale; above it a floor of sandstone slab on which were found charred

(35) Hargrave, 1939, p. 208.



Fig. 41

Finds in Pit 8: top, Horned owl skeleton.

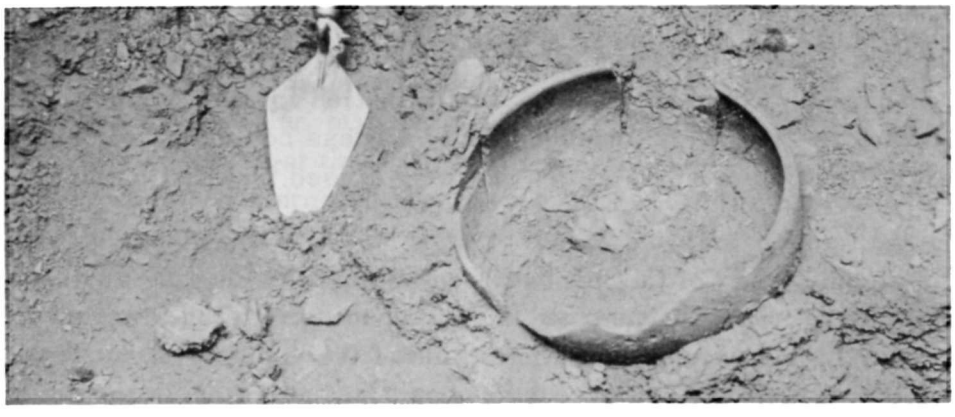


Fig. 42

Sunset Red bowl (.59) with three pairs of mending holes.



Fig. 43

Dog skeleton.

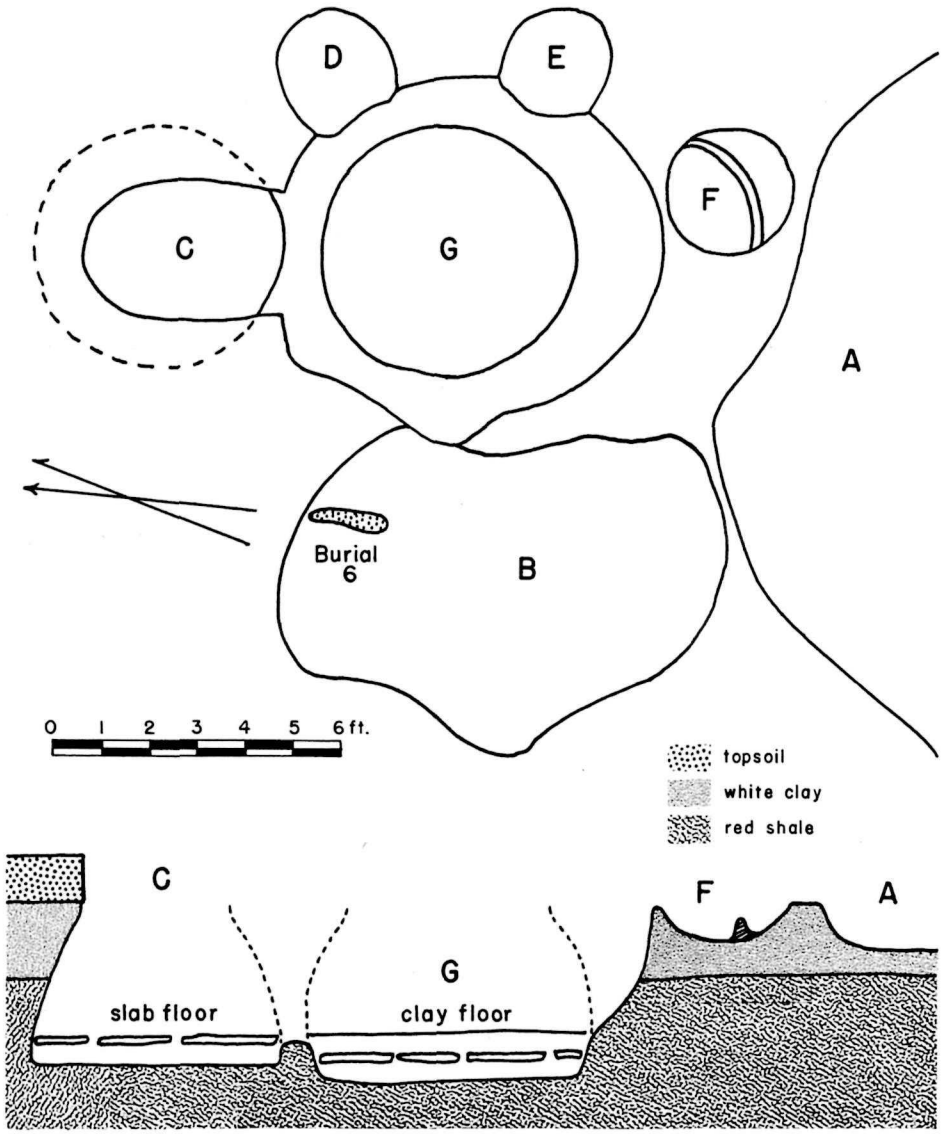


Fig. 44

Ground plan of and section through Pit 14. A, B - Borrow pits. C, G. - Original pits with undercut sides. F - Plaster mixing pit. D, E - Possible mixing pits.



Fig. 45

Pit 14 partially excavated, showing stratigraphic test pier and Burial 6.

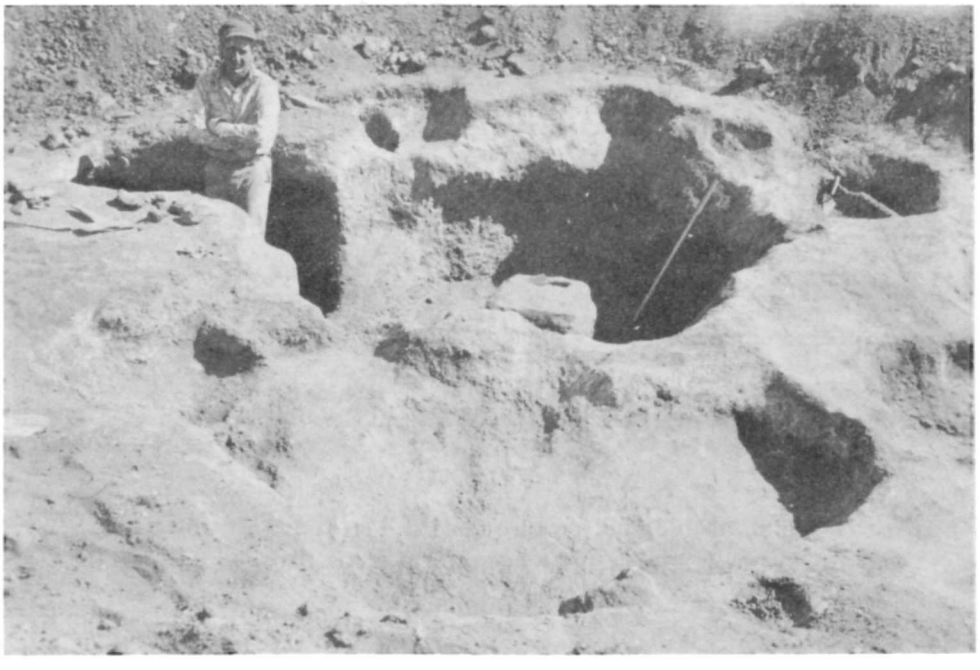


Fig. 46

Pit 14 after complete clearance. Man stands in C.



Fig. 47

Pit 14 looking across almost completely troweled stratigraphic pier in G toward C.

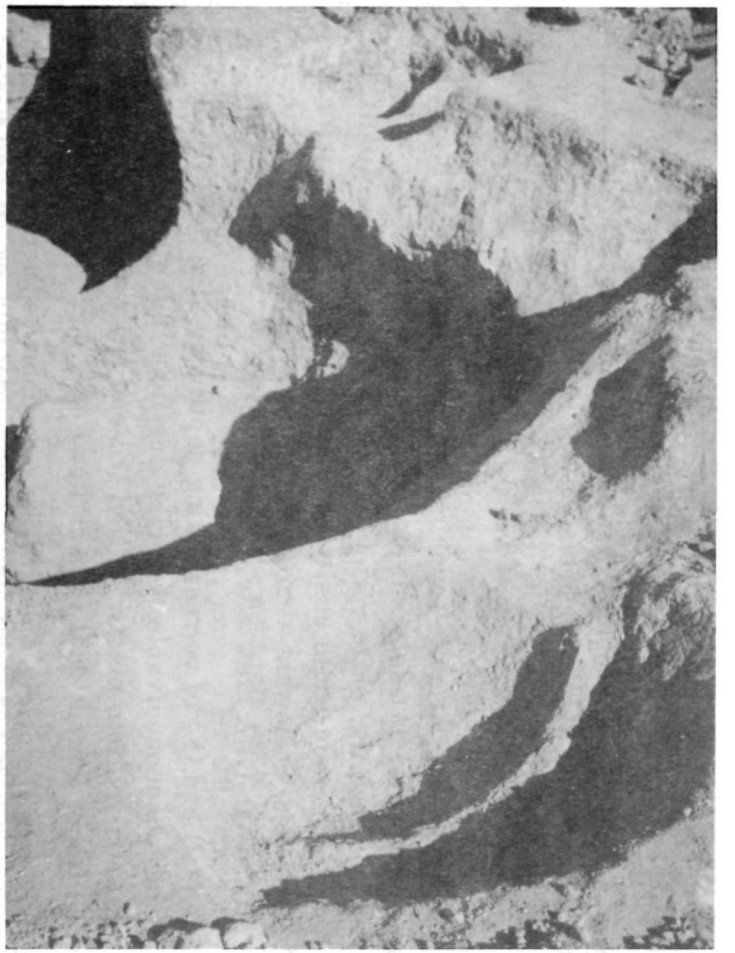


Fig. 48

Plaster mixing pit F in foreground.

corn cobs and ears. Above these there had accumulated an inch of fill on top of which was a good adobe floor, 3 inches thick.

Contiguous Alcove C probably was another jar-shaped pit with slab floor. At some time the thin wall between the 2 pits was broken through and the clay portion of the walls of (G) gouged back to quarry plaster material.

Shallow Hole (F), not quite touching the main depression, presents all the appearances of an adobe mixing pit. There was a curving ridge in it of clay darker than the white variety which comprises the walls of the hole (Fig. 48). A person could easily have left the ridge after mixing a "batch" of plaster. Somewhat similar ridges occasionally were noticed in adobe pits of the CWA crew after a day's work.

Alcoves (D) and (E) of corresponding depth may also have been mixing pits. It is not inconceivable that clay dug from Holes (A), (B) and (G) may have been mixed into plaster in (D), (E) and (F) where the mixer could work without a great deal of back bending.

Whatever was the original use of the amorphous structures, they were afterwards filled with trash; they contained many sherds and bones. In upper fill and in (D) Verde Black-on-gray appeared sparsely, but types ranged back to Deadmans Gray of the Medicine Valley focus of the Cohonina branch. This does not necessarily mean the pit was begun in Pueblo II times, however, for the type is found in the vicinity, probably coming from unexcavated structures.

Bone specimens identify as follows: American raven, Short-eared owl, Jack and Cottontail rabbit, White-footed mouse, Indian dog, Mountain sheep, and Black bear.

During excavation it was supposed the hollow would prove to be some sort of pithouse, but absence of any sign of roof or floor features, despite the presence of the unique adobe floor which lined up fairly well with the slabs in Alcove (C), practically forced relinquishment of the theory, although a tenuous possibility exists that later activities obliterated the identifying characteristics of a crude sub-surface dwelling.

PITS WITH VERTICAL SIDES

Nos. 2, 5, 9 and 10. Total, 4.

Homogeneity is hardly a characteristic of this class of pits, either. No. 2 alone possesses a hemispherical bottom. The sides of No. 5, much smaller than the rest, undercut almost imperceptibly and it could be classified in the group described previously. No. 9 has walls that bulge inward slightly. In No. 10, the sole truly cylindrical hole, a slab floor appears 32 inches below the white clay surface or 6 inches above the original bottom. (Fig. 49).

All were circular, however, and their contents notably meager—a few sherds in Pit 9, bones of American raven, and, in Pit 10, bones of Mountain sheep and Mule deer. None held traces of roofing, or hearth stones, nor were they noticeably fire-hardened.

They ranged in depth from 14½ to 40 inches, in diameter from 19 to 56 inches.

Pits 2, 9 and 10 are clustered fairly close together near the lower Citadel terrace. Others may occur in the untrenched area near them. (Fig. 11).

PIT OVENS WITH FLUES

Perhaps the most interesting undercut pits were Nos. 12 and 15, with flattened globular bodies and a flue or chimney leading from one side to the ground surface. (Fig. 37).

These showed more evidence of firing.

The bottom of the flue of Pit 12 opens on the side of the ellipsoidal body at a point 11 inches in perpendicular height above the pit floor. The flue is 5 inches in diameter and runs horizontally on a magnetic bearing of 348 degrees (ca. NNW) for 16 inches, then angles upward until its opening from the pit orifice, center to center, is 36 inches.

There were some charred cobs (.83) on the floor, and a few sherds in the fill.

The body of Pit 15 is jar-shaped, elongated in horizontal demension, with flattish bottom and a less pronunced vertical neck than No. 12.



Fig. 49

Pits 9 and 10 after excavation.



Fig. 50

Pits 11, foreground, and 12, not excavated for lack of time.

The flue's lower opening is rectangular, 6 inches wide by 7 inches high, and its lower margin is 4 inches vertically from the floor. The chimney runs horizontally almost exactly west for only 8 inches, then turns upward on a 25-degree slant and angles about 15 degrees to the south. Past the elbow the tunnel tapers to a 6-inch circular orifice. Pit and flue orifice centers are 37 inches apart.

There were no finds except sherds (.146) in the fill.

Roberts describes comparable examples from near Zuni, New Mexico,[36] and Houck, Arizona,[37] and Fewkes[38] noted at Heshotauthla ruin on the Zuni reservation communal ovens built of stone with chimney-like flues. An undescribed but illustrated cist from White Dog Cave apparently has two flues, each shaped like a tobacco pipe.[39]

The Nalakihu ovens vary somewhat in body shape from either illustrated by Roberts but their chief difference lies in the relatively sharp elbowing of their flues which would have militated against using the tunnels to poke or arrange the fire burning in the main pit, as suggested by Mindeleff.[40] Roberts does not specify orientation of pit-flue axis so it is not known whether there is correspondence in this feature.

Hopi Indians use analogous large ovens near their fields to bake sweet corn in the husk, in an event attended by considerable ritual. Titiev[41] fully describes the custom and points out that pit ovens with flues are properly called *gösi*, while flues are *yokaha*, a word for all ventilators. This is in contradistinction to Mindeleff who termed them pi-gummi ovens, which are cooking pits without flues employed not for baking sweet corn but for the preparation of a corn mush pudding known as *pikami*.[42]

Hough,[43] who spelled the word "pigame," also confused the 2 and later writers have followed. In the future, pit ovens with flues would be accurately described as gösi, or more easily, goishi, which does minor mutilation to the Hopi, and causes less trouble for the average manipulator of typewriters. The word rhymes with "coy she".

(36) Roberts, 1932, pp. 44-6.
(37) Roberts, 1939, pp. 55-6.
(38) Fewkes, 1891, p. 107.
(39) Guernsey and Kidder, 1921, Plate 9.
(40) Mindeleff, 1891, p. 164. Roberts, 1939, p. 55.
(41) Titiev, 1937, pp. 87-94.
(42) Beaglehole, 1937, p. 66.
(43) Hough, 1915, p. 66.

SUMMARY --- PITS

There were found 16 pits which were classed in 3 types, (1) pits with undercut sides, (2) pits with vertical sides, and (3) goishi ovens. The first and third classifications were recorded for the first time in the Flagstaff district. All are believed to antedate appearance of the Chino component at Nalakihu. Of the 3, the undercut specimens may, on the basis of ceramic content, be slightly the oldest.

None were plaster lined, and fire hardening, except in the goishi ovens, was not marked. Hearth or cooking stones were rare to nonexistent. These negative traits are in contrast to the situation outlined by Haury[44] for southern New Mexico and Arizona.

Relationship of the depressions to Nalakihu was not proved by the curtailed excavations, and the possibility remains that some or all were dug by occupants of other structures close at hand.

Of the undercut type the 2 which had possessed some sort of clay cover or roof yielded corn impressions and charred cobs, thus hinting at use as storage pits or bake ovens. Function as the latter could only have been for a short time, for walls are not burned to a bricklike consistency. Postulation of employment as storage cists raises the problem of why the maize remains are charred in most instances --- could fire, even intentional burning by a raiding enemy, successfully consume a pit full of maize ears?

Only 2 pits were oval in horizontal section and may have had a specialized function as trash or refuse receptacles.

Divergent examples included a pit which held a burial, another which consisted of joined globular bodies, and a third formed when 2 adjacent undercut cavities had been combined into a clay quarry with associated basins where plaster may have been mixed. Considerable secondary use is thus postulated.

The goishi ovens probably baked corn. Archeological literature has used the term "pi-gummi" for these, through confusion of the type with another which is employed by modern Hopi for the cooking of corn mush pudding. Elbows in the small-diameter flues would have hindered fire tending operations, hence these data tend to support the theory that the flues increased draft.

(44) Haury, 1941, pp. 56-62.

HUMAN BURIALS

A total of 6 burials were opened near Nalakihu. Four clustered about 60 feet to the south and 2 others were farther east. (Fig. 11). Pothunters may have removed a seventh from a slab cist (C1) which was discovered empty (Fig. 51).

Five inhumations were found in 3 shallow pits, an undercut pit, and another slab cist. The 1 cremation manifested intricate characteristics which made it dissimilar from any example in archeological literature of the Southwest.

Burial 1 (in Cist 2)

A piece of bone which immediately crumbled and a small Sunset Red bowl (B1.1) (Fig. 52) were the only contents of a slab-lined cist, the form of which was essentially a rectangular box with walls narrowing toward the bottom. The burial was shallow, one of the slabs protruding above the ground surface.

Burial 2

This cremation burial deserves more than casual mention, for it involved incineration on a pyre or platform over a shallow basin. (Figs 53-55).

The old land surface showed at a depth of about 11 inches below the present surface. This ancient soil layer was five inches thick, underlain by a stratum of white clay.

Into the old land surface had been hollowed out a shallow rectangular basin, 28 by 64 inches, with rounded corners. The height of the west shoulder was 3½ inches, of the eastern one, 5½ inches.

A circular pit, 11½ inches across and 13½ inches deep, with curving bottom, was dug in the approximate center of the rectangle and a posthole was sunk near each end of each long side. The 4 postholes (Fig. 55 a, b, c, d) were rather uniform in diameter (5 - 6 inches) and depth (8 - 11 inches) and slanted inward in directions parallel to the short axis of the basin at angles 25 degrees off the perpendicular. Thus, poles of opposing pairs would intersect at about 4 feet.

That the holes were for posts is certain because charcoal and rotted wood below it was found in Hole (c). They probably supported a platform or a log pile on which the body was placed.

Near each end of the basin was a shallow hole (e, f) which might have been the resting place of the butt end of a prop.

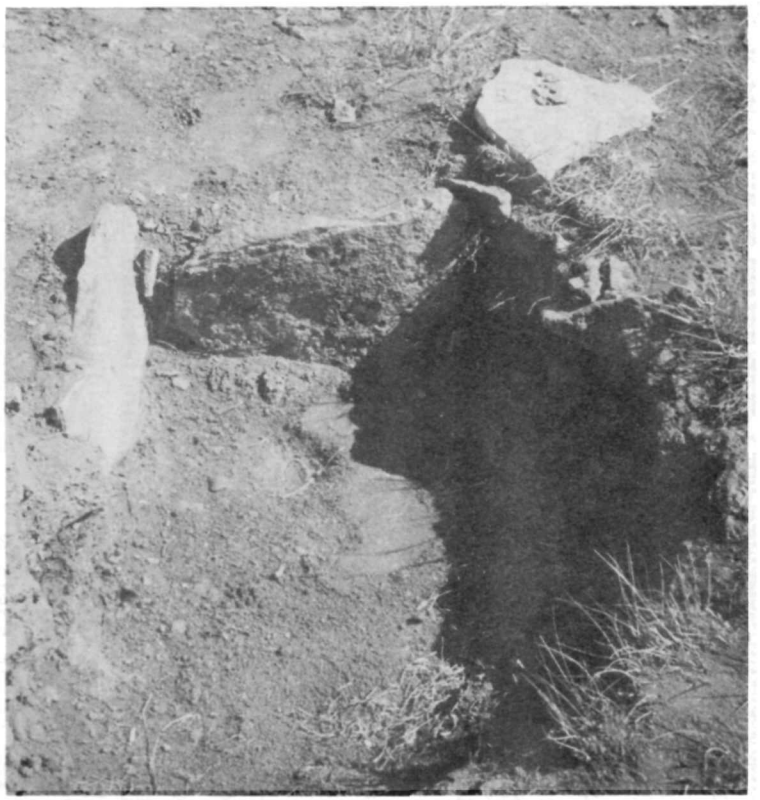


Fig. 51

Cist 1, found empty.

Image of human burial removed from the electronic edition.

Fig. 52

Cist 2, which contained Burial 1, a disintegrated infant skeleton accompanied by a Sunset Red bowl.

Image of human burial removed from the electronic edition.



Fig. 53

Burial 2, looking west. Note four post holes and shallow hole at far end.

Fig. 54

Pottery vessels in central hole of Burial 2. Sunset Red bowl is inverted over a Sunset Red jar.

Finally, 11 inches east of the basin, near center line, was another cavity (g) of unknown use. It was 10 inches deep and inclined slightly toward the north, or parallel with the long axis of the basin. It may not relate to the cremation, but to something in the unexcavated area immediately adjacent.

Fragments of calcined bone were found in small bunches throughout the basin and in the center pit. Pieces of cranium were found associated with bits of tibia, ribs, scapula, etc.

In the central pit was a Sunset Red jar (B2.6) containing some burned bone and small fragments of charred cotton textile (B2.7). It was covered with an inverted Sunset Red bowl (B2.5) and alongside was a Walnut Black-on-white mug, showing traces of fire. (B2.9). Above these were a Tusayan Black-on-red ladle (B2.4) and a Flagstaff Black-on-white pitcher (B2.3), both broken and badly burned. Small pieces of both were missing, and careful screening did not recover them. (Fig. 53).

A ¾-groove stone axe (B2.2) near the west end of the basin was fire-checked and broken; one missing piece turned up in the central pit and another near Hole (b). (Fig. 74 F, G)

A triangular obsidian projectile point (B2.13) was in the basin near Hole (b); 2 other similar points (B2.10-11), but of chalcedony, came from the central pit.

A heavily burned and broken glycymeris shell bracelet (B2.12) was found near the central pit, with 1 fragment in the pit itself.

The whole basin was altered by fire, especially its shoulders. They were smoke-blackened and hard for a distance of about 6 inches around the periphery.

The cadaver evidently had been burned on the superstructure along with the pitcher, ladle, axe, mug, and possibly the bowl. After the fire had cooled, bones were re-distributed and attempt made to place the pieces of broken pottery over the 2 vessels in the central hole. These latter may or may not have undergone the combustion, but the jar contained charred material and either it was in place or the charred fragments were put in it later.

McGregor[45] does not mention cremations with postholes in his discussion or summary. He does list[46] a 4-post cremation, N.A. 2133.C1,

(45) McGregor, 1941, pp. 262 ff.

(46) McGregor, 1941, pp. 266-7.

at Site N.A. 2133 in Winona Village, but shows no dimensions or plan. Bones and ashes were scattered about the ground, associated with a Winona Brown scoop, Sunset Red bowl, 2 Black Mesa Black-on-white bowls, a black-on-white jar with Dogoszhi-style decoration, 2 arrow points, burnt turquoise, and a straight nose plug.

Examination of field notes on file at the Museum of Northern Arizona yielded the following information: a sketch (no scale) shows 4 postholes at the corners of a rectangle, 90 by 120 cm. (ca. 35 by 47 inches), thus shorter and wider than the Nalakihu example. There was no central pit nor end holes. It was found 100 yards south of Site N.A. 2133C, or quite near N.A. 2133G and H, which McGregor places in the Angell[47] and Padre[48] foci, respectively. He assigns[49] the cremation to the Winona focus. Occurrence of a Dogoszhi-style jar might rather indicate the Angell focus, in which the type is more common.

The same author also mentions[50] what he considers to have been an almost identical situation at Site N.A. 2098, a little more than 2 miles north of N.A. 2133. Here, too, the rectangle was smaller (1 meter by half a meter) and the nearby houses were assigned to a transition stage between the Angell and Padre foci.

The Nalakihu cremation, then, had simpler antecedents a few miles south in the Hohokam-like Winona, or more probably Angell, focus about 1070-1120 A.D.

To find other archeological comparisons for this well developed funerary apparatus is difficult. The Snaketown pits[51] which most resemble it had no superstructure of offering pit, nor does Sayles mention such features in his discussion of the trait.[52] Nothing very comparable shows up in the archeological Southwest or even in the cremations of the mound area of the midwest.

Spier[53] outlined 2 well-defined ethnographic areas of cremation, 1 covering western Arizona, southern California, and the Peninsula, and

(47) McGregor, 1941, p. 268.
(48) McGregor, 1941, pp. 107-8.
(49) McGregor, 1941, pp. 121, 124.
(50) McGregor, 1941, p. 294.
(51) Gladwin, et al, 1937, Fig. 39.
(52) Gladwin, et al, 1937, pp. 96-100.
(53) Spier, 1928, pp. 293 ff.

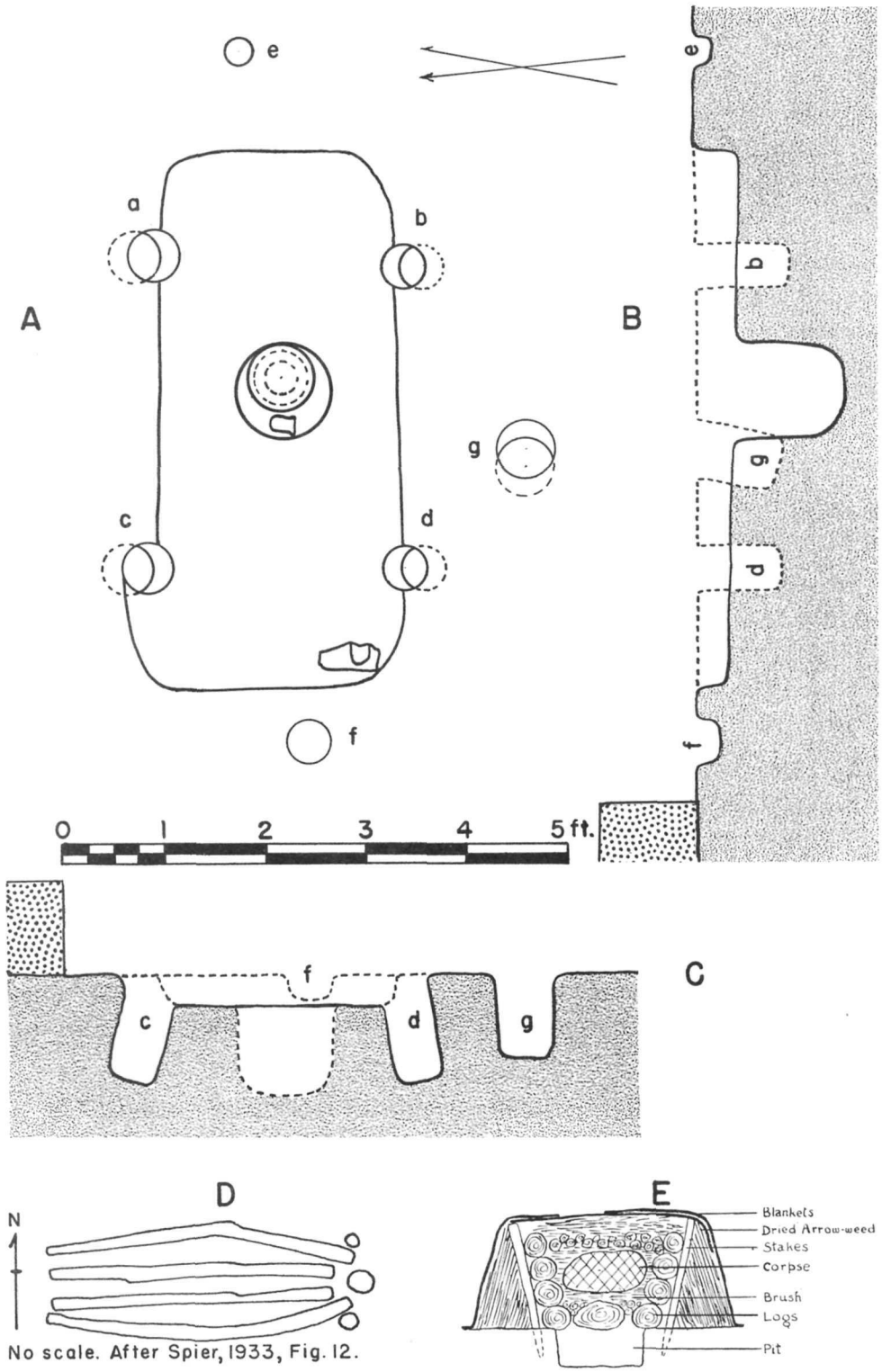


Fig. 55

Burial 2 plan (A), and Sections (B) and (C). D - Arrangement of logs in Maricopa cremation pyre. E - Yuma cremation pyre, Forde, 1931, p. 210.

the other in central and northeast California. Closest analogies exist in the former area with the practices of the Yuman-speaking Yuma[54] and Cocopah[55] of the lower Colorado River.

The Yuma build the pyre over a pit or basin, and stakes, apparently several, are driven alongside to support the fuel logs. Stakes slant outwards in contrast to those of the Nalakihu cremation. (Fig. 55E). Cooled ashes are placed in the basin.

Cocopah pyres are underlain by no basin, but logs are held together on each side by 2 posts, apparently vertical. Cooled ashes are placed in a pit dug the next morning.

The cremation pyres of the Maricopa[56] on the Gila River do not involve a basin and have only 3 vertical posts on the east end; cooled ashes are raked into 4 pits, not located in a basin. (Fig. 55D).

The Mojave and Diegueño do not use side supporting posts but do burn the body over a basin and place cooled ashes in a pit. No pyre basin is reported for the Akwa'ala and Walapai, but they use an ash pit.[57] The Yavapai and Havasupai[58] regularly cremate on pyres but their practices in general more closely resemble the tribes of Uto-Aztecan speech listed below:[59]

(54) Forde, 1931, pp. 208 ff.
(55) Gifford, 1933, pp. 294 ff, 320 ff.
(56) Spier, 1933, pp. 301 ff.
(57) Drucker, 1941, p. 146.
(58) Spier, 1928, p. 292.
(59) Stewart, 1942, p. 313.

Cremation Among Some Southwestern Uto-Aztecan Groups

	Pavant Ute	Wimonuntci Ute	San Juan Paiute	Moanunts Ute	Shivwits Paiute	Kaibab Paiute	Goshute	Taviwatsiu Ute	Pima-Papago
Regular practice	x	x	x						
Witches only				x	x	x	x		
Contagious diseases only								x	
War dead only									x
On pyre		x	x	x	x	x	x	x	x
In house	x	x	x				x		
Bury ashes				x					
No touch ashes	x	x	x		x	x	x	x	

The practice loses traits and fades out to the north. It seems that the Nalakihu cremation equates fairly nearly with a complex which centers in the Lower Colorado River Yumans, and which may have descended to them through the cultural history of the almost unstudied root which Colton calls Patayan.

Presence of Walnut and Flagstaff Black-on-white vessels in the cremations place it in the Elden focus, although the earlier type projectile points and the Tusayan Black-on-red ladle, if not heirlooms, may indicate it belongs to the beginning of that period.

Burial 3 (in Pit 4)

This extended inhumation[60], that of an adult male, supine, lay in the bottom of a typical undercut pit which had been enlarged slightly to accommodate it. (Fig. 56).

Along the skeleton's left side and apparently held by the arm was a wooden staff or wand (B3.9), 60½ inches long when found and longer originally, for the tip and butt had rotted a trifle. The middle section was gone. It tapered from a diameter of ½ inch at the butt or foot end to ¼ inch at the tip. It was painted blue from the tip almost to the middle where

(60) Colton, 1946, p. 294.

Fig. 56

Burial 3 (in Pit 4). Extended supine inhumation, accompanied by painted full-length staff, vessels with food offering, and painted plant stems near the decorated bowl.

there was a red band of indeterminable width. Only the upper juncture of blue and red remained, but the butt was blue also. The blue paint had preserved the wood better than had the red.

At the left side about 6 inches away from the knees were a Padre Black-on-white bowl with handle (B3.2), a Flagstaff Black-on-white pitcher (B3.3) covered with a thin, flat oval of sandstone (B3.4), perhaps a hoe, and containing a Jack rabbit femur (B3.5)[61] and 7 or more sections of plant stems (B3.8) painted with mineral green. These last were grouped near the bowl. Each was about an inch long.

On the right humerus there was worn a glycymeris shell armlet (B3.6), smoothed so the umbo forms a rounded sub-triangle with apex pointing down the arm. (Fig. 74A).

From near the pottery vessels came 2 olivella shell beads (B3.7) and from the dirt inside the right ribs, 15 others.

The man must have held a position of honor or authority exalted enough to allow him to be buried in his regalia.

Grave accompaniments may be contrasted with the famous "Burial of an Early American Magician" found by McGregor at Ridge Ruin about 25 miles south southeast. There, painted and carved sticks mostly were placed transversely across the body. A group of 8[62], painted blue, were arranged 4 on each side of the abdominal cavity and ran longitudinally, but were much shorter than the staff in Burial 3. Another[63] paralleled the right side, could have reached only shoulder height, and was tipped with a colored head in form of a flat and elongated wedge with serrations on the edges. No painted plant stems occurred.

Of the more than 200 remembered Hopi kachinas, 4 carry staffs, and in the left hand. Illustrations (Fig. 57) of them are included here not to predict the kachina cult can be traced back to the Nalakihu example but because they present closest analogies.

Skeletal Measurements. Overall length of the skeleton was 60½ inches in situ. Arms were straight along sides with palms down, the third and fourth fingers of the right hand flexed.

(61) Fewkes, 1926a, p. 4, footnote 1.

(62) McGregor, 1943, Fig. 3 (10); 1941, p. 271, gives focus position.

(63) McGregor, 1943, Fig. 3 (11); Plate III (5); p. 287.

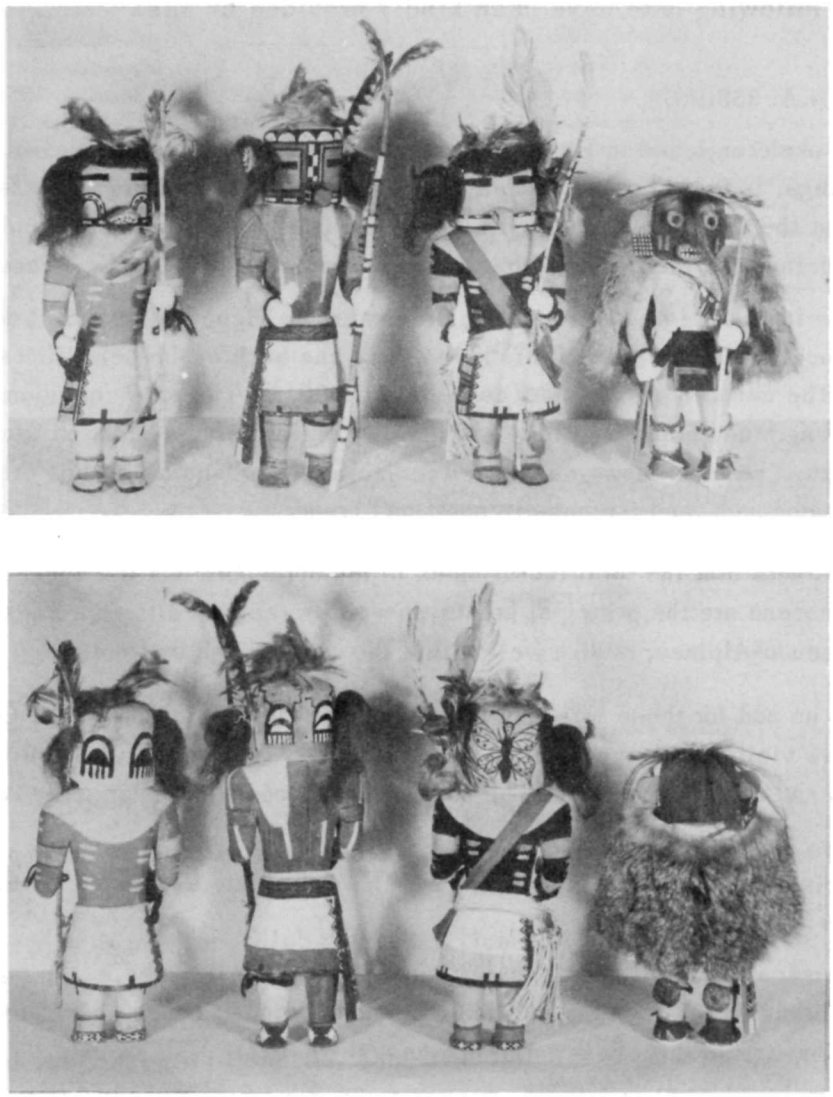


Fig. 57

Hopi dolls from the author's collection illustrating the four kachinas which carry full length wands in their left hands. L to R: *pawik*, Duck Kachina, a dancing kachina but his ceremony has not been held for some time; *malo*, a regular dancing kachina who can perform in spring and summer; *si wu wu yokte*, Black Bighead Kachina (because of his hair color; there is also a Red Bighead; faces are green, however) who takes part in mixed kachina dances and the parade of the Bean Dance; *yo-we*, named for his song, from the Pumpkin Clan, appears only at Bean Dance during initiation of boys and never in mixed kachina dances.

The following data have been kindly provided by Miss Katharine Bartlett:

Burial 3 (N.A. 358.B3)

"The skeleton found in Pit 4, laid out at full length and accompanied by various offerings, is that of an adult male about 5 ft. 1 in. tall, whose age was under 35 years at the time of his death. His bones are fairly large and heavy and he probably belongs to the Pseudo-Alpine type described by Hooton for Pecos.[64]

"This individual had a broad high cranium made higher by artificial deformation, the occipital bone being flattened to make the back of the head almost vertical. The capacity of the skull is medium, 1390 cc. The face considered in its total length and breadth is long and narrow, while the upper portion is of medium length. The face shows no forward projection or prognathism. The orbits are oblong, mesoconch, and the nose is short and broad.

"The facts that the total facial index is leptoprosopic and the upper facial index is mesene are the principal points where this cranium differs from the typical Pseudo-Alpines, though well within the range given by Hooton.

"Let us add for those who may be interested: The frontal bosses of the cranium are visible, the supraorbital ridge is seen only over the inner third of the orbits and above the nasion. The mastoidian processes are large, heavy, and long.

"Occipital deformation is medium, and the right parietal is more developed than the left.

"The sutures are all open except the coronal which is fused in the outer third and beginning to fuse in the middle portion. Wormian bones occur at the lambda. The occipital crest is large and heavy.

"Teeth: Upper maxillary - Teeth worn but in fairly good condition. Some pyorrhea. Dental caries in right premolars 1 and 2, and molars 1 and 2. At time of death had lost left molars 2 and 3, and right molar 3.

"Lower maxillary - Teeth in fairly good condition but worn. Some pyorrhea. At time of death had lost left molars 1 and 3, and right molars 1, 2, and 3."

(64) Hooton, 1930.

Facial Measurements

Bizygomatic dia.	142
Nasion-alveon ht	77
Nasion-menton ht	129*
Left orbit br	42
Left orbit ht	35
Right orbit br.	41
Right orbit ht.	38
Nasal height	53
Max. breadth nasal aperture	27
Palate - external l	55
Palate - external br.	68.5
Nasion-opisthion arc	339
Porion - transverse arc	327
Circumference	491
Cranial capacity.	1390 cc.
Cranial module.	149.3 mm

Mandible

Bi-gonial dia.	84
Bi-condylar dia	123
Ht. of symphysis	32
Min, br. ascending ramus	33
Condylo-symphysial l	102

Indices

Length-breadth index	91.9
Length-height index	88.1
Breadth-height index	95.9
Total facial index	90.9*
Upper facial index	54.3
Gnathic index	97
Orbital index left	83.1
Orbital index, right	92.8
Mean orbital index	87.9
Nasal index	50.9
External palatal index	124.5

	cm.
Femur - left, max. l.	39.6
right, max l	40.2
Tibia - left, max l	35.7
right, max l	35.7
Fibula - left	34.7
right	34.7
Humerus, left	29.1
right	28.9
Radius, left	23.3
right.	22.9
Ulna, left	24.5
right	24.7
Stature (Pearson formula).	153 cm.

*The teeth are somewhat worn.

Burials 4, 5 and 6.

These were burials of children in shallow, oval pits with few or no grave offerings.

Horizontal sandstone slabs covered Burial 4 (Fig. 58). Cranial and a few other bone fragments of a small child lay in the middle of the pit. To the east above the cranium was a broken Verde Black-on-gray ladle (B4.1) and Moenkopi Corrugated sherds. One sherd of Walnut Black-on-white may also have been associated, but came from a slightly higher level.

No sherds or accompaniments marked Burial 5 (Fig. 60) of an infant; pothunters may be responsible. There were badly disintegrated fragments of cranium and humeri. Pit sides were almost vertical.

Flexed Burial 6, slab covered, occurred in Hole (B) of Pit 14 (Figs. 61 - 63). The skeleton of a child about 10 years of age lay on its left side on a slab which tilted downwards slightly from pelvis to shoulder. Basalt stones supported the jaw and right leg. There were no finds.

Miss Bartlett states:

"Burial 6 was that of a child about 9 or 10 years old. The cranium, mandible, and some of the bones of the skeleton were in a good state of preservation.



Fig. 58

Burial 4. Slab covering before removal.

Image of human burial removed from the electronic edition.

Fig. 59

Child's cranium and broken Verde Black-on-gray ladle.

Image of human burial removed
from the electronic edition.

Fig. 60

Burial 5; no finds except disintegrated bone.



Fig. 61

Slabs covering Burial 6, in a pit near edge of Pit 14.

Image of human burial removed from the electronic edition.

Fig. 62

Shellacking bones of Burial 6.



Fig. 63

Location of Burial 6 after skeleton was removed.

The cranium exhibits a slight lambdoid deformation more on the right side, which means that it is slightly flattened on the crown of the head. This is a different type of cranial deformation from that described for the adult N.A.358.B3. Several Wormian bones are seen in the lambdoid suture.

"In both upper and lower maxillaries, the child had its adult incisors, but baby canines and premolars, and first molars. The second molars are well formed within the bone. The teeth indicate that the child was about 9 or 10 years old. The baby teeth and the first molars all show considerable wear."

SUMMARY - BURIALS

The long measures of burial pits oriented consistently southeast or east as shown in magnetic bearings in degrees:

No.	Type	Slab cover	Axis	Bearing	Direction
C1	Slab cist	no	Long axis	133	SE
B1	Slab cist	no	Long axis	111	ESE
B2	Cremation	no	Long axis	96	E
B3	Undercut pit	no	Foot to head	130	SE
B4	Shallow pit	yes	Long axis	127	SE
B5	Shallow pit	no	No bearing possible	---	---
B6	Shallow pit	yes	Vertebral-cranial line	136	SE

Infants and children were interred in shallow pits and slab-lined cists. Graves at most contained a bowl, a broken vessel and sherds, or were empty save for skeletal material.

An unusual cremation comprehended burning of the corpse on a platform or pyre supported by 4 posts and additional props. A shallow, rectangular basin underneath caught the debris which were re-distributed, after the fire, in the basin and its central pit which held funerary offerings of pottery vessels.

An extended inhumation of an adult male in an abandoned storage pit displayed 2 uncommon accompaniments: (1) indisputable evidence of food in a covered pitcher, and (2) the presence of a full length painted staff.

Determination of foci represented is difficult due to the well known habit of mankind to include heirlooms or exotic articles in graves. Solely

on the basis of pottery offerings, 2 of the burials, Nos. 2 and 3, might be placed in the Elden focus near its inception. Burial 4 probably relates to the Chino-Turkey Hill period. About all that can be said of Burial 1 is that it probably was Sinagua. Burial 6, flexed, possibly was Anasazi.

The adult male of B3 was of short stature, under 35 years at time of death, and of Hooton's Pseudo-Alpine type. Occipital deformation was medium and vertical, as is common among Sinagua skulls.[65] The cranium of the 10-year-old child of B6 showed lambdoid deformation, a different type more characteristic of the Anasazi.

STONEWORK

GROUND STONE

Metates (9)

Of the metates found 3 were of sandstone, 2 of McGregor's[66] type B, and 1 type D. Six were of basalt (2 A, 1 B, and 3 E's).

The grinding stones are shown in Figs. 64-66. Gross measurements in inches are:

	Type	Material	Breadth Max.	Breadth Min.	Length	Groove width	Thickness
Top, L to R							
No. 1	E	B	9	5	13	---	7
2	D	SS	11	10	19	---	---
3	B	SS	15	11	20	11	---
4	B	SS	11	9	18	8	---
5	A	B	13	14	17	8	---
Middle	E	B	13	12	18	---	9
Bottom, L to R							
No. 1	B	B	11	10	15	9	4
2	B	B	11	10	15	8	6
3	A	B	11	10	17	8	8

(65) Colton, 1946, p. 296.

(66) McGregor, 1941, pp. 168-70.



Fig. 64

Five different types of metates, all from R1, and manos.

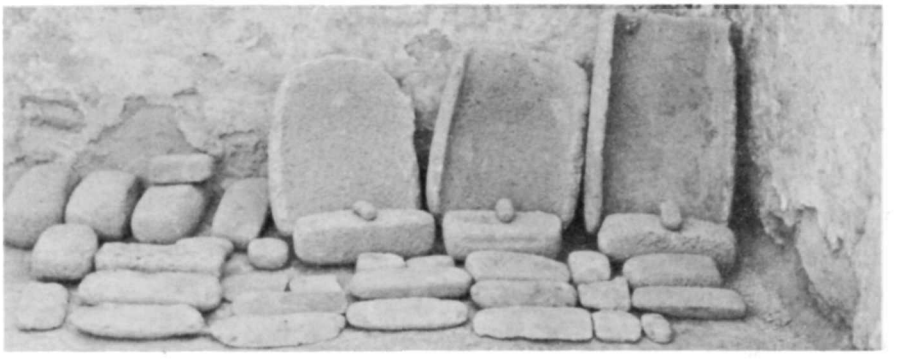


Fig. 65

Manos and metates from R4.



Fig. 66

Large mano and broken metate of basalt from Room 7.

This assemblage is not too different from that found by McGregor at Winona except that basalt outnumbers sandstone at Nalakihu 2:1, and type E is more common. As is usual in Sinagua sites, no metates were found in bins.

Manos (42) 6 sandstone, 36 basalt.

After the field session, manos and 3 metates disappeared, either buried in some un-noted place, or transported to Wupatki where they may have been gradually carted off by visitors during the days when the ruin was not attended by a full-time custodian. From field notes and the photographs, Figs. 64-66, it is possible to make the following listing, using McGregor's types:

Total, 42: 1-AI, 1-AV, 11-BI (1 SS), 1-BIV (SS), 2-BV, 5-BVII (1 SS), 16-CI (1 SS), 2-CIII (1 SS), 1-CVIII, 2-DI.

Translating this somewhat complicated classification, the manos group as follows:

LONG, DEFINITELY TWO-HAND

11 biface (BI)
1 partial wedge (BIV)
2 oval cross-section, little used
5 uniface with rounded top

SHORTER

17 uniface (AI and CI)
2 wedge (CIII)
1 oval cross-section, little used (AV)
1 uniface, possibly one hand (CVII)
2 uniface, true oval shape

It is to be noted that the grooved type does not appear and that wedge-shaped manos and those of sandstone are relatively scarce.

Small Metate (1)

A sandstone rectangular flat mano (.106), 10.0 by 25.5 cm., was utilized on 1 side to grind paint, for pulverized red pigment still adhered to it in the very shallow oval cavity thus formed near 1 end. It was perhaps used in conjunction with the hematite fragment (.153) described under Minerals. (Page 107).

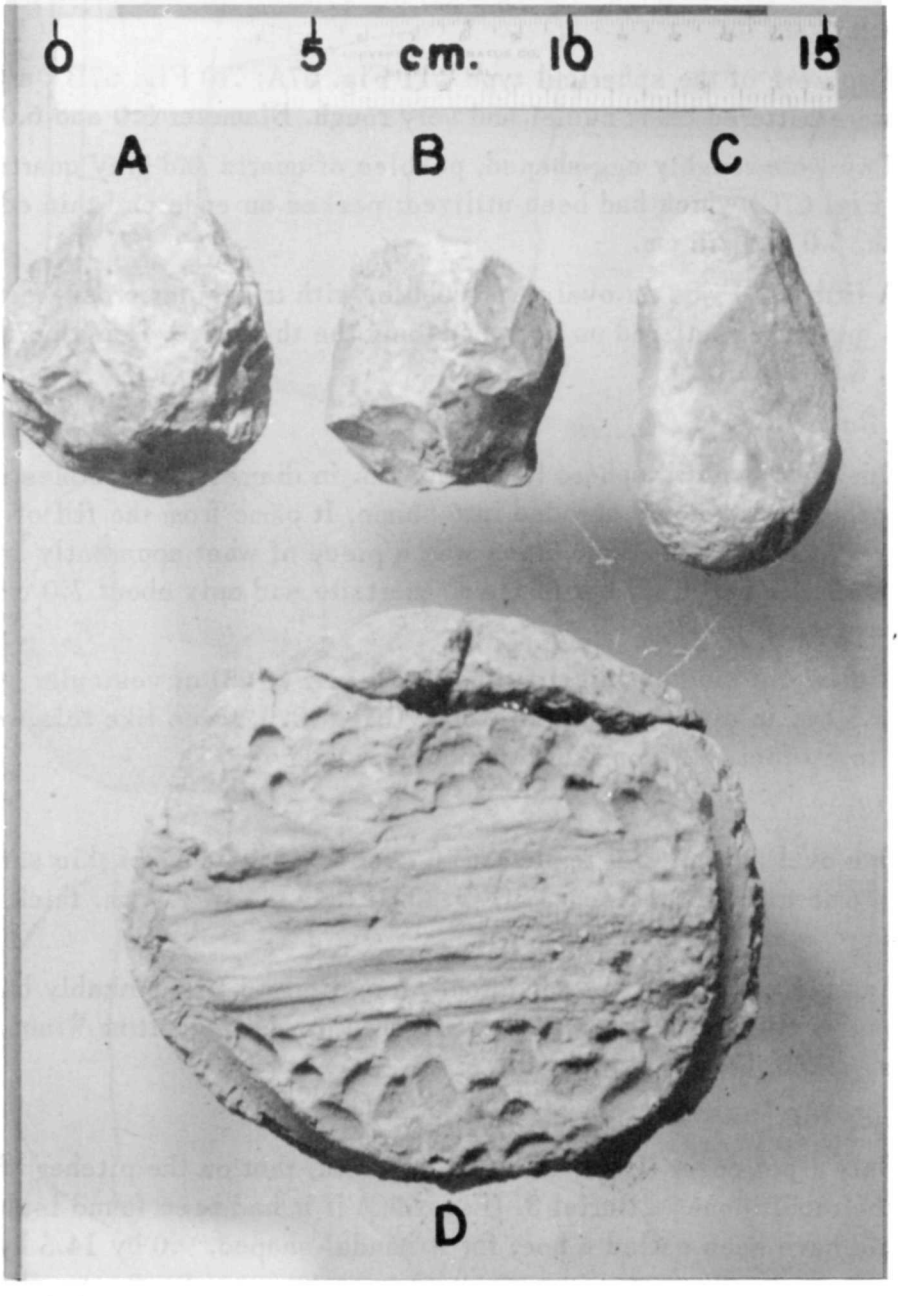


Fig. 67

A (.11) and B (.10) - Battered chert nuclei hammerstones. C (.129) - Gray quartzite hammerstone, egg-shaped. D (.133) - Clay jar stopper showing imprints of beans and maize husks.

Hammerstones (5)

Two were of the spherical type (.11 Fig. 67A; .10 Fig. 67B), although they were battered chert nuclei and very rough. Diameter 5.0 and 6.0 cm.

Two were roughly egg-shaped, pebbles of quartz and gray quartzite (.129 Fig. 67C) which had been utilized; pecked on ends and thin edges. Length, 5.0 and 7.5 cm.

A fifth (.65) was an oval river pebble, with triangular cross-section, of red quartzite, battered on both ends and the thin edge. Length, 7.0 cm., width, 5.0 cm.

Stone Balls (3)

One dark granitic sphere (.35) 10.0 cm. in diameter, resembles a river pebble pecked and abraded into shape. It came from the fill of Room 2. Also from the same place was a piece of what apparently had been a similar ball (.33) but of black quartzite and only about 7.0 cm. in diameter. (Fig. 68C).

A different kind of object is the small ball (.165) of vesicular basalt, 3.5 cm. in diameter, from Room 4. (Fig. 70E). Ones like this were found in all foci at Winona, but their use is unknown.

Hoes (2)

One oval agricultural implement (.7) or rough scraper of thin sandstone came from fill of Room 1. (Fig. 68B) It is 0.4 to 1.5 cm. thick and edges are worked all around.

Another (.108), also of sandstone, from Room 3 fill, probably had the roughly triangular shape of the 1 figured by McGregor from Winona.[67] It was broken, however (Fig. 68A).

Pot Lids (6)

Only 1 pot cover (B3.4) was found in situ, that on the pitcher which held the rabbit bone in Burial 3. (Fig. 69C) If it had been found isolated it would have been called a hoe, for it sandal-shaped, 9.0 by 14.5 by 0.5 cm.

Others are of sandstone but 4 are circular, ranging from ca. 5.0 to ca. 17.0 cm. in diameter. (Fig. 69B) One apparently oval specimen is 17.3 cm. across the short axis and also could be classed as a hoe.

Axes (2)

One ridged axe (B2.2) of highly polished diorite came from the

(67) McGregor, 1941, pp. 171, 2. Fig. 59D.

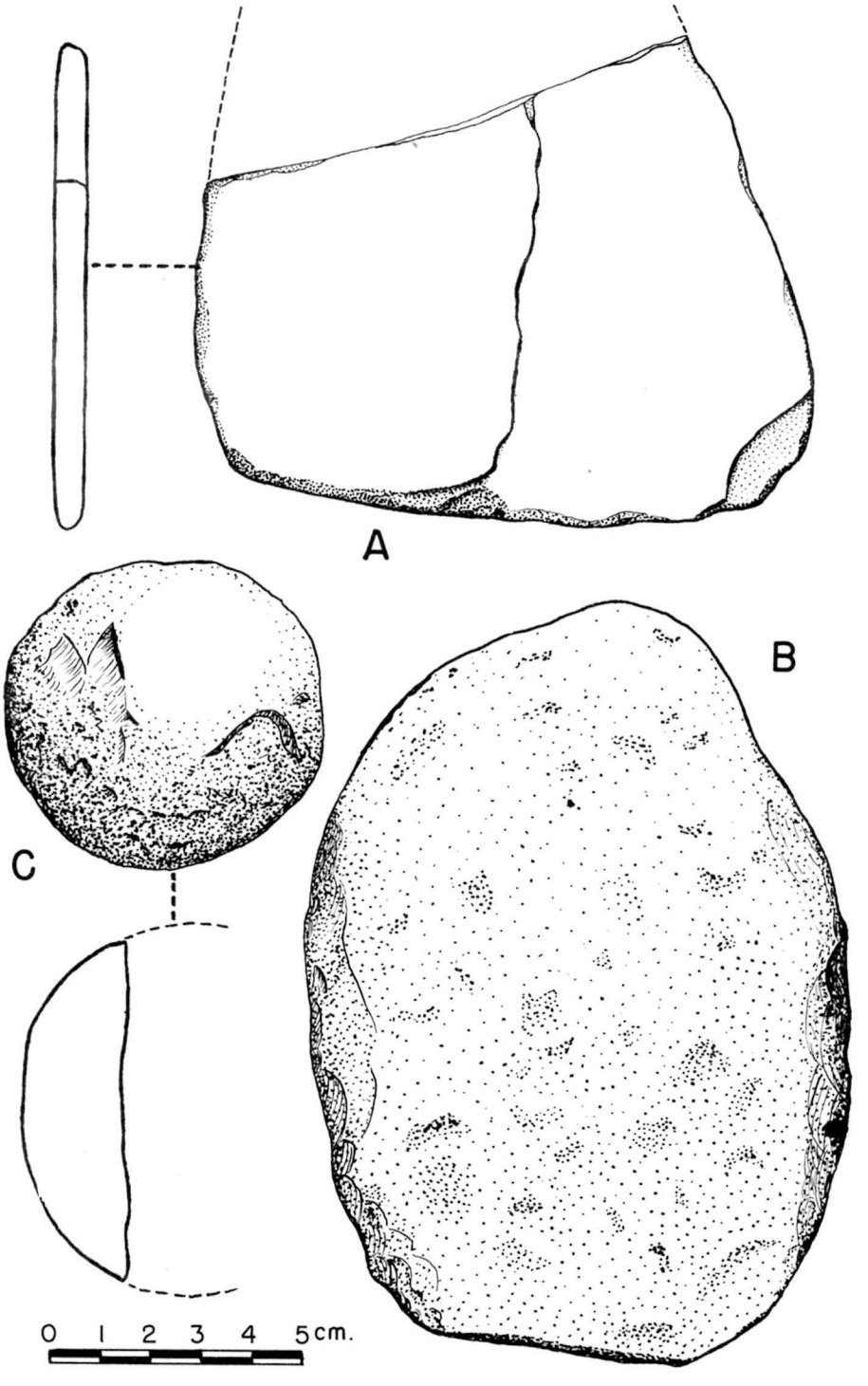


Fig. 68

A (.108) - Triangular hoe of sandstone. B (.7) - Oval agricultural implement or rough sandstone scraper. C (.33) - Portion of black quartzite ball.

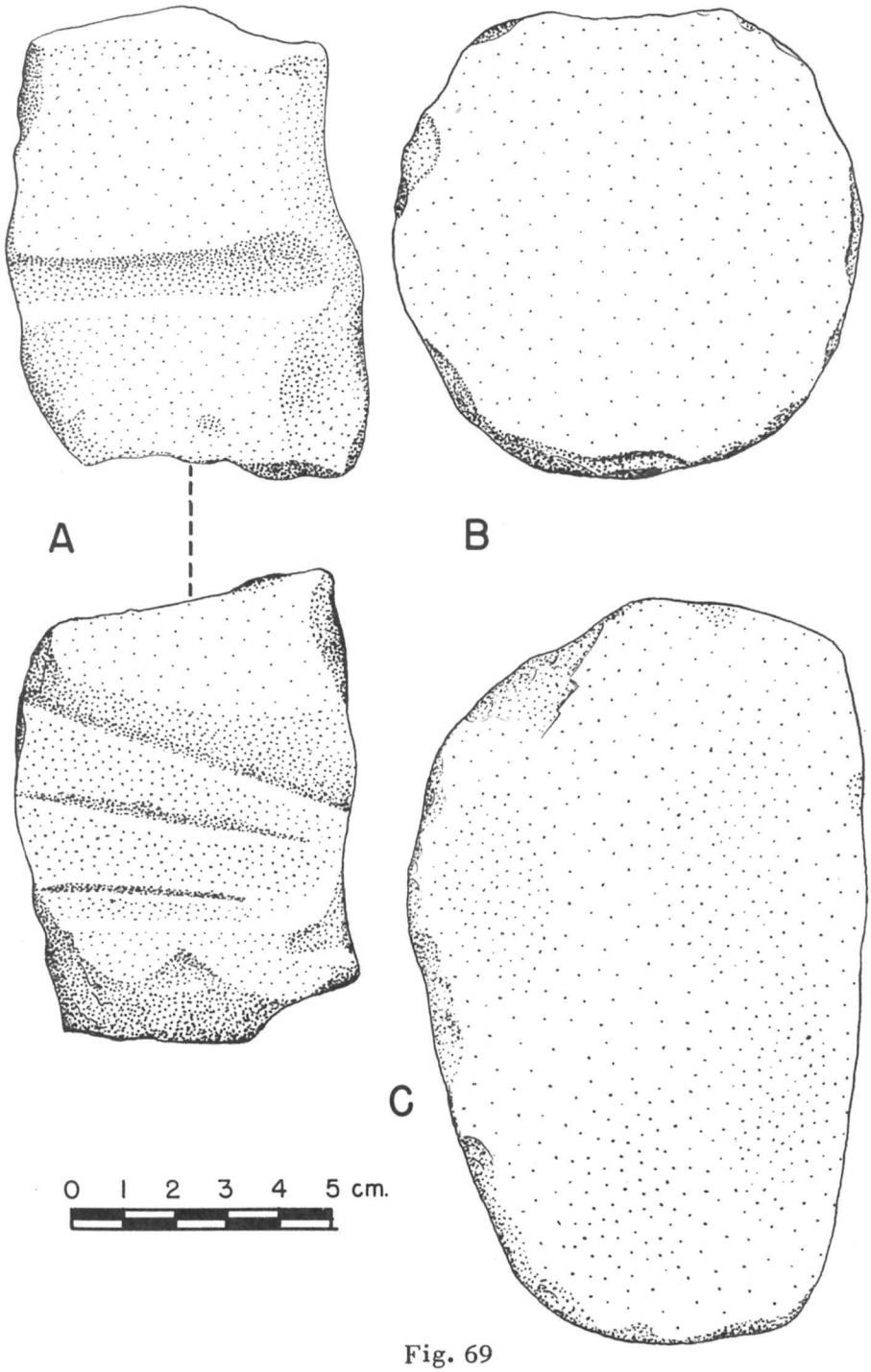


Fig. 69

A (.42) - Kaibab limestone arrow shaft smoother and awl sharpener. B (.117) - Moenkopi sandstone circular pot lid. C (B3.4) - Moenkopi sandstone pot lid found covering food pitcher with Burial 3.

cremation burial. Large, ¾-grooved type with flattened head and long bit. Length, 17.0 cm. plus. Cross-section of the bit is elliptical. Head expands to prominent ridge above the channel of the groove; here thickness and breadth are greatest. The ridge below the channel of the groove is slightly more pronounced on the outer edge than on the sides. (Fig. 74F and G).

The axe does not resemble closely the ones from Winona, Elden Pueblo, those in the collection of the Museum of Northern Arizona, nor any 1 type at Snaketown, although a composite of 2 Santa Cruz types[68] would be similar except the Snaketown bits are shorter.

A fragment of an axe bit (.74) from Pit 14 is sub-rectangular in cross-section. It is of highly polished diorite.

Stone Cylinders (20)

One of the most common artifacts and typical of many sites in the San Francisco Mountain district is the cylinder[69] made of light vesicular basalt. At Winona in Sinagua foci they were found in conjunction with pointed, plummet-like, and bifurcated objects of the same stone. The more complicated forms were absent in the Winona focus, predominantly Hohokam, although such did appear at Snaketown in Sacaton phase associations.[70] Only the simpler types occurred at Nalakihu. For descriptive purposes they are divided as below:

1. *Rough cylinders with rounded ends* (5) (Fig. 70A).
Length ranges from 7.0 to 12.5 cm; diameter from 2.7 to 4.4 cm.
2. *Flattened on 2 or more faces* (7) (Fig. 70B).

Six of these are flattened on 2 faces to produce an oval cross-section; 2 are curved longitudinally. The seventh is flattened on all 4 sides and roughly square in cross-section.

Length, 7.1 to 10.2 cm. Shortest axis, 2.0 to 3.0 cm. Shorter axis, 2.2 to 3.8 cm.

3. *One end beveled* (3) (Fig. 70C).

End beveling may be accidental but it appears marked on 2 cylindrical and one flattened specimen. Length, 6.3 to 7.6 cm. Width, 2.5 to 3.8 cm.

4. *One end flat, the other rounded* (5) (Fig. 70D).

(68) Gladwin, et al, 1937, Pl. LXXVII, d and e, Plate LXXVIII, f.
(69) Bartlett, 1934, p. 26. Hough, 1903, p. 322. Caywood and Spicer, 1934, p. 58. McGregor, 1941, p. 178.
(70) Gladwin, et al, 1937, Pl. LXXXI.

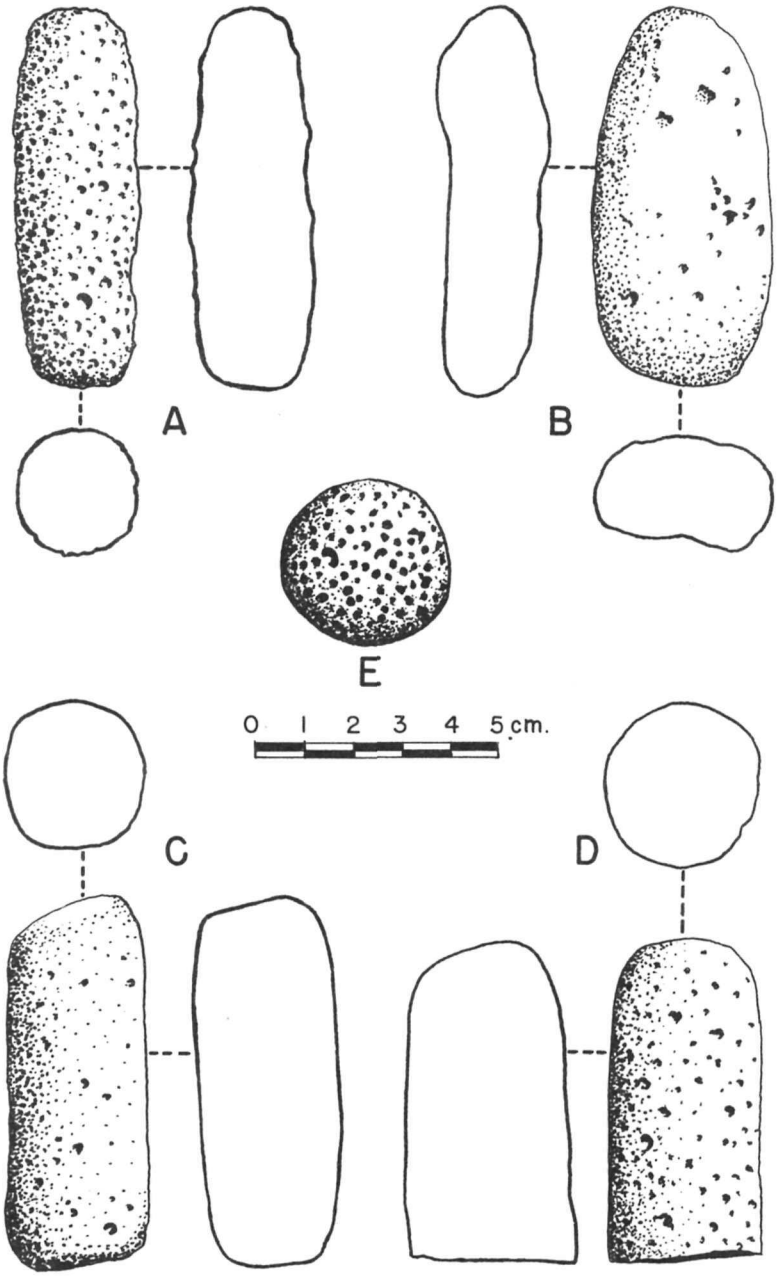


Fig. 70

A (.112) - Rough vesicular basalt cylinder with rounded ends. B. (.58) - Flattened on two faces. C (.111) - One end beveled. D (.43) - One end flat, the other rounded. These may have been used to shell corn. E (.165) - Vesicular basalt ball from Room 4.

Two of these are circular in cross-section, 1 is elliptical, and 2 tend toward the square. They are all carefully made and the type seems definitely developed. Length, 5.5 to 7.2 cm; width, 3.0 to 3.8 cm.

Function of these ubiquitous objects has been variously interpreted as phallic symbols, hand grips for runners, and rubbing tools. The most interesting suggestion has been made by Gratz Harlan of Flagstaff, Arizona, that they were used instead of the usual cob to shell maize ears. Finding of 8 cylinders in living Room 4 conveniently near storage Room 5 lends support to this guess.

All 20 specimens came from Nalakihu except 2 which were found in Pit 8.

Arrow shaft smoother and awl sharpener (1)

A rough piece (.42) of sandy Kaibab limestone has on 1 flattish face a distinct groove, 1.0 cm. wide at the middle and splayed at each end to 1.4 and 1.2 cm., respectively. (Fig. 69A). The channel is 0.5 cm. deep. On the reverse side is a broad shallow trough with three slightly converging smaller grooves in it which might have served to sharpen awls or sticks. All grooves run at right angles to the long axis of the specimen.

Length, 9.0 cm. Width, 7.0 cm. Thickness, 4.8 cm.

The object resembles Winona's roughest examples. For distribution of similar implements see Toulouse.[71]

Perforated disks (2)

Two beautifully worked disks of dark, hard, cretaceous shale may be spindle whorls. Both are barely 0.2 cm. thick.

One (.5) from the floor of Room 1 is almost circular, 4.2 cm. in diameter, with a 0.6 cm. hole almost in the center. (Fig. 71D).

The other (.94) more symmetrical disk, 5.2 cm. across with almost exactly the same size perforation, came from Room 3 above the second story floor. Its material shows contorted banding. (Fig. 71C).

Only 2 similar specimens, 1 from near Leupp and the other from near Flagstaff, Arizona, are to be found in the collections of the Museum of Northern Arizona. Both were contributions from collectors and exact provenience is not available.

Caywood and Spicer[72] note apparently comparable disks, 2 from Fitzmaurice Ruin and a broken example from Kings. The latter was

(71) Toulouse, 1939, pp. 80-89.

(72) Spicer and Caywood, 1936, pp. 58, 113.

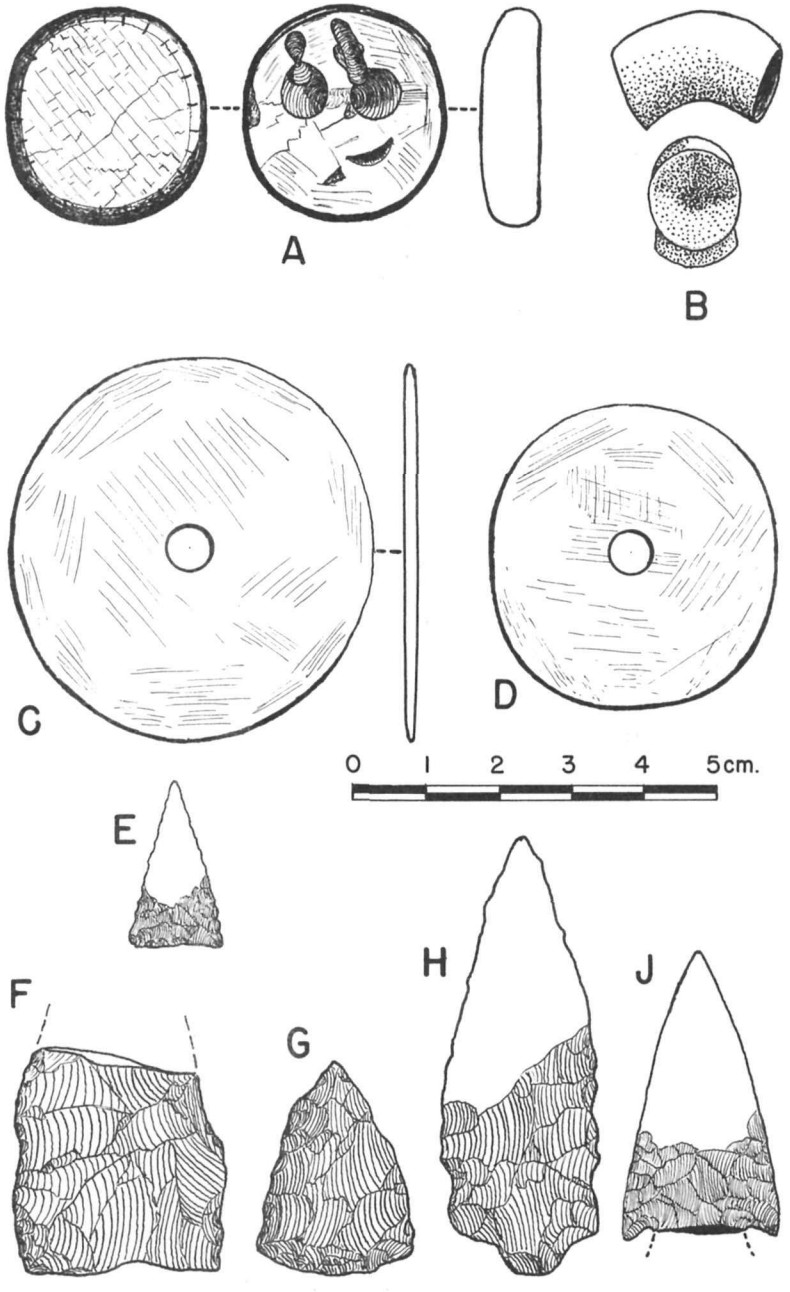


Fig. 71

A (.130) - Obverse and reverse sides of lignite button. B (.152) - Limestone nose plug, surface find. C (.94) and D (.5) - Beautifully worked spindle whorls of dark, hard cretaceous shale. E. (B2.10) - Triangular arrow point from cremation burial. F (.120) - Broken base of knife without stem; agatized wood. G (.14) - Leaf-shaped biface projectile point. H - Chalcedony point with tapering stem; surface find. J (.119) - Chalcedony point, possibly McGregor's Type G.

carelessly made. Fewkes found perforated stone disks at Pueblo Viejo on the Gila.[73]

Lignite Button (1)

From the floor of Room 4 came this slightly elliptical (2.8 by 3.0 cm) button, 0.8 cm thick. (Fig. 71A).

The 1 plane side is highly polished. On the curved edge are short engraved lines[74] pointing toward the center. The slightly convex, but not ridged, back bears 2 conical holes drilled downward at a diagonal and meeting to provide means of suspension or attachment. Two other pairs of smaller holes nearer the periphery once had functioned likewise but their "bridges" had broken. The axes of their drilling had been perpendicular to that of the larger holes.

Buttons like this are reported from Pueblo Bonito in the Chaco Canyon,[75] from the Tsegi,[76] from the Chevelon district[77], from Youngs Canyon near Flagstaff[78] and from Ridge Ruin.[79] McGregor has suggested it is possible they were adapted from the pyrite mirror of Hohokam and Mexican cultures. However, the lignite buttons, highly polished as they are, could not have performed mirror function, as could the pyrite mirror in the collection of the Museum of American Indian, Heye Foundation, New York City. They show no attempt at mosaic work and only the method of attachment is the same.

Nose plug (1)

Only 1 instance (.152) of this interesting type of ornament was found, and it, unfortunately, on the surface near Nalakihu. (Fig. 71B). It is of fine-grained limestone, 2.0 cm. long and 1.3 cm. in diameter. It resembles McGregor's[80] small type F except it is larger and ends expand even more slightly. Conical drilled hollows in each end served to anchor plastic which held ornamental buttons of some kind.

(73) Fewkes, 1904, p. 186.
(74) Guernsey and Kidder, 1921, p. 106, Pl. 43K.
(75) Pepper, 1920, Pl. 1.
(76) Kidder and Guernsey, 1919, Fig. 69.
(77) Fewkes, 1904, p. 88.
(78) Fewkes, 1926a, p. 7, footnote 1.
(79) McGregor, 1941, p. 195; 1943, pp. 281, 297.
(80) McGregor, 1941, pp. 204-9; Fig. 71F.

McGregor mentions the large form of Type F as occurring at Wupatki, in the Verde Valley, and elsewhere. Presumably all are of red argillite, while the Nalakihu specimen is the first recorded of limestone.

CHIPPED STONE

Chipped stone artifacts were very rare at Nalakihu, only 15 being recovered, of which 6 were flakes or chips.

Implements with secondary flaking on all major faces. . . . . .(9)

Projectile points and knives without stems (6)

Pointed at one end, square at the other (1) (Fig. 71F)

One broken base of agatized wood, poorly chipped, from the surface near Nalakihu. (.120)

Miscellaneous leaf-shaped (2) (Fig. 71G).

Two fragments, 1 (.14) obsidian from Room 1 and the other of patinated rose colored chalcedony from Room 3 fill.

Triangular projectile points (3) (Fig. 71E).

Straight sides and slightly concave base without serrations. All 3 from Burial 2. One obsidian and 2 chalcedony. McGregor's Type F,[81] but with less pronounced concave bases. Length 2.4 cm.

Projectile points and knives with stems (3)

Tapering stem (1) (Fig. 71H).

One of chalcedony, probably from the Shinarump Conglomerate. Broader than those of Pecos. Very short stem, probably broken. A deep flake on either side may have aided hafting. Length, 6.2 cm.; width, 2.4 cm.

Miscellaneous stem (2) (Fig. 71J).

One of chalcedony, probably from Petrified Forest. Stem broken but possibly McGregor's Type G.[82] Notches are inclined at 45-degree angle. Length, 4.0 cm. plus. Width, 2.2 cm.

Implements with little or no secondary retouch. . . . . .(6)

Scrapers (6)

Utilized flakes (3) (Fig. 72 A, D).

One obsidian, 2 agatized wood. (.132, .76)

Side scraper (1) (Fig. 72E).

Large agatized wood flake (.118) with secondary retouch on concave side. Length, 9.3 cm.; width 6.5 cm.

(81) McGregor, 1941, p. 185.

(82) McGregor, 1941, p. 189.

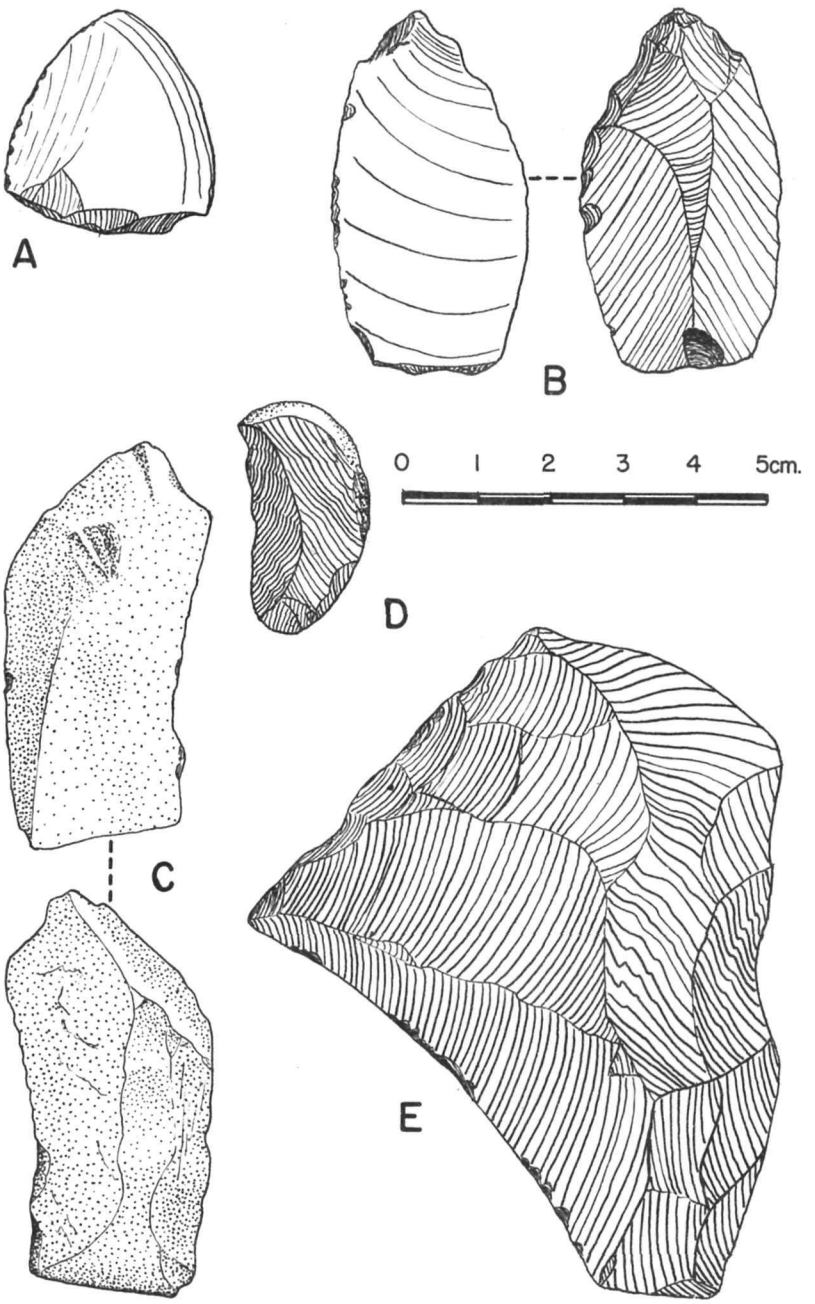


Fig. 72

A (.132) and D (.76) - Utilized flake scrapers of agatized wood. B (.41) - Obsidian flake blade. C (.77) - Black quartzite flake blade. E (.118) - Agatized wood concave side scraper.

Flake blades (3) (Fig. 72C, B).

Two flakes which could have been used for blades. Struck off with Mousterian-like technique. Black quartzite (.77), 2.9 by 6.0 cm., and obsidian (.41), 2.8 by 5.0 cm.

SHELL

Beads (17)

All beads (B3.7) were from Burial 3, most from the thoracic cavity as if they had adorned some upper garment. They are olivella shells ground at both ends to average 0.8 cm. long. Thickness is 0.6 cm. Sometimes grinding was careless so that an end may not always be perpendicular to the long axis. (Fig. 74B).

They equate with Type G[83] of the Winona report. This is the most common class in Angell, Padre, and Elden foci of the Sinagua branch.

Pendant or Needle (1)

In a plastered-over floor hole in Room 2 was found a shell object (.46) of the type considered by Haury[84] a needle and by McGregor[85] a pendant. The Nalakihu specimen is slightly more curved and relatively broader than either the Snaketown or Winona examples. It is distinguished, and probably labeled definitely as a pendant, by 2 engraved lines across it below the perforation and 0.7 cm. from the squarish end. (Fig. 74C).

The 2 Winona pendants were found in the Padre focus while the Snaketown ones came from Santa Cruz and Sacaton phases, all earlier cultural stages than Nalakihu.

Length, 3.6 cm.; maximum width, 0.5 cm.

Armlets or Bracelets (2)

On the right humerus of the skeleton in Burial 3 was a heavy glycymeris shell armlet (B3.7) with umbo barely ground at the apex so there is no perforation. The apex pointed down the arm. Overall diameter, 9.5 cm. (Fig. 74A).

(83) McGregor, 1941, pp. 217, 219.

(84) Gladwin, et al, 1937, pp. 138-9.

(85) McGregor, 1941, pp. 203, 221.

These heavy types occurred late at Snaketown,[86] but at Winona[87] they were supplanted in popularity by a thin type in later foci.

Another equally heavy armlet or bracelet, badly broken and calcined, was found in the cremation burial, No. 2.

BONE AND ANTLER

Awls (10)

Mammal leg bone with head unworked except by original splitting (4).

(All from Room 1)

1. Proximal end of deer or antelope metatarsus split in half. (.1). Point dull or broken. Possibly used as flaking tool. Length, 19.5 cm. Width at base, 2.5 cm. (Fig. 75C).
2. Half the distal end retained (.3). Long example of Winona Type D[88] (Fig. 75D).
3. Two consisting of ¼ the proximal end of a metatersus. Length, 13.2 and 11.6 cm. (Fig. 75 E).

Mammal leg bone with head wholly removed (3)

1. Two sharp bone splinters from floors of Rooms 1 and 2. (Fig. 75F). Butt ends rounded and smoothed. Length, 9.2 (.18) and 11.0 cm (.167).
2. Bluntish awl (.44) or light chisel of Jackrabbit fibula from Room 2 above the second story floor. (Fig. 75G). Working end long slanting bevel, the other end squared off. Possibly an unfinished needle. Length, 10.0 cm. Width, 0.6 cm.

Unclassifiable awl tips (3) (Fig. 75H).

1. One from Room 3 (.114) and 2 from Room 4 (.151, .160). One of the latter is made from a rib.

Nalakihu awls vary somewhat from those of Winona. Perforated and spatulate types do not appear and there is more use of the proximal ends of bones split in halves or quarters.

(86) Gladwin, et al, 1937, p. 142; Pl. CXVII c.

(87) McGregor, 1941, pp. 204, 222.

(88) McGregor, 1941, p. 228.

Needle (1) (Fig. 75J)

Jackrabbit fibula (.128) ground to circular cross-section. Point long and sharp. Eye drilled without preliminary cutting[89] and goes through only 1 wall of the tube, 0.4 cm. from the base. The instrument would have been valuable in some kinds of weaving for threading weft strands, as among the Navaho, and for other uses.

Such needles are uncommon. Most needles or bodkins in the literature[90] were perforated awls or slivers of bird bone.[91]

Dice (3) (Fig. 75B).

Two sub-rectangular (.91, .92) and 1 round dice were found on the floor of Room 3. There are random scratches on the grooved side but no intentional decoration. The sub-rectangular ones are 1.3 by 2.5 cm., and the circular one 1.4 cm. in diameter. All were concavo-convex, apparently of deer metatarsals.

Dice illustrated from northeastern Arizona[92] and the Forestdale Valley,[93] east central Arizona, are oval in form. Haury credits the Anasazi examples with more frequent occurrence of incised decoration on 1 face than is the case in Mogollon dice.

Closest comparison in form is with Pecos.[94] A lone find at Winona[95] was sub-rectangular but smaller and was uncommon in the culture.

Polisher (?) (1) (Fig. 75A)

From a metatarsus was fashioned this well made implement (.45) showing wear by rubbing or polishing at the smaller end. Somewhat similar tools but made of ribs of large mammals were found at Pecos.[96] They did not appear at Winona. Length, 16.5 cm. Width, 1.4 cm. From Room 2 floor.

(89) Kidder, 1932, p. 222.
(90) Haury, 1940, pp. 114-5, 117. Roberts, 1931, p. 152. Martin, et al, 1940, p. 70. Fewkes, 1926a, Pl. 2e, f.
(91) Kidder, 1932, pp. 222-3.
(92) Kidder and Guernsey, 1921, p. 191.
(93) Haury, 1940, pp. 115-17.
(94) Kidder, 1932, pp. 243-4, Fig. 202a, d.
(95) McGregor, 1941, p. 233, Fig. 75K.
(96) Kidder, 1932, Fig. 182n, pp. 229-30, 32.

Antler tine (1)

An antler tine (.88) was taken from the floor of Room 3. It shows a faint wear facet on the side of its tip opposite the natural convexity of the tine. Length, 16.7 cm.

CLAY OBJECTS AND WORKED POTSHERDS

Pipe (1) (Fig. 73)

"Cloud blower" type, short and conical, of burned clay not slipped, polished, or decorated (.6). Bowl only 2.0 cm. deep with hemispherical internal end. Pipe 3.0 cm. wide at orifice and 5.9 cm. long, so bowl takes up only 1/3 the length. Carbon blackened inside and out. Crude brown paste with heavy quartz sand temper.

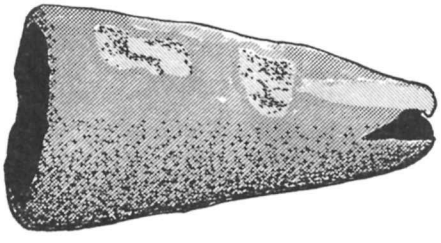


Fig. 73

Pottery pipe (.6) from Room 1.

This pipe differs from the short, straight specimen found in the Angell focus at Winona[97] and its bowl is shallower than Pecos specimens.[98]

Disks (4)

Perforated (2)

Carelessly cut from Tusayan Black-on-red (.147) and Citadel Polychrome bowl sherds, the latter having broken before drilling was completed. Diameters, 2.5 and 4.2 cms. (Fig. 74E).

Unperforated (2)

Roughly rounded from Deadmans Gray and Walnut Black-on-white (.149) sherds. Diameters, 2.5 and 4.2 cm. (Fig. 74D).

The Citadel Polychrome disk came from Pit 14; the others were surface finds.

(97) McGregor, 1941, Fig. 21c and p. 74.

(98) Kidder, 1932, pp. 156 ff.

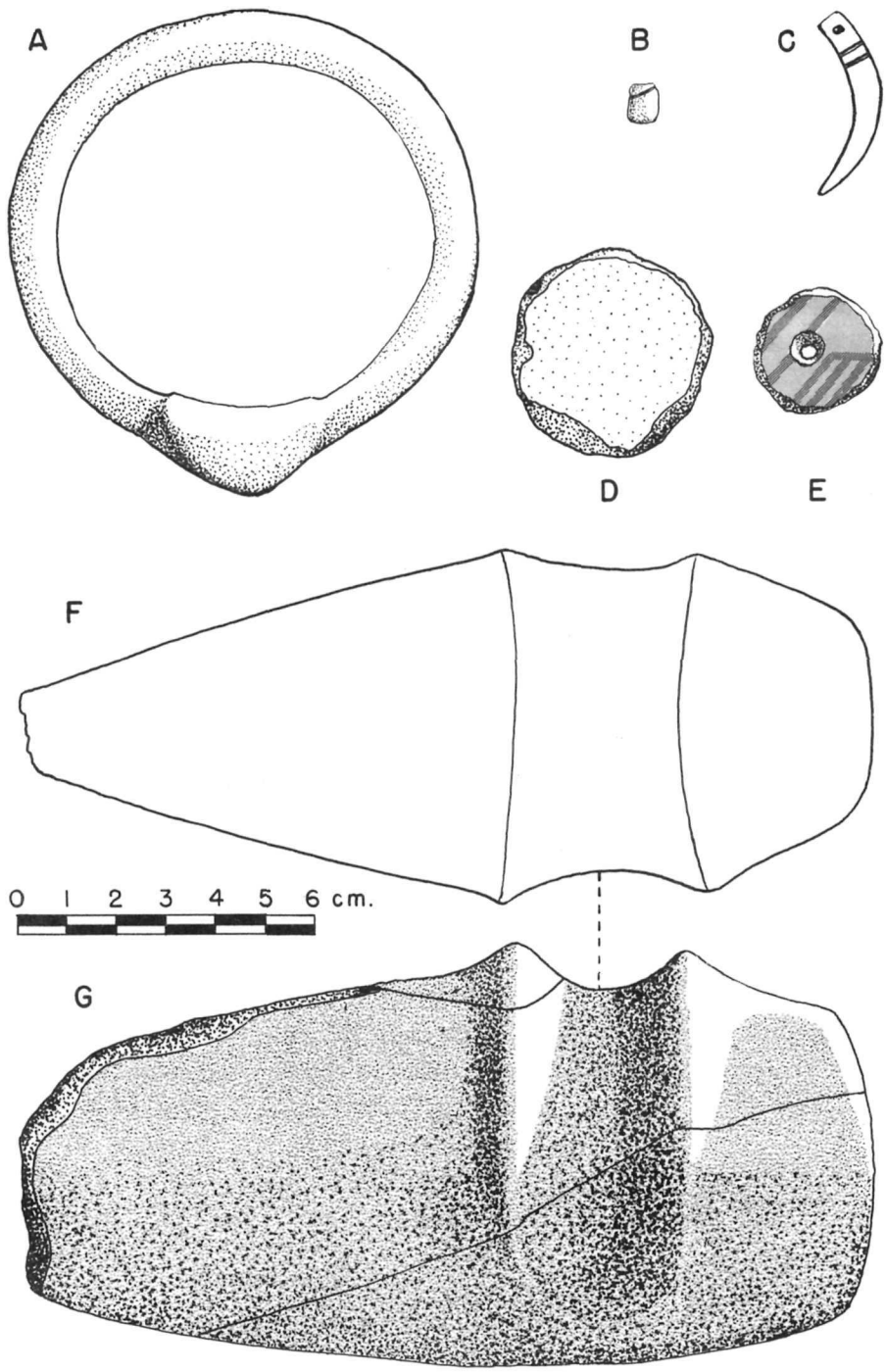


Fig. 74

A (B3.6) - Glycymeris shell armlet from Burial 3. B (B3.7) - Olivella shell bead ground at both ends. C (.46) - Engraved shell pendant. D (.149) - Roughly rounded, unperforated disk of Tusayan Black-on-red. F. (B2.2) - Top view of ridged three-quarter grooved axe of polished diorite from cremation burial. G. Side view of F.

Jar stoppers (2)

Of the local reddish clay, including a few cinders, applied when the clay was plastic. One (.133) from Room 5 showed clearly the imprints of beans. (Fig. 67D). Several strips of corn husks had been laid across the beans almost filling the jar mouth. The protruding end could used to lift the stopper easily. Convex top rounded and neat. Diameter, 12.2 cm. Thickness, 4.5 cm.

Similar stoppers were found in all foci and sites at Winona.[99]

TEXTILE

The Sunset Red jar in the central pit of B2, the cremation, yielded a dozen or so tiny pieces of charred cotton braiding. According to Mrs. Kent[100], who identified the technique involved, about half was done with an over-3 under-3 rhythm, while the rest was over-2 under-2.

She judges the thread to be 2-ply left-spun, right-twined, which is the usual prehistoric type in which raw fibers are first spun together so that all fibers twist from right downwards towards the left. From such left-spun (or Z-spun) thread, 2-ply thread was made by twisting 2 threads together. This twist, however, was from left downward toward the right, or in the direction of the center line of the letter S.

One narrow piece is the edge of the braid, and 2 pieces are over-2 under-2, 5-strand braid.

Mrs. Kent states that flat over-2 under-2 cotton braids are very common in all prehistoric sites where cotton is found. She has recorded other flat over-3 under-3 braids only from Tonto and Montezuma Castle National Monuments, which are Salado and southern Sinagua sites, respectively.

(99) McGregor, 1941, p. 72.

(100) Kent, 1948.

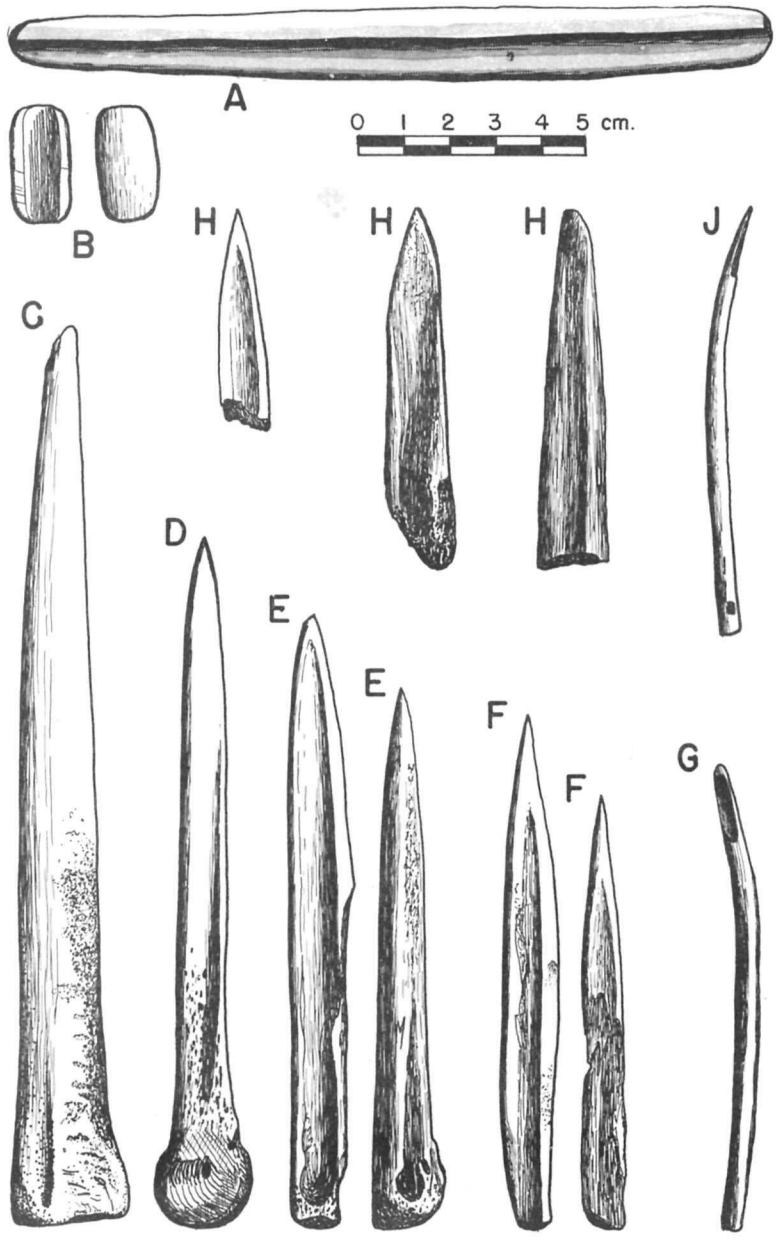


Fig. 75

A (.45) - Metatarsus bone polisher. B (.91) - Sub-rectangular bone dice. C (.1) - Flaking (?) tool. D (.3) - Leg bone awl with half of the distal end retained. E (.4, .2) - Awls of one fourth the proximal end of a metatarsus. F (.167,.18) - Splinter awls. G (.44) - Light blunt awl or unfinished needle of Jackrabbit fibula. H (.114, .151, .160) - Unclassifiable awl tips. No. 160 is made from a rib. J (.128) - Jackrabbit fibula needle.

BASKETRY

Several wisps of coiled basketry (.137) came from the floor of Room 5. They were in poor condition, but Morris[101] thinks there can be no doubt that direction of the work is from right to left and that the stitches are un-interlocked. He trimmed lightly the ends of the exposed foundation, but could not obtain a clear enough view even with magnification to be positive what the foundation was. Most probably it was a bundle, but there is also a possibility that it was a rod, split into so many filaments by the successive piercing of the awl that in their rotten condition the filaments resemble bundle strands. He ventured no guess as to the identity of the material.

This probably is McGregor's Type I[102] from N.A. 1785B.16, Elden focus, and N.A. 2134E.B1, Angell focus, which Weltfish called "coiling with non-interlocking stitches on a single rod foundation"[103]. She reported it from central California, Sayles from Snaketown, Sacaton phase[104], and Tschopik the similar vertical element group from sporadic places in the northern periphery of the Southwest.[105] McGregor[106] considers this 1-rod, un-interlocked stitch type an indication of Hohokam contact or influence.

VEGETAL MATERIAL

Because Volney Jones of the Ethnobotanical Laboratory of the Museum of Anthropology, University of Michigan, thoroughly studied the plant material, his report appears in full in this bulletin as an appendix.

Briefly, he found the pinyon nuts (.143) to have been cracked and used for human consumption. Also, 2 were perforated at the tip in preparation for stringing.

The staff (B3.9) of the extended inhumation was of cottonwood or willow and its paint was mineral. What apparently were painted corn

(101) Morris, 1948.

(102) McGregor, 1941, pp. 235 ff.

(103) Weltfish, 1932, p. 18.

(104) Sayles, 1937, p. 159.

(105) Tschopik, 1939, p. 118.

(106) McGregor, 1941, p. 253.

stems (B3.8) could not be matched with corn, and, although distinctive and obviously of some monocotyledonous plant, probably grass, must await further work for identification. The paint on them was mineral.

No beans were found, but their molds appear on the clay pot lid (.133), Fig. 67D.

The pumpkin seeds (.142) were of *Cucurbita moschata*, the species which was first and has always predominated in the Anasazi area. *C. pepo* was the only type found at Winona.[107]

The situation regarding corn is more complex. All of the material found was charred, and cobs are of exceptionally small size, the largest being smaller than the smallest ear of modern Hopi corn in the Michigan laboratory's collection. They seem to be "nubbins" or abnormalities and not a tiny original type from which later, larger corns developed; researches have proved there is no progressive increase in corn size through time in the Southwest. Franke and Watson[108] have suggested drouth as a possible cause.

A total of 28 cobs had 8, 10, 12, and 14 rows in the ratio of 12:10:5:1, which situation contrasts with Winona,[109] where 10 and 12 rows were the commonest. Cobs from Pits 3, 12, and 14 totalled 5 eights, 6 tens, 3 twelves, and 1 fourteen.

No kernels appear on any of the cobs and all were too large to have been borne by any of the cobs. Most kernels are wedge-shaped but a few are crescent-shaped, and apparently 2 types are represented.

Charred corn material was found on the floors of Rooms 3, 4, 5 (a storage room), and 7, and in trash pit 14, goishi oven 12, and roasting or storage pit 3. Kernels occurred only in the storage room (both types) and the trash pit (1 type).

Possibly a local crop failure caused Nalakihu's people, after they had exhausted their "nubbins," to trade for 2 varieties of corn, mostly shelled, with more successful farmers who had not been so hard hit by drouth or deterioration of agricultural conditions when the cinder mulch was blowing into dunes or arroyos.

(107) McGregor, 1941, p. 297.

(108) Franke and Watson, 1936, pp. 37-8.

(109) McGregor, 1941, p. 296.

MINERALS

Fragments of malachite, of widespread occurrence in northern Arizona, were found above the second story floor in Room 2 (.39 and .40 - contained a little hematite). One of these was ground partially flat. Others occurred on the floor of Room 5 (.144 - contained a little limonite) and in the fill above the inhumation, Burial 3, (B3.10).

In the pit in Room 3 earthy limonite (.96) containing quartz grains was found, and yellow ochre (.140) in storage Room 5 was clay, rich in limonite. Lumps of a lighter yellow substance (.60) from Pit 8 gave a suggestive reaction for bismuth or antimony but no confirmatory test could be obtained. These materials probably came from the Mancos shale in the Painted Desert.

A hematite fragment (.153) was found on the floor of Room 4. Its faces had been ground on some object like the small metate (.106) which, however, came from the second story room above Room 3. Another piece (.95), earthy hematite, was troweled out of the Room 3 pit. Hematite occurs near Indian Gardens in the Grand Canyon, on the Apache reservation, and another deposit was discovered in 1948 just across the Little Colorado River northeast of Nalakihu.

Room 5 floor yielded a small piece of azurite (.145), probably from the Verde copper deposits.

The above - limonite, hematite, and azurite - could have been used as body paint, on wood, basketry, etc.

Lumps of white, iron-free, highly calcareous clay (.97) were in the Room 3 pit. In addition to the uses listed in the preceding paragraph, such clay makes a white slip on gray pottery and white designs on red pottery.

SUMMARY, MISCELLANEOUS

Metates were of the normal Kayenta-Sinagua types; none were in bins, nor did scoop metates or grooved manos appear. Wedge-shaped manos were scarce. A 2-hand mano received secondary use to grind hematite.

Two kinds of stone balls occurred, (1) fairly large ones of heavy stone, and (2) smaller ones of vesicular basalt. Stone hoes were the

usual kind for the district; pot lids were usually circular, but one sandal-shaped specimen was found in situ. Both axes came from the cremation, B2, and resemble Gila types more than those of the San Francisco Mountain area.

Vesicular basalt cylinders were simple in form; their provenience suggests their function may have been to shell corn. The only arrow shaft smoother was similar to Winona's roughest examples.

Two fine perforated disks may have been spindle whorls and seem to have affiliations with the Prescott and Gila districts. The only lignite button found resembles others from the Plateau but may have been adapted from Hohokam or Mexican types. A limestone nose plug, a surface find, resembles argillite ones from the Sinagua culture.

There was little distinctive about the sparsely represented chipped stone implements. The Type F projectile points from Burial 2 seem to be fairly common in the Elden focus.

Of shell work there were found the common olivella beads, an unusual curved incised pendant, and a glycymeris armlet, heavier than the average at Winona.

Perforated and spatulate awl types were rare, most being proximal ends of bones split in quarters or halves. An uncommon needle was made from Jackrabbit bone. Dice were not incised.

The clay "cloud blower" pipe was short and conical; 1 jar stopper of unfired clay showed imprints of beans and a husk by which the stopper could have been removed easily.

The only textile found was braiding, over-2 and under-2 and over-3 and under-3. The former is very common, but the latter is reported only from the southern Sinagua and Salado cultures. Basketry was 1-rod, uninterlocked stitch, probably of southern influence.

Pinyon nuts were cracked for human consumption and some were drilled for stringing. The common type of pumpkin, *Cucurbita moschata*, and bean imprints appeared. A full length staff with Burial 2 was of cottonwood or willow, but plant stems accompanying the same burial could not be identified. Blue and red paint on the staff and green paint on the stems was mineral.

Corn kernels, 2 varieties, never occurred on cobs, which were too tiny to have borne them. Perhaps a local crop failure occasioned Nalakihu's people to barter for shelled corn.

Minerals included yellow, blue, red, and white paint, and malachite.

POTTERY

Potsherds were collected at random during the excavations and placed in sacks numbered according to the room or pit being cleared. In rooms, the sherds found above a level 6 inches above the floor were labeled "Fill"; those in the lowest 6 inches, "Floor". All sherds from a pit, regardless of depth, were lumped together.

No discernible difference was noted between fill and floor sherds, nor could many significant variations be found in the tabulations of one pit compared to another.

A center stratigraphic pier was worked out in Pit 14, a rather complex structure. Unfortunately, the sherds from this test were mislaid somewhere between the field and the laboratory and have never been found. They may have become mixed with the large mass of ceramic material from the contemporaneous Wupatki Ruin excavation, and perhaps will come to light whenever that material receives complete study. It is doubtful, however, if they will reveal data much more significant than was extracted from the random sherds studied from the same pit.

Due to lack of provision by the Civil Works Administration for post-excavation laboratory study, the sherds were tabulated with some difficulty. The National Park Service transported them to the author's residence in southern Arizona where he sorted and classified them in the summer and autumn of 1934 according to the best information available then. Doubtful specimens were submitted by mail to the staff of the Museum of Northern Arizona for corroboration of analysis. No further work was accomplished until September, 1936, when the sherds were returned to the Museum and tabulations completed by re-evaluation of doubtful categories through the assistance of Archeologist Lyndon L. Hargrave.

Weight vs. Number

Since the total number of sherds collected was small, 5,881 in all, the author tabulated them by number and by weight in ounces and computed

percentages by both systems, impelled by curiosity to see how results would compare. It is doubtful that the extra labor involved produced results particularly worthwhile, but both systems are published herein for whatever interest they may have.

Table 4 shows the totals rounded off to the nearest percentage integer. Computation by percentage of weight, it will be noted, allots most pottery types to the same relative standing in relation to other types as does percentage by number, except in the cases of the large thick vessels of Turkey Hill Red and Sunset Red.

Ware totals by weight and number parallel each other with no disorder in relative standing of any ware in either column.

The greatest differences in percentage is noticed in the totals by technique where it becomes immediately apparent that types fired by an oxidizing flame were distinctly heavier than those fired in a reducing atmosphere.

It is definitely faster to sort large quantities of pottery by weight than by counting each individual sherd. Future studies could compute average or modal weights for jars, bowls, ladles, etc., for each pottery type. These factors could be more easily applied to weight totals and percentages than to number counts. The results, on complete rather than random collections, would give a clearer idea of the number of individual vessels of each kind in use at a site for any analyzed period. Compilation of such data might prove a sterile endeavor, but unexpected illumination might be thrown on various problems of conjunctive[110] as well as comparative nature.

In the discussion below, mentioned percentages are by weight, unless otherwise specified.

Vessel Shapes

Jars constituted 88% of all sherds collected. This total was made up of 58% fired by oxidizing flame and 30% fired by reducing flame. The oxidized paddled jars formed the largest group - 56%. Reduced scraped was the next most numerous category with 28%. Reduced paddled formed 3% of the total, and oxidized scraped only 1%.

Three types of large storage ollas combined to dominate the jar percentages: Verde Black-on-gray with 27%, Turkey Hill Red with 18%, and Sunset Red with 12%.

(110) Taylor, 1943.

TABLE 1

Sherds from Rooms

	Bowls				Jars				Total			
	No.	% No.	Wt.	% Wt.	No.	% No.	Wt.	% Wt.	No.	% No.	Wt.	% Wt.
I. Fired by oxidizing flame	132	3	54	2	2587	55	1578	65	2719	58	1632	67
A. Coiled, thinned by scraping	70	1	28	1	97	2	39	2	167	4	67	3
MOGOLLON BROWN WARE? WINONA SER.	1	T	1	T	-	-	-	-	1	T	1	T
Walnut Corrugated	1	T	1	T	-	-	-	-	1	T	1	T
SAN JUAN ORANGE WARE	68	1	27	1	97	2	31	1	165	4	57	2
Tusayan Black-on-red	42	1	16	1	85	2	31	1	127	3	46	2
Citadel Polychrome	26	1	11	T	12	T	8	T	38	1	19	1
Tsegi Red-on-orange	1	T	1	T	-	-	-	-	1	T	1	T
B. Coiled, thinned by paddling	62	1	26	1	2490	53	1540	63	2552	55	1566	64
ALAMEDA BROWN WARE, R.De FLAG SER.	59	1	23	1	1214	26	793	32	1273	27	816	33
Sunset Red	59	1	23	1	255	5	298	12	314	7	321	13
Turkey Hill Red	-	-	-	-	959	20	496	20	959	20	496	20
PRESCOTT GRAY WARE	3	T	3	T	1276	27	747	31	1279	27	750	31
Verde Black-on-gray	3	T	3	T	1276	27	747	31	1279	27	750	31
II. Fired by reducing flame	515	11	172	7	1447	31	641	26	1962	42	813	33
A. Coiled, thinned by scraping	515	11	172	7	1367	29	599	24	1882	39	771	32
TUSAYAN GRAY WARE, TSEGI SER.	-	-	-	-	779	17	313	13	779	17	313	13
Tusayan Corrugated	-	-	-	-	6	T	3	T	6	T	3	T
Moenkopi Corrugated	-	-	-	-	773	17	310	13	773	17	310	12
TUSAYAN WHITE WARE, KAYENTA SER.	7	T	5	T	229	5	135	6	236	6	140	6
Fine sand temper, Walnut dec.	-	-	-	-	59	1	50	2	59	1	50	2
Black Mesa Black-on-white	1	T	1	T	-	-	-	-	1	T	1	T
Dogoszhi Black-on-white	6	T	4	T	170	4	85	3	176	4	89	4
TUSAYAN WHITE WARE, WUPATKI SER.	155	3	53	2	184	4	65	3	339	7	118	5
Flagstaff Black-on-white	155	3	53	2	177	4	60	2	332	7	113	5
Wupatki Black-on-white	-	-	-	-	7	T	6	T	7	T	6	T
TUSAYAN WHITE WARE, TOTAL	162	3	58	2	413	9	200	8	575	12	158	6
LITTLE COLO. WHITE WARE, WALNUT SER.	353	8	114	5	175	4	86	4	528	11	200	8
Padre Black-on-white	37	1	11	T	10	T	5	T	47	1	16	1
Walnut Black-on-white	315	7	102	4	165	4	81	3	480	11	183	8
Walnut and Tusayan Corrugated	1	T	1	T	-	-	-	-	1	T	1	T
Walnut and Moenkopi Corrugated	-	-	-	-	-	-	-	-	-	-	-	-
B. Coiled, thinned by paddling	-	-	-	-	80	2	43	2	80	2	43	2
Coarse sand temper with shiny specks	-	-	-	-	1	T	1	T	1	T	1	T
Sandy gray ware	-	-	-	-	13	T	8	T	13	T	8	T
SAN FRANCISCO MOUNTAIN GRAY WARE	-	-	-	-	66	1	34	1	66	1	34	1
Deadmans Gray	-	-	-	-	62	1	32	1	62	1	32	1
Deadmans Fugitive Red	-	-	-	-	4	T	2	T	4	T	2	T
GRAND TOTAL, REDUCING AND OXIDIZING	647	14	226	9	4034	86	2219	91	4681	100	2445	100

TABLE 2

Sherds from Pits

	Bowls				Jars				Total			
	No.	% No.	Wt.	% Wt.	No.	% No.	Wt.	% Wt.	No.	% No.	Wt.	% Wt.
I. Fired by oxidizing flame	117	10	51	12	94	8	66	16	211	18	111	27
A. Coiled, thinned by scraping	73	6	26	6	-	-	-	-	73	6	26	6
MOGOLLON BROWN WARE? WINONA SER.	-	-	-	-	-	-	-	-	-	-	-	-
Walnut Corrugated	-	-	-	-	-	-	-	-	-	-	-	-
SAN JUAN ORANGE WARE	73	6	26	6	-	-	-	-	73	6	26	6
Tusayan Black-on-red	13	1	7	2	-	-	-	-	13	1	7	2
Citadel Polychrome	60	5	19	5	-	-	-	-	60	5	19	5
Tsegi Red-on-orange	-	-	-	-	-	-	-	-	-	-	-	-
B. Coiled, thinned by paddling	44	4	25	6	94	8	66	16	138	12	91	22
ALAMEDA BROWN WARE, R. DE FLAG SER.	37	3	16	4	68	6	32	8	105	9	48	12
Sunset Red	36	3	15	4	9	1	5	1	45	4	20	5
Turkey Hill Red	1	T	1	T	59	5	27	7	60	5	28	7
PRESCOTT GRAY WARE	7	1	9	2	26	2	34	8	33	3	43	7
Verde Black-on-gray	7	1	9	2	26	2	34	8	33	3	43	7
II. Fired by reducing flame	234	20	71	17	755	63	224	54	989	83	295	72
A. Coiled, thinned by scraping	233	20	70	17	634	53	191	46	867	72	261	63
TUSAYAN GRAY WARE, TSEGI SER.	-	-	-	-	378	32	82	20	378	32	82	20
Tusayan Corrugated	-	-	-	-	6	1	5	1	6	1	5	1
Moenkopi Corrugated	-	-	-	-	372	31	77	19	372	31	77	19
TUSAYAN WHITE WARE, KAYENTA SER.	4	T	3	1	25	2	15	4	29	2	18	4
Fine sand temper, Walnut dec.	-	-	-	-	-	-	-	-	-	-	-	-
Black Mesa Black-on-white	-	-	-	-	-	-	-	-	-	-	-	-
Dogoszhi Black-on-white	4	T	3	1	25	2	15	4	29	2	18	4
TUSAYAN WHITE WARE, WUPATKI SER.	103	9	27	7	148	12	52	13	251	21	79	19
Flagstaff Black-on-white	99	8	25	6	148	12	52	13	247	21	77	19
Wupatki Black-on-white	4	T	2	T	-	-	-	-	4	T	2	T
TUSAYAN WHITE WARE, TOTAL	107	9	30	7	173	14	67	16	280	23	97	24
LITTLE COLO. WHITE WARE, WALNUT SER.	126	11	41	10	83	7	42	10	209	17	83	20
Padre Black-on-white	19	2	7	2	5	T	3	1	24	2	10	2
Walnut Black-on-white	106	9	33	8	78	7	40	10	184	15	72	18
Walnut and Tusayan Corrugated	-	-	-	-	-	-	-	-	-	-	-	-
Walnut and Moenkopi Corrugated	1	T	1	T	-	-	-	-	1	T	1	T
B. Coiled, thinned by paddling	1	T	1	T	121	10	33	8	122	10	34	8
Coarse sand temper with shiny specks	-	-	-	-	-	-	-	-	-	-	-	-
Sandy gray ware	-	-	-	-	-	-	-	-	-	-	-	-
SAN FRANCISCO MOUNTAIN GRAY WARE	1	T	1	T	121	10	33	8	122	10	34	8
Deadmans Gray	1	T	1	T	119	10	32	8	120	10	33	8
Deadmans Fugitive Red	-	-	-	-	2	T	1	T	2	T	1	T
GRAND TOTAL, REDUCING AND OXIDIZING	351	29	122	30	849	71	290	70	1200	100	411	100

TABLE 3
Sherds from Rooms and Pits

	Bowls				Jars				Total			
	No.	% No.	Wt.	% Wt.	No.	% No.	Wt.	% Wt.	No.	% No.	Wt.	% Wt.
I. Fired by oxidizing flame	249	4	105	4	2681	46	1644	58	2930	50	1749	61
A. Coiled, thinned by scraping	143	2	54	2	97	2	39	1	240	4	92	3
MOGOLLON BROWN WARE? WINONA SER.	1	T	1	T	-	-	-	-	1	T	1	T
Walnut Corrugated	1	T	1	T	-	-	-	-	1	T	1	T
SAN JUAN ORANGE WARE	141	2	52	2	97	2	31	1	238	4	83	3
Tusayan Black-on-red	55	1	22	1	85	1	31	1	140	2	53	2
Citadel Polychrome	86	1	30	1	12	T	8	1	98	2	38	1
Tsegi Red-on-orange	1	T	1	T	-	-	-	-	1	T	1	T
B. Coiled, thinned by paddling	106	2	51	2	2584	44	1605	56	2690	46	1656	58
ALAMEDA BROWN WARE, R. DE FLAG SER.	96	2	39	1	1282	22	825	29	1378	23	864	30
Sunset Red	95	2	38	1	264	5	303	12	359	6	341	12
Turkey Hill Red	1	T	1	T	1018	17	523	18	1019	17	524	18
PRESCOTT GRAY WARE	10	T	12	T	1302	22	781	27	1312	22	793	28
Verde Black-on-gray	10	T	12	T	1302	22	781	27	1312	22	793	28
II. Fired by reducing flame	750	13	243	9	2202	37	865	30	2952	50	1108	39
A. Coiled, thinned by scraping	749	13	242	8	2001	34	789	28	2750	47	1031	36
TUSAYAN GRAY WARE, TSEGI SER.	-	-	-	-	1157	20	395	14	1157	20	395	14
Tusayan Corrugated	-	-	-	-	12	T	8	T	12	T	8	T
Moenkopi Corrugated	-	-	-	-	1145	20	387	14	1145	20	387	14
TUSAYAN WHITE WARE, KAYENTA SER.	11	T	8	T	245	4	150	5	265	5	157	6
Fine sand temper, Walnut dec.	-	-	-	-	59	1	50	2	59	1	50	2
Black Mesa Black-on-white	1	T	1	T	-	-	-	-	1	T	1	T
Dogoszhi Black-on-white	10	T	7	T	195	3	100	4	205	4	106	4
TUSAYAN WHITE WARE, WUPATKI SER.	258	4	80	3	332	6	117	4	590	10	197	7
Flagstaff Black-on-white	254	4	78	3	325	6	116	4	579	10	194	7
Wupatki Black-on-white	4	T	2	T	7	T	6	T	11	T	8	T
TUSAYAN WHITE WARE, TOTAL	269	5	88	3	586	10	267	9	855	15	354	12
LITTLE COLO. WHITE WARE, WALNUT SER.	479	8	155	5	258	4	128	5	737	13	283	10
Padre Black-on-white	56	1	18	1	15	T	8	T	71	1	25	1
Walnut Black-on-white	421	7	135	5	243	4	121	4	664	11	256	9
Walnut and Tusayan Corrugated	1	T	1	T	-	-	-	-	1	T	1	T
Walnut and Moenkopi Corrugated	1	T	1	T	-	-	-	-	1	T	1	T
B. Coiled, thinned by paddling	1	T	1	T	201	3	76	3	202	3	77	3
Coarse sand temper with shiny specks	-	-	-	-	1	T	1	T	1	T	1	T
Sandy gray ware	-	-	-	-	13	T	8	T	13	T	8	T
SAN FRANCISCO MOUNTAIN GRAY WARE	1	T	1	T	187	3	67	2	188	3	68	2
Deadmans Gray	1	T	1	T	181	3	64	2	182	3	65	2
Deadmans Fugitive Red	-	-	-	-	6	T	3	T	6	T	3	T
GRAND TOTAL, REDUCING AND OXIDIZING	999	17	348	12	4883	83	2509	88	5881	100	2856	100

Table 4. Total Pottery Occurrences in Percentage by Firing and Thinning Techniques, Wares, and Types.

FIRING AND THINNING TECHNIQUES	% by wt.	% by no.
Fired by oxid. flame	61	50
Fired by reduc. flame	39	50
Oxidized - scraped	3	4
Oxidized - paddled	58	46
Reduced - scraped	36	47
Reduced - paddled	3	3
Total, scraped	39	39
Total, paddled	61	61
WARES		
Alameda Brown, R. de Flag Series	30	23
Prescott Gray	28	22
Tusayan Gray, Tsegi Ser.	14	20
Tusayan White	12	15
Little Colorado White	10	13
San Juan Orange	3	4
San Francisco Mt. Gray	2	3
Mogollon Brown	T	T
TYPES		
Verde Black-on-gray	28	22
Moenkopi Corrugated	14	20
Turkey Hill Red	18	17
Walnut Black-on-white	9	11
Flagstaff B/W	7	10
Sunset Red	12	6
Dogoszhi B/W	4	4
Deadmans Gray	2	3
Tusayan Black-on-red	2	2
Citadel Polychrome	1	2
Padre B/W	1	1
Fine sand temper, Walnut decoration	2	1
Sandy gray ware	0.3	0.2
Wupatki B/W	0.2	0.2
Tusayan Corrugated	0.3	0.2
Deadmans Fugitive Red	0.1	0.1
Coarse sand temper, shiny specks	0.03	0.01
Walnut & Tus. Corr.	0.03	0.01
Black Mesa B/W	0.03	0.01
Tsegi Red-on-orange	0.03	0.01
Walnut Corrugated	0.01	0.01
Walnut & Moenk. Corr.	0.01	0.01

Bowls and ladles made up 12% of the total, of which only 4% was oxidized. Scraping and paddling were about equally used as thinning techniques. Only 1 sherd of a reduced paddled bowl was found; the remainder of the 9% of reduced bowls had been thinned by scraping.

Construction Techniques

Oxidizing firing was encountered in 61% of all sherds, reducing firing in only 39%. Exactly the same percentages hold true for paddling versus scraping.

Ware Occurrences

The 2 most common wares were about equally represented with Alameda Brown Ware of Sinagua affiliations comprising 30% and the Prescott branch Prescott Gray Ware totalling 28%. Not far behind were the Kayenta branch Tusayan Gray Ware with 14% and Tusayan White Ware with 13%.

Little Colorado White Ware of Winslow branch derivation totals 10%. San Juan Orange Ware percentage of 3% is a sharp drop, as is San Francisco Mountain Gray Ware, 3%. Only traces of Tsegi Orange and Mogollon Brown Wares were found.

Type Occurrences

Verde Black-on-gray was the most common type with 28% of the total. Other frequently occurring types were Turkey Hill Red (see the qualification concerning this type on page 124) with 18%, Moenkopi Corrugated 14%, Sunset Red 12%, Walnut Black-on-white 9%, Flagstaff Black-on-white 7%, and Dogoszhi Black-on-white 2%.

Occurrence of other types is shown in Table 4.

By Cultural Subdivisions

The tabulations take on more meaning when arranged according to the cultural subdivisions suggested by Colton[111] in 1939 when he adapted for northern Arizona Gladwin's[112] outlined method of classifying prehistoric cultural units and showing their relationships. This arrangement is made in Table 5 to conform with the published system, but it should be remembered that there has been little excavation in sites of the postulated Mogollon and Patayan roots which fall far short of the validity of Anasazi and Hohokam.

(111) Colton, 1939b.

(112) Gladwin, 1934.

Table 5. Ceramic Tabulations by Percentage According to Cultural Subdivisions.

	Type	*Series*	*Ware*	*Branch*	*Root*
MOGOLLON (?) ROOT					30
SINAGUA BRANCH				30	
Alameda Brown Ware			30		
Rio de Flag Series		30			
Sunset Red	12				
Turkey Hill Red	18				
MOGOLLON BRANCH				0.01	
Mogollon Brown Ware			0.01		
Winona Series		0.01			
Walnut Corrugated	0.01				
ANASAZI ROOT					40
KAYENTA BRANCH				30	
Tusayan White Ware			13		
Wupatki Series		7			
Flagstaff Black-on-white	7				
Wupatki Black-on-white	0.2				
Kayenta Series		6			
Fine sand temper	2				
Black Mesa Black-on-white	0.03				
Dogoszhi Black-on-white	4				
Tusayan Gray Ware			14		
Tsegi Series		14			
Tusayan Corrugated	0.3				
Moenkopi Corrugated	14				
San Juan Orange Ware			3		
Tusayan Black-on-red	2				
Citadel Polychrome	1				
Tsegi Red-on-orange	0.03				
WINSLOW BRANCH				10	
Little Colorado White Ware			10		
Walnut Series		10			
Padre Black-on-white	1				
Walnut Black-on-white	9				
PATAYAN (?) ROOT					30
COHONINA BRANCH				2	
San Francisco Mountain Gray Ware			2		
Deadmans Gray	2				
Deadmans Fugitive Red	0.1				
PRESCOTT BRANCH				28	
Prescott Gray Ware			28		
Verde Black-on-gray	28				

Thus, it immediately becomes apparent that for the total lumped ceramic complex of the site, the 3 roots involved contributed roughly equal influence - Anasazi 40%, Mogollon (?) 30%, and Patayan (?) 30%.

It is also clear that of the 2 branches represented from the Anasazi root, the Kayenta branch was the more important with 30% against 10% for the Winslow branch. Similarly, the Prescott branch of the Patayan (?) root with 28%, far outweighs in importance the Cohonina branch with 2%. And the Sinagua branch (30%) of the Mogollon (?) root is important. The Mogollon branch of the Mogollon (?) root is supposedly represented by 1 sherd of Walnut Corrugated, which, however, is a doubtful member of the types assigned to this branch.

Our significant branches are, then, in descending order: Sinagua and Kayenta, each 30%, Prescott 28%, and Winslow 10%.

(It should be pointed out that all ceramic tabulations in this report differ from the brief listing in Colton's Sinagua report[113], which was based on counts of sherds from only part of the house rooms.)

Relative Age of Pueblo and Pits

The problem of which outlying pits and burials were the results of activities by the dwellers in Nalakihu will not be solved until Citadel and N.A. 357, and other nearby sites are excavated and studied.

An attempt to find significant differences in ceramic content of the different types of pits and burials is shown in Table 6, which, however, is based on far too few sherds, in some cases, to attain statistical validity. It shows totals by branches and roots of another table which listed pottery types, but which was judged too unwieldy and detailed for publication.

Anasazi wares, particularly those of the Kayenta branch, are dominant in almost all pits. Mogollon (?) pottery is fairly consistently represented. The Cohonina branch of the Patayan (?) root, mainly in the form of Deadmans Gray pottery, appears strongest in pits with undercut sides, suggesting that these possibly constitute the oldest type along with the goishi ovens.

Definite conclusions as to the age of the pits lie tantalizingly just beyond the grasp of Table 7, which seriates the pottery from them by descending percentages of Moenkopi Corrugated, with types arranged roughly in chronological order with oldest at the left.

(113) Colton, 1946, p. 54.

TABLE 6

Percentages by Number of Sherds from Pits and Burials According to Cultural Units.

	No. Sherds	PATAYAN (?)			MOGOLLON (?)		ANASAZI		
		Cohonina	Prescott		Sinagua		Kayenta	Winslow	
Vertical Pits									
P9	22	0	0	0	18	18	33	50	83
P10	34	0	0	0	21	21	76	3	79
Undercut Pits									
P3	15	13	0	13	13	13	47	27	74
P4 (B3)	59	12	0	12	19	19	46	24	70
P6	77	3	0	3	13	13	68	17	85
P8	277	3	2	5	13	13	60	24	84
P13	9	0	11	11	11	11	66	11	77
Ditto, with floors									
P7	112	6	0	6	28	28	42	23	65
P14	624	16	4	20	12	12	53	13	66
Goishi Ovens									
P12	15	13	0	13	20	20	27	40	67
P15	14	0	0	0	50	50	50	0	50
Burials									
B1						X			
B2						X	X		
B3 (P4)	59	12	0	12	19	19	46	24	70
B4	7	0	0	0	14	14	86	0	86
B6	93	13	5	18	4	4	39	39	78

Table 7. Pottery from Pits Seriated by Descending Percentage of Moenkopi Corrugated.

	Deadmans Gray	Tusayan Black-on-red	Dogoszhi Black-on-white	Tusayan Corrugated	Sunset Red	Citadel Polychrome	Padre Black-on-white	Flagstaff Black-on-white	Walnut Black-on-white	Moenkopi Corrugated	Turkey Hill Red	Verde Black-on-gray	TOTAL sherds
P10 (V)		3		3	9	6		32	3	41	3		34
P6 (U)	3	1		3	1	8		31	17	34	3		77
P13 (U)								33	11	33		11	9
P14 (U)	16	1	2	T	3	3	T	19	13	32	5	4	610
P8 (U)	2		5		3	5	7	23	17	32	5	2	277
P7 (U)	6	1	2	1	9	18	1	15	22	24			112
P3 (U)	13							27	27	20	13		15
P9 (V)		9		5		9	9	14	41	14			22

As Moenkopi decreases:

1. Tusayan Black-on-red decreases (Pit 9 is an exception).
2. Tusayan Corrugated also decreases (Pit 9 excepted).
3. Flagstaff Black-on-white increases erratically.
4. Walnut Black-on-white increases erratically.
5. Turkey Hill Red increases steadily.
6. Verde Black-on-gray comes in strong in the middle of the seriation and then decreases.

Although sherds are too few and were collected too haphazardly, the above data agree well with known ceramic history of the region, so the seriation can be taken as a rough guess as to any possible age difference between individual pits.

It would be logical to presume the pits, in general, might have been contemporaneous with Nalakihu, and perhaps they were, but there are 2 evidences that they are older than the pueblo: (1) Pit 1 (not excavated) definitely underlies the outside wall of Room 8; and (2) Turkey Hill Red and Verde Black-on-gray are sparingly represented in pits although both types were in use in the pueblo at the time of its burning. Apparently most pits had been filled sometime before the last days of Nalakihu.

Another more graphic table, No. 9, divides pottery types into services and utility types, each arranged in rough chronological order, which are plotted by sherds from rooms and pits. Room sherds are preponderantly late, while those from pits reach their maxima in somewhat earlier types.

Sherd percentages were also tabulated in the laboratory according to Colton's ceramic groups[114] with which he ingeniously dates ruins within 100 miles of the Kayenta-Sinagua frontier near Flagstaff. Almost all pottery from Nalakihu excavation falls within Ceramic Group 7, 1130-1210 A.D., with the exception of a sprinkling of Tusayan Black-on-red, Dogoszhi Black-on-white, and Black Mesa Black-on-white. No differentiation could be made between contents of rooms and pits.

Rim Types

Rim types were tabulated according to Colton and Hargrave's system[115] and are shown in Table 10. No detailed analysis is presented here, for only 370 rim sherds were found, 52% bowls and 48% jars, and the table will be mainly of use to some future student who will undertake a detailed

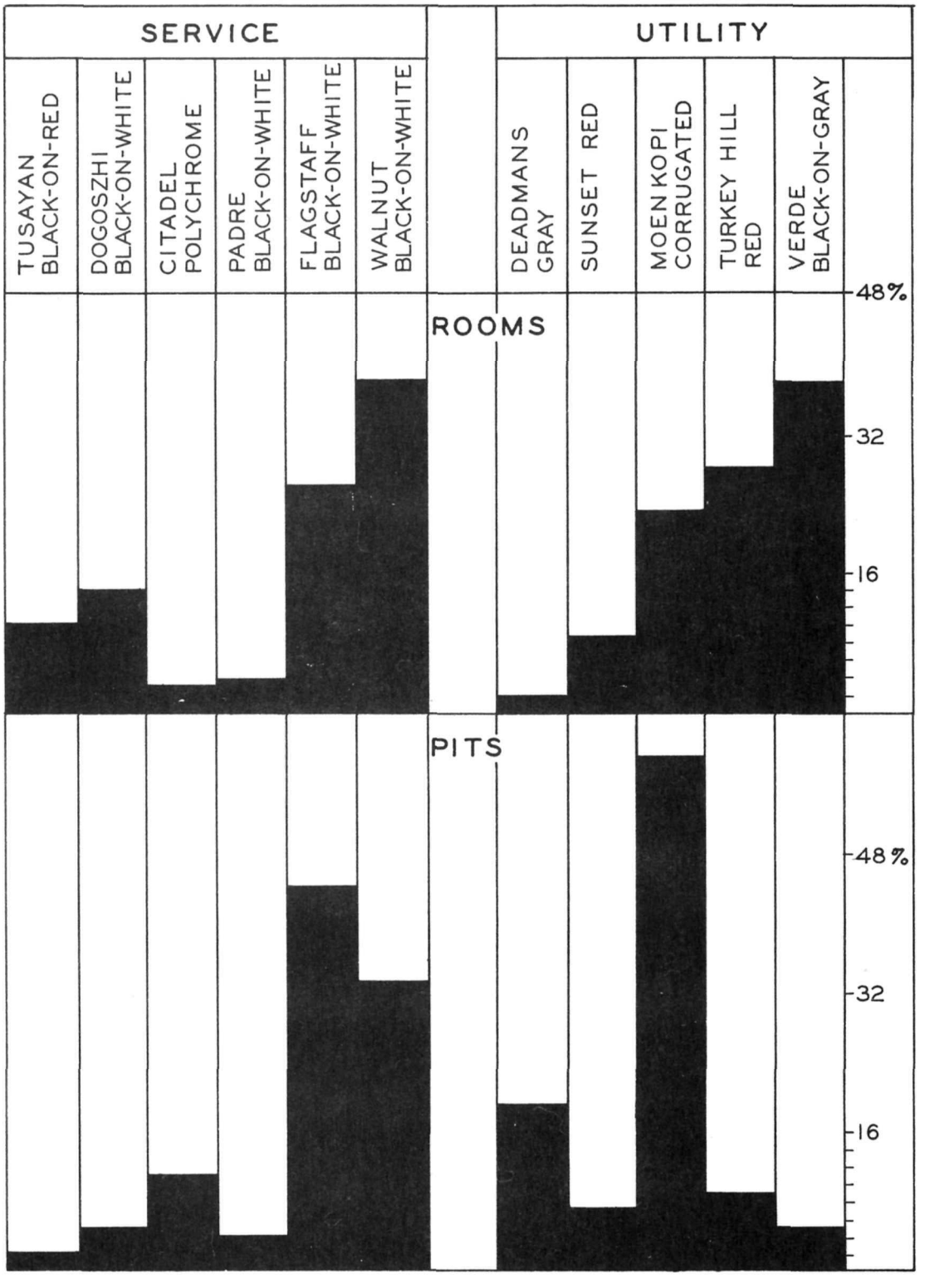
(114) Colton, 1946, p. 18.

(115) Colton and Hargrave, 1937, p. 10.

TABLE 8

Percentage of Pottery Types in Rooms and Pits with Types Arranged in Approximate Chronological Order.

	Deadmans Gray	Deadmans Fug. Red	Black Mesa B/W	Tusayan B/R	Dogoszhi B/W	Tusayan Corrugated	Sunset Red	Citadel Polychrome	Padre B/W	Flagstaff B/W	Wupatki B/W	Walnut B/W	Moenkopi Corr.	Turkey Hill Red	Verde B/G	No. of sherds
Rooms	1	T	T	4	4	T	7	1	1	7	T	11	17	20	27	4681
Goishi ovens																
Pit #12	13			7						7		40	20	13		15
Pit #15							14			14			36	36		14
Pits, undercut sides																
Pit #3	13									27		27	20	13		15
Pit #6	3			1	3		1	8		31		17	34	3		77
Pit #7	6			1	2	1	9	18	1	15		22	24			112
Pit #8	2	1			5		3	5	7	23	T	17	32	5	2	277
Pit #13										33		11	33		11	9
Pit #14 (total)	16			1	2	T	3	3	T	19	T	13	32	5	4	610
-Alcove b	5			2			11			16			48	16	3	64
-Alcove c				3	3		3	7		13		30	27		13	30
-Fill	20			1	2	T	2	3	1	21	1	10	31	5	4	498
-Floor	6			6		11		6		11		39	22			18
Pits, vertical sides																
Pit #9				9		5		9	9	14		41	14			22
Pit #10				3		3	9	6		32		3	41	3		34
Burials																
B1							X									
B2					X		X			X						
B3 (P4)	12			3			7	7	14	22		10	24	2		59
B4													86	14		7
B6	13		1	4		1				9		39	28		5	93


SERVICE
UTILITY
TUSAYAN BLACK-ON-RED
DOGOSZHI BLACK-ON-WHITE
CITADEL POLYCHROME
PADRE BLACK-ON-WHITE
FLAGSTAFF BLACK-ON-WHITE
WALNUT BLACK-ON-WHITE
DEADMANS GRAY
SUNSET RED
MOEN KOPI CORRUGATED
TURKEY HILL RED
VERDE BLACK-ON-GRAY
ROOMS
PITS
48%
32
16
48%
32
16

| SIDEWALL | BOWL / JAR ← INSIDE OUTSIDE → | I | | |

analysis of the regional pottery forms. Any addition to previously published descriptions will be found in notes on pottery types later in this report.

Table 11 indicates the general tendencies of rim types in this region during early Pueblo III times. Uniform thickness of side wall is the rule in all types, except that reduced jars (Tusayan Corrugated) and scraped jars (Tusayan Black-on-red and Citadel Polychrome) show a tendency to thin toward the lip. Bowls with direct or vertical lip greatly outnumber all others. Jar lips practically all recurve outwardly, mostly fairly gently. By far the most common rim form is the slightly rounded No. 3, with the squarish No. 4 second in popularity.

Notes on Pottery Types

SAN JUAN ORANGE WARE

Tusayan Black-on-red: Add IA11, IB3 to bowl rims. One jar rim, IIIB3, and 2 jar handles (pierced lugs) were found. Three bowl rims were painted black. Jars outnumbered bowls 85:55. See Fig. 76C.

Citadel Polychrome: Add IA6, IIA4 to bowl rims; IIIA3 and IIIB3 to jar rims. One hollow handle of ladle found. Bowls outnumbered jars 86:12.

Tsegi Red-on-orange: Add IIIA11 to bowl rims.

ALAMEDA BROWN WARE, Rio de Flag series.

Sunset Red: Add IA7, IA9, IB3 to bowl rims. Jar to bowls, 264:95. See Fig. 79 for picture of bowls and jar.

Turkey Hill Red: When sherds were sorted, Winona and Youngs Brown had not been recognized and described. Consequently, this category in this report undoubtedly includes some of both of these types, and possibly also Angell Brown.

PRESCOTT GRAY WARE

Verde Black-on-gray: Add IA8 to bowl rims; jar rims were IB3, IB4, and IIB3. Jars to bowls, 1302:10. A broken ladle, a hitherto undescribed form, was found with Burial 4. See Fig. 77, upper, picture of restored jar. It is decorated with crudely painted wide black lines diagonally pendent from the lip on the inside.

Verde Black-on-gray appears in 19 structures in 13 sites described in Colton's Sinagua publication. In only 3 does it constitute 10 percent or more of total sherds: (1) 10% at N.A. 3577E, an unexcavated rock

Table 11. Rim Type Characters by Percentage of Total Rims, According to Ceramic Techniques and Vessel Shape

	Sidewall				*Lip Direction*			
	I	II	III	Total	A	B	C	D
Oxidized	27	7	2	35	12	24	0	0
Bowls	12	1	1	13	12	1	0	0
Jars	15	6	1	22	T	22	0	0
Reduced	52	5	8	67	37	15	11	2
Bowls	34	3	2	39	36	2	T	0
Jars	19	1	6	26	1	13	10	2
Paddled	23	6	0	29	5	24	0	0
Bowls	7	0	0	7	5	1	0	0
Jars	16	6	0	23	0	23	0	0
Scraped	56	5	9	71	44	14	11	2
Bowls	39	4	2	45	42	2	T	0
Jars	17	1	7	35	2	12	10	2
Total	80	11	9	100	49	38	11	2
Bowls	46	4	2	52	48	3	1	0
Jars	34	7	7	48	1	35	10	2

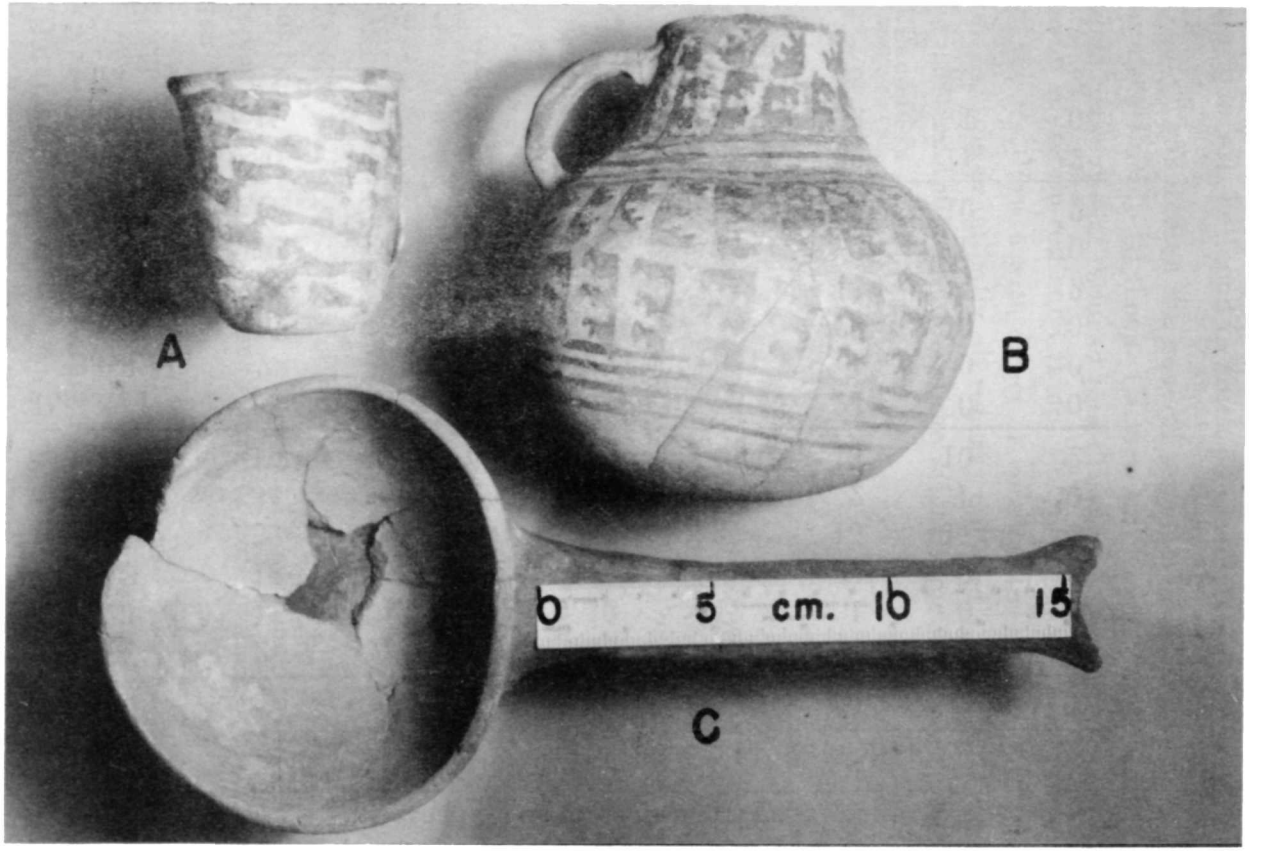


Fig. 76

A (B2.9) - Walnut B/W mug. B (B2.3) - Flagstaff B/W pitcher. C (B2.4) - Tusayan Black-on-red ladle.



Fig. 77

Upper (.28 from 2nd story floor, R2) - Restored Verde Black-on-gray jar, diam. 18 in., depth 17 in. Lower (.51) - Dogoszhi B/W jar from R9.

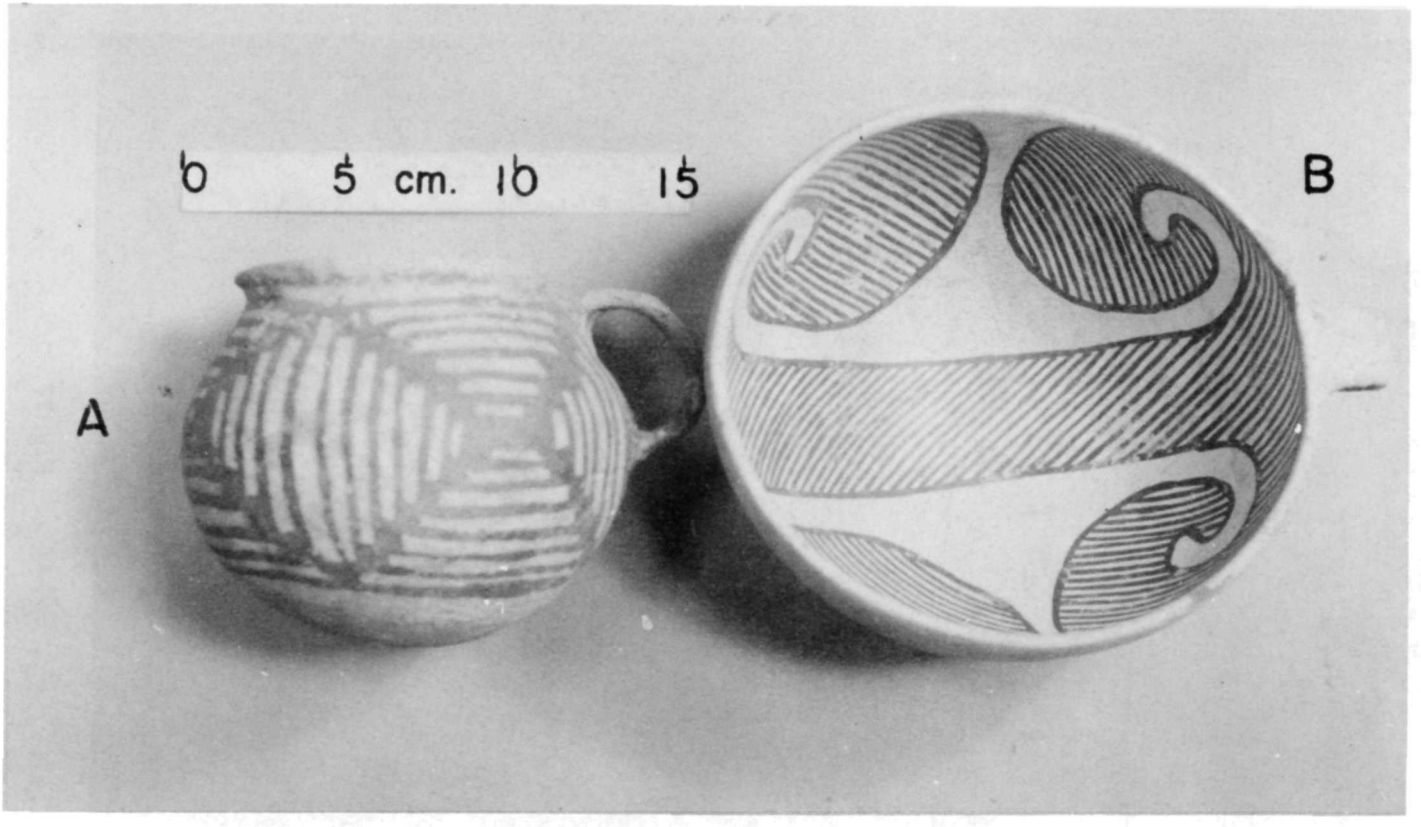


Fig. 78

A (B3.3) - Flagstaff B/W jar. B (B3.2) - Padre B/W bowl.



Fig. 79

Left (B1.1) - Sunset Red bowl, diam. 5 in., depth 3 3/4 in. Middle (B2.6)-- Sunset jar, diam. 6¼ in., depth 6 in., diam. of orifice 3 5/8 in. Right (.59 from Pit 8) - Sunset bowl, diam. 6½ in., depth 4½ in.

mound at the Pittsberg site north of Williams, Arizona, Ceramic Group 4-5, 900-1050 A.D.; (2) 20% at N.A. 1764B, a rectangular masonry pit house near Metate House in a group of 2 habitation periods on Deadmans Mesa, Ceramic Groups 6-7, 1050-70 and 1100-1170 A.D.; and (3) 28% in N.A. 1765B, a rectangular masonry room in the preceding group.

By ceramic groups, the other sites (all N.A. numbers) are: *Group 4* (800-1050) - 3590 (T); *Groups 4-5* (900-1050) - 3577A (T); *Group 5* (900-1050) - 1625B (20%); *Group 6* (1050-1100) - 1764A (1%), 1814E (T); *Group 7* (1125-1200) - 355 (4%), 537 (1%), 811 (1%), 1586 (4%), 1814A (T), 1814B (9%), 2033 (2%), 2765B (1%); *Group 9* (1250-1300) - 72 (4%).

The type apparently existed for a long time in the Flagstaff district but was popular in only a few villages; further excavation may prove it more widespread. Only a few sherds appeared on the surface before the Nalakihu project was started - there was little indication the type would be excavated in such quantity.

TUSAYAN GRAY WARE, Tsegi series.

Tusayan Corrugated: Only 12 sherds, nothing unusual, found.

Moenkopi Corrugated: Rim types, IA4, IA12, IB3, IC3, ID8, IIIB3, IIIB4, IIIC10 in the ratio 1:2:14:21:5:9:3:4. All recorded as jars, although many bowl sherds would be indistinguishable.

TUSAYAN WHITE WARE, Kayenta series.

Fine sand temper, Walnut style decoration: One rim sherd, IB3. All 59 sherds from Rooms 3 and 4, none in pits. All jars.

Dogoszhi Black-on-white: Add IA5 to bowl rims, IC3 and IIID3 to jar rims. Jars to bowls, 195:10. One bowl sherd had horizontal strap handle. See Fig. 47, lower, (.51 from Room 9), jar 17 7/8 inches in diameter, 15½ inches high. Diameter of orifice, 7¼ inches.

TUSAYAN WHITE WARE, Wupatki series.

Flagstaff Black-on-white: Add IA11 and IIA4 to bowl rims. Jar rims were IB3, IB13, IC3, IIB3, IIC3, and IID3 in the ratio 6:1:2:2:2:1. IIA4 rims were often dotted. Two ladles, 1 with hollow handle and drilled holes. One horizontal strap handle for a bowl and 1 vertical cylindrical side handle for a pitcher. Jars to bowls, 325:254. See Fig. 78A for jar (B3.3). Fig. 76B for pitcher (B2.3).

LITTLE COLORADO WHITE WARE, Walnut series.

Padre Black-on-white: Add IA3, of which there were 14, and IA4, 4 examples, to bowl rims; IA3, IB3, and IC3, 1 each, to jar rims. The IA3 example was a "seed" jar. Bowls to jars, 56:15. See Fig. 78B, bowl (B3.2) with vertical strap rim handle, now type specimen in Museum of Northern Arizona collection. (Fig. 80) is bowl (.103) from Room 3.

Walnut Black-on-white: Add IA5, IA6, IA7, and IA11 in ratio 1:5:1:1 to bowl rims; IB3 and IC3, ratio 2:2 to jar rims. Bowls to jars, 421:243, or 63:37%. One of the IA4 rims was grooved. Two bowl sherds had vertical strap handles. The only ladle handle was a solid cylinder. See Fig. 76A for mug (B2.9).

SAN FRANCISCO MOUNTAIN GRAY WARE

Deadmans Gray: Add IB3, 5 examples, to jar rims. Jars to bowls, 181:1.

Deadmans Fugitive Red: Only 6 jar sherds.

SUMMARY - POTTERY

Sherds were tabulated both by weight and number and results found to be comparable for wares, although heavy utility types fired by oxidizing

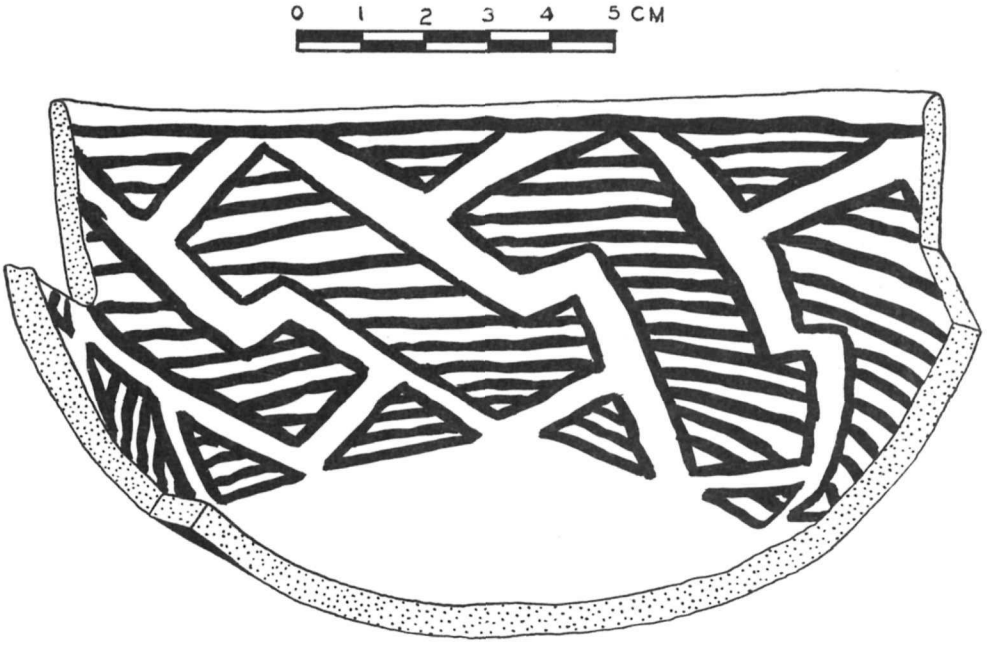


Fig. 80

(.103) - Broken Padre B/W bowl.

flame differed in relative standing in the two tabulations. Sorting by weight is to be preferred because of greater speed and wider possibility of utilization of data in conjunctive studies.

Jars constituted almost 90% of all sherds, with Verde B/G and Turkey Hill and Sunset Reds predominating. Oxidized paddled examples formed the largest group, 56%.

Oxidizing and paddling were more common than reducing and scraping by 61:39.

Most common wares in percentage were Alameda Brown, 30; Prescott Gray, 28; Tusayan Gray, 14; and Tusayan White, 13. Dominating types were Verde B/G, 28; Turkey Hill Red (although Winona and Youngs Brown were not separated out of this type), 18; Moenkopi Corrugated, 14, and Sunset Red, 12.

Three roots contributed almost equal influence - Anasazi, 40%; Mogollon (?) 30%, and Patayan (?) 30%. Significant branches were Sinagua and Kayenta, each 30%; Prescott, 28%; and Winslow, 10%.

Pits excavated near Nalakihu also could have been dug by Indians from the Citadel, several adjacent small sites, or N.A. 357. Several seriations give hints that Kayenta branch pottery was strongest in the pits, which may have had their heyday before that of the pueblo. Some of the oldest pottery was in pits with undercut sides, suggesting these and goishi ovens may have pre-dated the other types. A seriation by descending percentage of Moenkopi Corrugated yielded an interesting possibility whereby a large series of pits, when the whole area is excavated, might be dated relative to each other.

Almost all pottery from Nalakihu and the pits falls in Colton's Ceramic Group 7, 1130-1210 A.D.

The sidewall of nearly all rim sherds is of uniform thickness, except that 3 types, Citadel Polychrome, and Tusayan Corrugated and Black-on-red show a tendency to thin toward the lip. Direct or vertical lips greatly predominated in bowls; jar lips gently recurve outward. Slightly rounded rims greatly outnumber the squarish ones.

A considerable number of unrecorded rim forms were found and a few additions made to published descriptions of pottery types.

TREE RING DATES

McGregor[116] states "...seven fragments of charcoal were readily datable. As all of these are apparently of Douglas fir, and give an almost identical record, they are assumed to have been fragments of the same piece..." His detailed report of Specimen F.4268: outside dated ring, 1183; inside dated ring, 1117; radius in mm, 23; kind of wood, yellow pine; type of specimen, ½ section; no sap-heart date; no rings lost at outside or in sequence; bark date, 1183. (Note inconsistency in listing this specimen as Douglas fir. McGregor's file cards in the Museum of Northern Arizona give all the specimens as yellow [Ponderosa] pine.)

The other 6 specimens yield the following dates: F.4263-1183; F.4262-1156 (part of outside missing); F.4267-1182; F.4271-1182; F.4265-1183; F.4272-1183.

All pieces came from the charred and collapsed main viga in Room 6, which is thus seen to have been constructed in the late 1100's. The central block of rooms, Nos. 3, 4, and 5, could be older.

(116) McGregor, 1936a, p. 15.

Douglass[117] reports the securing of 2 dates of 1192 and one of 1260 from Citadel proper, thus indicating the 2 ruins were approximately contemporaneous.

TRAIT COMPARISONS

Trait comparisons were made rather hopelessly in view of the paucity of excavated sites in Klethla and Chino foci. Reports have been published on only 2 or perhaps 3 of the former (RB 564, 568 and 551)[118] and 2 of the latter (King's and Fitzmaurice ruins).[119] Elden focus is much more fully known due to Colton's work culminating in the fine monograph, *The Sinagua.*[120]

In that paper Colton proposed an index - the *index of abundance* - which he defined as the number of artifacts belonging to a type divided by the number of rooms excavated per focus, multiplied by 100 to eliminate decimal points. Due to the well known habit of archeologists to list vaguely "several" instead of the actual number, and to publish incomplete or no tables of artifacts found, such an accurate quantitative analysis could not be made in this comparison, and, consequently, only a rough approximation in terms of "common," "rare," etc., is used, in some cases pretty much a guess. Actual numbers are listed for the Nalakihu site, however.

In the Chino focus report, artifacts are incompletely described and categorized and it is not clear whether earlier material may not be included. The Klethla focus paper is so condensed as to be difficult to work with and fails, for example, to tabularize bowl vs. jar and local vs. imported occurrences. The list below, then, will be transitory, but may give someone at least a hazy view of the 3 foci most strongly represented at Nalakihu.

(117) Douglass, 1935.
(118) Beals, et al, 1945, pp. 62 ff, 71 ff, and 42 ff.
(119) Spicer and Caywood, 1936.
(120) Colton, 1946, pp. 312 ff.

Table 12. Comparison of Material Culture Traits by Foci.
(P-present; R-rare; C-common; ?-presumed)

	Elden focus	Klethla Focus	Chino focus	NA 358	Conclusively in Nalakihu
Traits shared by all three foci:					
Arrow smoothers, grooved	C	R	R	R(1)	P(1)
Hammerstones	C	R	C	C(5)	
Manos, 2-hand	C	C	C?	C(39)	P(39)
Manos, 1-hand	R	R	C?	R(3)	P(3)
Mauls	R	R	R	No	
Metate, oval basin	R	C?	R	No	
Metate, troughed	C	C?	C	P(6)	P(6)
Mortars	R	R	R	No	
Paint grinders	C	C	C	R(1)	P(1)
Polishing pebbles	C	C	R	No	
Stone disks, perforated	R	R	R	R(2)	P(2)
Drills	C	R	C	No	
Knives	C	R	C	C(5)	P(3)
Scrapers	C	R	C	C(6)	P(3)
Bowls, native made	C	C	C	R(3%)	P(1)
Bowls, imported	C	R	C	R(14%)	
Dippers, imported	C	R	R	R(4)	
Disks, plain	R	?	R	R(2)	
Disks, perforated	R	?	C	R(2)	
Effigies, human, animal	R	R	R	No	
Jars, native made	C	C	C	C(23%)	
Jars, imported	C	R	R	C(77%)	P(4)
Miniature jars	C	R	R	No	
Pitchers, side handle, imported	R	R	R	R(1)	
Seed jars, imported	C	R	R	R(1)	
Bone awls	C	C	C	C(10)	P(6)
Needles	R	R	R	R(1)	P(1)
Whistles	R	R	C	No	
Arrow foreshafts	R	C?	?	No	
Arrow points, wooden	R	?	?	No	
Arrow shafts	R	C?	?	No	
Bows	R	C?	?	No	

Table 12 (cont.)

	Elden focus	Klethla Focus	Chino focus	NA 358	Conclusively in Nalakihu
Cradle boards	R	?	?	No	
Digging sticks	R	?	?	No	
Hearths and sticks	C	?	?	No	
Cotton cloth	C	R	R	R(2)	
Shell beads	C	C	C	R(17)	
Stone beads	R	C	C	No	
Dog	R	?	?	C	
Parrot	R	?	?	R(1)	
Turkey	R	?	?	No	
Leather	R	?	?	No	
Beans	R	P	?	R	
Corn	R	C	R	C	P
Gourds	R	P	?	No	
Squash	R	P	?	R	P
Traits unique to Elden					
Arrow straighteners, groove and ridge	R			No	
Effigies in stone	R			No	
Hoes, sandstone	C			R(2)	
Nose plugs	R			R(1)	
Lip plugs	R			No	
Plumb bobs	R			No	
Pottery pipes, conical	R			R(1)	
Unfired clay jar stoppers	R			R(2)	
Ceremonial sticks, hoof or hand	R			No	
Ceremonial wands, turquoise inlay	R			No	
Carved hands	R			No	
Wooden ladles	R			No	
Spindle whorls, sticks	R			No	
Weaving battens	R			No	
Baskets, one rod and bundle coil (plus others)	R			R(1)	P(1)
Feather cord	R			No	

Table 12 (cont.)

	Elden focus	Klethla Focus	Chino focus	NA 358	Conclusively in Nalakihu
Incised shell	R			R(1)	P
Painted shell	R			No	
Shell rings	R			No	
Lignite Buttons	R			R(1)	P(1)
Animal & bird pendants	R			No	
Copper bells	R			No	
Corncob on stick	R			No	
Mescal chew	R			No	
Traits common to Elden and Klethla only					
Axes, full groove	R	C		No	
Hoes, hafted	R	C		No	
Manos, 2-hand, grooved	R	R		No	
Metate, flat	R	C?		R(3)	P(3)
Stone pot covers	R	R		C(6)	P(5)
Pitchers, side handle, native made	R	C		R(3)	
Dippers, native made	R	C		R(2)	
Seed jars, native made	R	C		No	
Bone dice	R	C		P(3)	P(3)
Loom	?	P		P(1)	P(1)
Traits unique to Klethla					
Conical stone pipes		C		No	
Metates in bins		C		No	
Stone fleshers or chisels		R		No	
Plates		R		No	
Finger rings, bone		R		No	
Finger rings, stone		R		No	
Bone fleshers		R		No	
Grass seeds		C		No	
Hackberry seeds		C		No	

Table 12 (cont.)

	Elden focus	Klethla Focus	Chino focus	NA 358	Conclusively in Nalakihu
Traits common to Klethla and Chino, only					
Stone pendants, other than effigy		C	C	No	
Traits unique to Chino					
Basalt hoes			C	No	
Picks			C	No	
Scrapers, 1 curved edge			C	No	
Bone pendants			R	No	
Wooden arm bands, painted			R	No	
Traits common to Chino and Elden, only					
Axes, 3/4 grooved	C		C	P(2)	
Paint palettes	C		R	No	
Pottery anvils	C		?	No	
Stone balls	?		R	P(3)	P(1)
Cylinders, basalt	C		R	C(20)	P(10)
Miniature bowls	C		R	No	
Pottery scoops	R		R	No	
Bone spatulas	R		R	R(1)	P(1)
Bone tubes	R		R	No	
Antler tools	R		C	R(1)	P(1)
Ceremonial wands, plain	R		R	R(1)	
Basket, coil, 2-rod and bundle	R		R	No	
Shell pendants	R		C	R(1)	P(1)
Shell tinklers, conus	C		C	No	
Inlay work, shell and turquoise	R		C	No	
Pinyon nuts	R		R	R	P
Lac	R		C?	No	
Pinyon gum	R		C	No	

In summary, 113 traits are listed of which the N.A. 358 site exhibited 47. Definitely in Nalakihu house itself were 26. The table below shows, as

did the ceramic studies, that the site is very mixed, quite heavy in traits which were common to all 3 foci, and drawing much influence from the south, notably the Elden and Elden-Chino combination. To the list could have been added architectural and burial traits. Obviously, the storage pit in Room 3 was also a Chino trick,[121] pole coverings of Chino and Klethla graves may have had some connection through the Elden people, and other details would perhaps be significant.

Table 13. Number and Percentage Totals of Material Culture Traits by Foci.

	Foci		N.A.358 Site		Conclusively in Nalakihu	
	No.	%	No.	%	No.	%
Traits common to all 3 foci	46	41	27	57	13	50
Traits unique to Elden	24	21	7	15	3	12
Traits common to Elden and Klethla	10	9	5	11	4	15
Traits unique to Klethla	9	8	0	0	0	0
Trait common to Klethla and Chino	1	T	0	0	0	0
Traits unique to Chino	5	4	0	0	0	0
Traits common to Chino and Elden	18	16	8	17	6	23
	113	99	47	100	26	100

GENERAL SUMMARY AND CONCLUSIONS

The excavations at Nalakihu provide an object lesson on how not to do archeology. Field work was accomplished on a governmental relief program which failed to provide funds or facilities for the all-essential laboratory study and publication. Consequently, most of such work had to be personally and painfully contributed, and published results are delayed a decade and a half, thus destroying all the timeliness of the discovered information, weakening its strength because of the intermittent character of the research, and denying to science and interpretation data which should have been available years ago.

Particularly is this regrettable in the case of a ruin on a national monument or park. Such ruins are uniquely valuable, for in the long run they are the only ones which will be preserved indefinitely. Thousands

(121) Spicer and Caywood, 1936, p. 27.

of ruins in the Southwest are being destroyed each year by vandalism, land clearing, dam building, road operations, etc. Very little, if any, protective personnel is available to patrol or save prehistoric resources on national forest, Indian, grazing, or state lands. Only those in national parks and monuments have a chance to survive for future study and interpretation. Hence, this little ruin is reported here as fully as possible.

Work on Nalakihu consumed 3½ months ending April 12, 1934. Four men excavated and restored a portion of the ruin while 2 others conducted an archeological survey of 20 surrounding quarter sections.

Nalakihu was an interesting site. It lay on the frontier of 2 or more prehistoric tribal territories and partook of cultural items from several peoples so that its makeup is confusingly mixed. Its excavation points to the need for further research in Wupatki National Monument, particularly in the Citadel area where many peculiar sites are located.

The sandstone masonry pueblo, 10 ground floor rooms with 3 or 4 others once forming a second story, exhibited some unusual architectural traits, i.e., a doubtful rectangular kiva, a jar-shaped storage pit in a floor, ornamental basalt courses in walls, loom holes in a floor, and a windbreak wall. Wall junctures showed at least 2 periods of construction, probably close together.

Masonry technique deteriorated slightly in later additions. It was non-ashlar, fine unbanded with incidental core. Doorways were both T-shaped and rectangular; sills were remodeled to heighten them and ventilators left in some. No trace of outside plaster was found and there was only 1 coat on inside walls.

The generalized roofing pattern was to have a main viga span the room's shorter axis and support crossing rafter poles. Over these, shakes, and sometimes stone slabs, supported another crosswise layer of reeds, commonly, or, occasionally, branches, juniper bark and grass.

Rooms were relatively large; a rafter height of more than 6 feet can be inferred. Most firepits were hemispherical without rim; none were slab-lined.

At the time of abandonment 6 rooms were used for living and/or storage (1 definitely for the latter), 5 definitely for living, 1 kiva (doubtful), and 1 "porch," storage rack, or whatever.

A fire in ground floor rooms caused desertion of the house; after a lapse of some time, upper story roofs burned and fell in on the accumulated debris.

At the toe of the Citadel slope between Nalakihu and N.A. 357 was uncovered a peculiar assemblage of pits and burials. Sixteen pits were classified in 3 types; 8 with undercut sides or jar-shaped, 4 with vertical sides, and 2 goishi pit ovens with flues. All may have antedated inception of the Chino component at Nalakihu.

Two undercut pits had some type of clay roof and held corn, thus probably were storage pits or bake ovens, although not noticeably fire hardened. Two, oval in cross section, were obviously trash pits. One undercut example held an inhumation, another pit consisted of joined globular holes, and a third complicated complex came about through the conversion of 2 undercut pits into a clay quarry with associated mixing pits for plaster.

The goishi ovens, fairly similar to ones in the Zuni and Hopi country, baked corn; their flues were to increase the fire draft - they were too crooked to have been used for stoking.

Six burials were found: 1 extended in an undercut pit, 1 flexed, 1 cremation, and 3 incomplete burials of infants in a shallow pit and 2 slab-lined cists. There was apparent intention to orient burials to the southeast or east.

In the cremation, the body must have been burned on some kind of wooden platform or pyre supported by 4 posts and additional props. A shallow rectangular basin underneath caught the debris which was redistributed in the basin and in a central pit which held offerings of pottery vessels. Other than 2 4-post cremations reported at and near Winona, the burial has few known archeological congeners, but it resembles cremations of Lower Colorado and Gila River Yuman tribes.

The inhumation of an adult male in an undercut pit had been accompied by a piece of rabbit in a covered pitcher. Alongside the skeleton was a full-length wooden wand, painted red and blue. The cranium was deformed vertically in the occipital region and has been compared to Hooton's "Pseudo-Alpine" type. The wand probably was ceremonial, perhaps accessory to some sort of cult.

The assemblage of material culture traits in general showed considerable mixture, with most derived from Elden and Chino foci of the Sinagua and Prescott branches, respectively.

There were no bin or scoop metates or grooved manos. Axes, the nose plug, basketry and cotton braiding have a Gila River look, while perforated schist disks are unusual except in the Prescott branch. The basalt cylinders, ubiquitous in the Flagstaff district, were found in such places as to suggest they were used to shell corn. Loom holes seem to be Kayenta in type.

Plant foods represented were pinyon nuts, pumpkin, beans, and 2 varieties of corn. Corncobs were abnormally tiny, perhaps from a crop failure, and shelled corn may have been traded in.

Compared with the fauna of Winona and Ridge Ruin reported by McGregor the Nalakihu species list is smaller and somewhat different.

Of mammals Nalakihu had Bighorn sheep, Black bear (instead of Grizzly), pronghorn, Mule deer, Jack and Cottontail rabbit, Ground squirrel, Prairie dog, Kangaroo and Wood rat, fox, White-footed mouse, and Indian dog. Lacking were bison, elk, chipmunk, Rock squirrel, Deer mouse, gopher, bobcat, skunk, and badger.

The major difference shows in birds. The N.A. 358 site yielded Horned, Burrowing, Long- and Short-eared owls, and Military macaw, none of which appeared at Winona and Ridge Ruin. The only species common to both groups of sites was the American raven. Nalakihu lacked the Canada goose, Mallard duck, the 5 species of hawks, Golden eagle, Scaled quail, turkey, Little brown crane, Road runner and the 9 other passerine species McGregor lists. No fish bones were found. There seems to be no evidence of an ecological difference in the late 1100's such as McGregor felt to have existed at Winona between 1070 and 1130 A.D.

Tabulation of more than 5,000 sherds showed 3 prominent roots: Anasazi 40%, Mogollon (?) 30%, and Patayan (?) 30%, while significant branches were Sinagua and Kayenta, each 30%, Prescott 28%, and Winslow 10%. Common wares were Alameda Brown 30%, Prescott Gray 28%, Tusayan Gray 14%, and Tusayan White 13%.

Pottery jars outnumbered bowls almost 9 to 1. Firing by oxidizing flame and thinning by paddling were more common than their corresponding techniques by 61:39.

The presence of so much Verde Black-on-gray pottery, 28%, almost all of it large jars, is puzzling, for the paste indicates they were made in the Prescott area and Colton[122] has pointed out they must have been carried 60-100 miles. It is easy to see why small and attractive decorated types were traded over long distances, but these large, crude, porous and friable jars must have had some sentimental, religious or functional value to the people who lugged them so many miles over rough terrain to Nalakihu. The type apparently existed for a long time in the Flagstaff area, but was popular in only a few villages.

At least 3 pieces of evidence hint that the Klethla component at Nalakihu may have been stronger during the early days of the pueblo, and southern traits, perhaps people, came later. The loom holes in Room 4 are probably of northern type, no Verde Black-on-gray or Turkey Hill Red sherds were in the ash of the plastered-over firepit in Room 2, and the same 2 types occurred sparsely in the pits which are known to underlie, at least in 1 case, the pueblo.

Colton's Ceramic Group 7 includes most of the pottery from the site. This group is dated at 1130-1210 A.D., which corresponds well with a bark date of 1183 A.D. obtained by McGregor from charcoal of the main viga of Room 6. Nalakihu is believed to have been built late in the 1100's and to have carried not very far into the first quarter of the thirteenth century. It was probably contemporaneous, in part at least, with the Citadel.

Although the traits which appear in the foregoing paper are only a scanty part of the ones which made up the total culture, they do give us at least a glimpse of aboriginal life on Wupatki National Monument in the late 1100's A.D.

Crowded, perhaps overly so, on a tract of sub-marginal farmland, were the small houses of a mixed group of Indian farmers. Because agricultural conditions were worsening, the time was becoming one of trouble and strife, as the people of 2 or more tribes competed for the choice farm plots and scarce water.

The black cinder, which Sunset Crater's series of eruptions about 1066 A.D. had spread over the land, no longer lay evenly--the constant winds were piling it into dunes and sweeping if off into the arroyos--thus returning profitable corn fields into barren desert again. Seep springs in

(122) Colton, 1946, p. 54.

the arroyos were being covered by the deep drifts, and the flow of other springs was lessening as the cinder cover blew away and no longer effectively reduced the evaporation rate.

In appearance the country was not much different than now except that, in general, the cinder was thicker, particularly in the flat lands, and gave rise to a more luxuriant growth of shrubs, and, in patches, grass. The pines and also the more distant firs, aided by the moisture-conserving mulch, ranged closer to the Citadel region than they do now. Pinyon and juniper trees grew more densely, but the people constantly cut them for firewood and undoubtedly kept a considerable area around the settlements denuded of forest.

Perched along the low mesa rims and dotting the intervening flats were the pueblos, consisting of relatively small family or extended family houses, rarely grouped together, except toward the end of the century, into larger towns, presumably for defensive purposes. Most of the mesa houses were built of red Moenkopi sandstone and yellow Kaibab limestone, because the materials were readily accessible, while the "prairie" houses usually were of black basalt. All presented about the same appearance, for they were probably plastered with mud.

Two, and perhaps more, tribes had been drawn into the area by the promise of the newly created land. They all followed the same general pueblo pattern of life, but they may have spoken different languages and some of their religious and other practices varied.

Occupying mainly the northern portion of what is now Wupatki National Monument were the Kayenta people ("branch" or tribe) from northern Arizona, of the Klethla focus, and mixed in with them and also holding the territory to the south were the people who have been called the Sinagua (Elden focus). They had been peaceful, may have experienced little difficulty with nomadic raiders, and obviously got along well together in times of plenty, for some of their settlements are almost contiguous and were occupied contemporaneously.

In even greater concentration than usual their dwellings were clustered around 2 limestone sinks which must have served as dependable sources of water supply. Near the edge of the larger of these and close to several other and differing houses was Nalakihu, the strange little pueblo which typifies to a great extent the confusing cultural mixture which an ethnic frontier produced.

From archeology, particularly in a site exposed to weather and decay, we get a pitifully fragmentary portion of their material practices and almost none of their non-material ones, but let us see what inferences can be drawn from the data.

Racially they were Pueblo Indians, medium-sized and relatively small-boned. Most of the excavated skeletons had been destroyed by decay or cremation; the 2 which were in good shape showed culturally-produced differences which will be discussed later.

Their food economy was based on corn, beans, pumpkins and squash, grown in some variety. A mainly vegetal diet, it was supplemented by meat obtained by their not inconsiderable prowess in hunting Mule deer, Bighorn sheep, Black bear, pronghorn, rabbits, and other rodents. They lacked (or else excavation methods failed to produce evidence for) the edible bird species used by the Ridge Ruin-Winona people a little farther south, notably geese, ducks, and quail. Nor did they have the fish which lived in the then-existing ponds and perhaps streams of the Winona district. Certainly they must have collected and used many wild plants, herbs, seeds, fruits, etc., but our only proofs are for pinyons, and, of course, the reeds used in their roofs.

How they prepared their food is unknown, but we can guess they shelled the corn with stone shellers. Cooking methods were well advanced, utilizing excellent baskets and specialized pottery in connection with inside firepits and well developed goishi ovens outside the house. Food storage was in covered ollas, a storage room, perhaps in an inside floor pit, and surely in outside covered pits. Both stone and clay lids sealed storage pots against moisture, insects, and rodents.

Little can be inferred of agricultural practices except the use of stones hoes, apparently without a handle. They probably scooped a hole through the cinder layer, planted seeds in the soil, then covered them with a few inches of cinder and filled in the hole gradually as the plants grew. Some or all of the stone alignments described by Steen in Appendix 3 may indicate the location of corn fields and represent attempts to stabilize the edges of blowing cinder patches.

They had progressed past the stage of using pit houses solely as dwellings and were living in well built masonry structures, enlarged as space was required, some 2- or 3-storys high and fairly imposing. A probable lack of windows made the houses dark and the small doorways were

difficult to close except by use of a heavy stone slab, or perhaps a hide, mat, or blanket. The houses served as comfortable retreats, in all seasons, and safe storage places, but a large proportion of activities must have been carried on outside in the sunlight in the plazas and on the roofs. The numerous shelter walls constitute an unusual architectural feature of the district. Many were constructed to ease a windy environment; others may have been associated with wooden stockades. There is no known reason why some doors were rectangular and others T-shaped.

Nalakihu's general architecture could be either Kayenta or Sinagua. The jar-shaped pit in Room 3 looks like a northern thing, but the lack of an unmistakable kiva would seem to indicate that people of the Elden focus built the house. Presence of kiva-like features in Rooms 4, 2 and 1 leads one into the type of speculations which arise in the minds of National Park Service rangers and archeologists as they guide visitors through ruins, day after day:

"Suppose a couple with several kids built, or were living in the first rooms (Nos. 3, 4, 5) of Nalakihu. Perhaps he is a Klethla man, a good weaver, and used to performing his ceremonies in a kiva, but his wife is of the matrilocal Elden tribe, and she sorta has the say-so about the house, so they built no kiva, and the man sets up his loom in Room 4, which, with the ventilator, serves after a fashion as the locale of whatever religious observances he feels impelled to perform.

"But, say, another Klethla man or two marries into the group, and their added numbers carry enough weight in the family councils so that when Rooms 1 and 2 are added to accommodate the population increase, the men install themselves a pretty fair ceremonial apparatus in Room 2, what with ventilator, ladder pit, deflector, firepit, and sipapu. However, the firepits in this room and in Room 4, can no longer be used when the second story is built over Rooms 2 - 5, so later kiva activities are carried out in Room 1.

"Oh, well," the ranger then mutters disgustedly, "after a few more years of excavating in the Flagstaff area, we'll know more about these kiva-less houses, and I'll forget all this!"

How they furnished their houses we do not know, except that they propped up their bin-less metates on the floor, set their pottery jars around in various corners, and their small objects - perforated pottery disks, lignite buttons, bone awls, needles, and dice - were scattered

on the floors. Only the shell pendant was cached in a small floor hole. In dry sites we should expect to find floor mats and many other tools and furnishings. At Nalakihu there was no trace of wall painting; there are only the somewhat doubtful ornamental courses of basalt stones.

Their stone utensils included manos and metates (no mortars), a little metate on which to grind paint, and stone pot lids. Their clay tubular pipe probably was for ceremonial smoking. Pottery utensils were fairly conservative in shape - large and small jars, bowls, and ladles with no eccentric forms, added modeling, or little surface manipulation, except corrugation. About half was gray, a quarter brown, and a quarter black-on-white. There were only a few bright red painted types, and they were rare.

Here again, in pottery particularly, occurs the complicated mixture of many types from several centers - the result of cultural interpenetration in a contact zone. Most of it can be attributed to trade, and with nearby tribes. Three ceramic branches are of almost equal importance - Kayenta, Sinagua, and Prescott. The first 2 are expectable, but why the presence of the admittedly poor (from a white man's viewpoint, anyway) Verde Black-on-gray large jars, which must have been made of materials which are found 60-100 miles distant?

Pottery and perhaps people of the Prescott branch were in the Flagstaff district a long time, but the only known site comparable in time to Nalakihu is on Deadmans Mesa, not far away.

Here our ranger muses more wildly: "Did one of our halfbreed lads from Nalakihu bring in a Prescott wife who was so attached to her crude Verde Black-on-gray pots that she insisted on using them? If so, how could he introduce her into a matrilocal community, as postulated in the pipe-dreams about the kiva? By that time, had the extended family through acculturation lost a lot of its prejudices and gained a certain tolerance for practices once frowned upon? I give up."

Such conjectures are admittedly far-fetched, but if future excavations produced additional evidence similar to that from Nalakihu, we might some day arrive at a suspicion as to the marriage patterns of some of the prehistoric tribes involved. Assuming that Verde Black-on-gray was really an inferior type to its contemporaries, we would not expect it to be a preferred trade item. Then, if pottery was essentially a woman's utensil, we would guess that a woman, marrying into a house, brought the type with her for sentimental and habitual reasons. Hence, some degree of

patrilocal belief would have to be inferred either in the resident family or in the incoming bride.

Other trade items include the shell, from California and the Gulf of Lower California, and the Military macaw, from southern Sonora and Chihuahua on south - both of which must have passed through the hands of several tribes before reaching Nalakihu.

In the line of tools, Nalakihu's inhabitants equipped themselves with hammerstones (but no stone hammers) and antler flakers to fashion other stone implements by percussion and pressure techniques. There must have been many wooden tools that have not survived. They roughly abraded their stone hoes, basalt corn shellers, and arrowshaft smoothers. Careful polishing was done on their excellent ¾-groove axes and also the perforated schist disks, which were possibly spindle whorls. Their bone awls and needles betoken considerable work in soft materials such as basketry, textiles, and hides. Weapons were few - probably only the bow and arrow, knife, and, perhaps, spear.

A possible mixture of influences shows again in weaving - the northern type loom in the house, and cotton braiding of 2 types, 1 southern, in the cremation burial. And the tiny wisp of basketry might have derived from the Hohokam.

Our evidence for toys and games is scanty (stone balls, perforated and unperforated pottery disks, and the 3 bone dice) but that for personal ornamentation is more full. There is nothing to show what type of clothes they wore, but they liked shell and pinyon beads, pendants, armlets, paint of several colors, and lignite buttons, and probably went so far as to pierce the nasal septum and lower lip in order to wear a nose plug and a labret.

We know almost nothing of their social routine (sleeping, eating, bathing, hospitality, etiquette, etc.), their arts of pleasure (music, dancing, drama), their concept of the world, practical knowledge, medicine or surgery, numerology, weights and measures, law, politics, etc. Our only source of judgement on their esthetic sense is from the decoration on their pottery, and the technical excellence of their craftsmanship.

In their funeral customs we get a hint of several beliefs, again confused by the cultural intermixture - of 6 burials, each differed in important details. There was some importance placed on southeast or east as a direction, for most burials were thus oriented. There was some belief in

APPENDICES

APPENDIX NO. 1

Table 14. Measurements of Walls in Nalakihu

Rm No.	Wall	Inside length at floor line Ft.	In.	Thickness N. end Ft.	In.	S. end Ft.	In.	E. end Ft.	In	W. end Ft.	In.	Height N. end Ft.	In.	S. end Ft.	In.	E. end Ft.	In.	W. end Ft.	In.	Diagonals NE/SW Ft.	In.	NW-SE Ft.	In.
1	N	11	4					1	4½	1	4½					3	10	2	8	18	5	19	10½
	E	15	7	1	5	1	6					3	10	5	8								
	S	10	8					1	11	2	1½					5	8	6	8				
	W	15	7	1	8½	2	0					2	8	6	8								
2	N	12	6½					2	6	1	11					7	10	3	11	15	1½	16	10½
	E	10	3¼	1	3	1	5					4	3	4	11								
	S	12	2½					1	4½	1	4½					4	10	3	9				
	W	10	2	1	3½	1	6					2	4	3	8								
3	N	10	9⅜					1	3½	1	4					4	5½	4	¼	14	¼	14	2¾
	E	9	8½	2	4	2	2					5	3½	6	7								
	S	10	11					2	6	1	11					5	6¾	4	6¼				
	W	8	5⅛	2	5½	2	2					3	8½	3	7								
4	N	10	11						0	11	10½					2	9	2	10	15	10	15	3
	E	11	0	2	0	2	3					5	7	6	2								
	S	11	0					1	3½	1	4					5	7	4	6				
	W	11	½	2	2	2	2					3	10	4	6								
5	N	10	9½					2	3	2	0					4	9	3	9	11	11½	11	6¾
	E	4	5½	2	0	2	0					5	8⅛	5	9								
	S	10	11					0	11¼	0	10½					2	5½	2	10				
	W	4	7	1	10	2	0					3	9	4	½								
6	N	10	3½					1	8	2	1					3	2	1	8½	17	6	16	6½
	E	13	11	2	3	2	0					3	0	1	11								
	S	10	5					2	3	2	0					4	3	3	6				
	W	13	½	2	2	2	8					2	10	3	2								
7	N	13	2					1	8	2	3					0	6	2	0	34	9	30	9½
	E	--	-	-	-	1	3					-	--	0	10								
8	N	5	5¼					1	4	1	3½					1	7¼	4	4	12	4½	12	7
	E	11	8	1	3	1	3½					1	7	2	9¼								
	S	5	6					1	3	1	2½					3	1	4	2				
	W	10	10¼	2	3	2	2					6	5½	6	7½								
9	N	5	5½					1	3	1	2½					3	1	3	11	12	9	13	6
	E	11	11	1	4	1	4½					2	10	3	7								
	S	5	6¼					1	3	1	2					3	2	3	4				
	W	11	11¼	1	3	1	5					7	6	4	2								
10	N	5	10					1	2	1	2					2	6	2	9	9	7	9	10
	E	7	7	1	4	1	4					2	6	1	8								
	S	6	1½					1	5	1	7					1	8	1	10				
	W	7	11¾	-	-	-	-					-	-	-	-								

Table 15. Measurements of Doorways in Nalakihu.

Rm No.	Door Edge From Wall Corner N.E. Ft.	In.	S.E. Ft.	In.	Width at Sill Ft.	In.	Width at Lintel Ft.	In.	Sill from Floor Ft.	In.	Height Ft.	In.	Notes
1	-	-	7	3	1	6	1	6	0	0	2	0	
2	4	6	4	3	1	7	2	2½					"T"-shape. Reconstructed to make ventilator
3	4	0			1	4	1	3	1	5	1	11½	
4			4	5	1	2½	0	11½	2	1	2	0	In S wall. Rectangular
4	2	3½			1	6	1	5½	1	10½	2	8	In E wall. Rectangular
6	4	6			1	7			1	7	?	?	Had ventilator 9" wide, 10½" high
9	?	?	5	4¾	1	6(?)	?	?	2	4½	?	?	Rectangular (?)
9					1	8	?	?	1	4	?	?	Doorway in E wall
													"T"-shape. Shoulders 4" wide and 2'6" from floor.

Table 16. Measurements of Holes and Pits

No.	Length Ft.	Length In.	Width Ft.	Width In.	Depth Ft.	Depth In.	NOTES
1a	0	7	0	5½	0	4½	Had been filled with dirt and plastered over
1b	0	8	0	6½	0	3	
1c	1	1	1	1	0	4½	Hemispherical firepit
2¹	0	9	0	8	0	1½	Plastered over
2²	2	3½	0	6	0	4	Probably for deflector. Plastered over.
2d	0	4¾	0	4¾	0	3¼	Held shell pendant and stone fragment
2e	0	3	0	3	0	¾	
2f	0	4½	0	4½	0	1½	
2⁴	2	5	2	5	0	8¼	1'9½" diameter at bottom. Inverted core. Plastered over. Contained ash.
2a	0	2	0	2	0	1	
2b	0	2	0	2	0	2	
2c	0	2	0	2	0	1	
2g	0	5	0	3½	0	3	Stone lid in place.
2h	0	5	0	5	0	2½	Plastered over.
2i	0	3	0	3	0	1½	
3	1	6	1	6	0	8	Hemispherical firepit.
3	2	3	2	3	3	11½	Jar-shaped pit. Diameter of floor, 4'½"
3	0	6½	0	4½	0	6	Oval, tapering to circular bottom, 2" diameter.
3	0	7	0	7	0	5	Flush with east wall. Stone cover in place.
4	1	3	1	3	0	7¾	Firepit. Bottom diameter 9".
4	2	2	1	4	0	4	Ash or pot pit. Irregular
6	1	8	1	6	0	3½	Rectangular pit flush with N wall
6	0	7	0	7	0	3	Hemispherical hole.
6	0	10	0	10	0	4	Circular hole.
6	3	9	2	4-8	0	3½	Irregular firepit.
7	0	7½	0	7½	0	5	Posthole flush with west wall
9	0	9	0	9	0	5½	Nearer SE outside corner of room
9	0	9	0	9	0	5	Near doorway.
C1	2	10	1	6½	0	11	Disturbed cist
C2	2	4	1	8	1	10	Contained B-1. Bottom: 1'8" x 8".
B2	5	3¾	2	3¾	1	2½-4½	Cremation burial
B4	3	0	1	9	1	2	
B5	2	11	2	5	1	6	Burial in shallow pit.
P2	3	4	3	4	2	4	Diameter 1'2" from bottom is 3'.
P3	2	5½	2	5½	3	8	Diameter of bottom, 4'4".
P4	3	6	3	6	3	3	Diameter of bottom, 4'10", Contained B3.
P5	1	7	1	7	1	2½	Diameter of bottom, 1'10¼"
P6	2	10½	2	7½	3	6½	Diameter of bottom, 3'9" x 4'.
P7	2	8	2	8	3	6	Diameter of bottom, 4'
P8	3	9½	2	2	4	9	Diameter of bottom, 4'2" x 3'10".
P9	2	11	2	11	2	5½	Diameter of bottom, 2'8".
P10	4	8	4	8	3	4	Diameter of bottom, 4'9½".
P11	4	0	2	0	?	?	Unexcavated.
P12	2	4	2	4	2	7	Maximum diameter 3'1" at 1' from floor.
P13	1	6	1	6	3	2	
P15	1	6½	1	6½	2	5	Maximum diameter 4'1" at 9" above floor.
P16	1	6	1	6	?	?	Unexcavated.

APPENDIX No. 2. REPORT ON VEGETAL MATERIAL, by Volney H. Jones.

Description

Original no. 694/NA 358.75 (Pit 14)

Laboratory no. 3372

Segments and fragments of charred corn cobs, charred corn kernels, and small pieces of charred bark.

A. Nine segments of charred corn cobs and several fragments, as follows:

1. 3 cms. long, incomplete, 1.4 cms. in diameter, 14 rows, very narrow kernels borne by this cob must have been very small.
2. 2.3 cms. long, incomplete, greatest diameter 1.2 cms., somewhat elliptical, 10 rows with tendency toward pairing of rows, cob spirally twisted.
3. 3.5 cms. long, incomplete tip fragment, tapering 1.3 cms. in diameter, 12 rows, but irregular toward tip.
4. 3 cms. long, incomplete, 1 cm. in diameter, 10 rows, somewhat paired and divided.
5. 3 cms. long, incomplete, 1 cm. in diameter, 10 rows.
6. 2 cms. long, incomplete, 9 mms. diameter, 10 rows.
7. 2 cms. long, incomplete, 7 mms. diameter, 8 rows.
8. 1.2 cms. long, incomplete, 9 mms. diameter, 8 rows, angular, paired.
9. Half-round, 1 cm. long, incomplete, 1.3 cms. diameter, apparently 12 row.

Also about 10 small fragments apparently from cobs similar to the above.

B. A quantity of charred corn kernels, mostly single kernels but some fused together in linear position as on the cob. The lot, constituting about 60 kernels, is rather uniform.

The range in size is from 6 to 8 mms. in length, from 6 to 8 mms. in width, and from 2 to 3 mms. in thickness. The majority are 8 x 8 x 3.

The kernels are wedge-shaped and no denting appears.

The uniformity suggests that these kernels might all be from one ear, or at least from a single variety. They could not have been borne by any of the associated cobs described under A above.

C. Small fragments of charred bark, unidentified.

Orig. no. 694/NA 358.83 (Pit 12)

Lab. no. 3373

Six fragments of charred corn cobs as follows:

1. 1.3 cms. long, incomplete, 1.2 cms. diameter, 10 row, rows paired, angular cross-section.
2. 1.2 cms. long, incomplete, 1.1 cms. diameter, 10 row.
3. 1.4 cms. long, incomplete, 1.1 cms. diameter, 8 row.
4. 2 cms. long, incomplete tip fragment, tapering, 9 mms. diameter, 8 row.
5. 1.6 cms. long, incomplete tip fragment, 8 row (?).
6. Small fragment.

Orig. no. 694/NA 358.86 (Pit 3)

Lab. no. 3374

A charred segment of a corn cob from near tip. 2.5 cms. long, 1.5 cms. in diameter, with 12 rows. The rows are narrow and closely spaced but more or less paired. The chaff is prominent.

Orig. no. 694/NA 358.89 (Room 3 floor)

Lab. no. 3375

Four segments of charred corn cobs, as follows:

1. 4.5 cms. long, apparently almost complete, 1.3 cms. diameter (greatest diameter), tapering acutely, 8 rows, somewhat angular in cross-section.
2. 3 cms. long, incomplete, 1 cm. diameter, 8 row.
3. 2.5 cms. long, incomplete, 1 cm. diameter, tapering, 8 row.
4. 2.4 cms. long, incomplete, 1 cm. diameter, tapering, 8 row.

Orig. no 694/NA 358.121 (Floor Room 7)

Lab. no. 3377

Three charred segments of corn cobs:

1. 3 cms. long, apparently almost complete, 1.2 cms. diameter, 10 rows, rows narrow, somewhat irregular.
2. 3 cms. long, incomplete, .8 cms. diameter, 10 row, tendency to spiral, exceptionally slender.
3. Tapering tip of cob, 1.2 cms. long, 1 cm. in greatest diameter, 8 row.

Orig. no. 694/358.125 (Floor Room 4)

Lab. no. 3378

Charred corn cob, cob segments, and ear stalks of corn (all charred):

1. Three segments of corn cob which fit together to make a cob (broken in handling or in transit?) about 9 cms. long and 1.7 cms. in greatest diameter. The rows are narrow and irregular but seem to be 12 in number.
2. Two small cob segments, very similar, one 2 cms. in length, 1.2 cms. in diameter, with 10 rows. The other 2.2 cms. in length, 1 cm. in diameter, and with 10 rows. Neither is complete.
3. Five fragments of corn ear stalks. Two of these are of fair size (1.5 cms. in diameter), the others smaller.

Orig. no. 694/NA 358.134 (Floor Room 5)

Lab. no. 3379

A. A quantity of charred corn kernels and fragments of kernels, representing perhaps about 100 kernels. A few of the kernels are more or less complete but many are fragmentary.

These vary in size from about 5.5 mms. to about 8 mms. in length, from about 5.5 mms. to about 8 mms. in width, and from 2 to 3 mms. in thickness. The average is about 7 x 7 x 3. The kernels are mostly wedge-shaped but some are somewhat globular (butt and tip kernels?).

There are a very few kernels which are crescent-shaped and 8 to 9 mms. wide by 6 to 7 mms. in depth. These seem to represent a separate variety from the others.

B. Two segments of charred corn cobs and one small fragment of a cob, uncharred. The larger of these is 2.5 cms. long, 7 mms. in diameter, and 8-row. The other charred segment is a tip fragment about 8 mms. in diameter and apparently also 8-rowed. The uncharred piece represents a part of two rows from a larger cob. None of these are of sufficient size to have borne the associated kernels described under A.

Orig. no. 694/NA 358.135 (Floor Room 5)

Lab. no. 3380

A portion of a corn cob, not affected by fire but somewhat disintegrated. It is 3.5 cms. long but not complete, 1.4 cms. in diameter, and has 12 rows.

Orig. no. 694/NA 358.142 (Floor Room 5)

Lab. no. 3381.

A quantity of pumpkin seeds and fragments of seeds. Eight of these are more or less complete, there are 3 sizeable fragments, and a number of smaller

fragments. These are not affected by fire but are somewhat disintegrated.

These are seeds of *Cucurbita moschata* and the lot is sufficiently uniform to be from a single pumpkin. They vary in length from about 1.6 to 1.8 cms. and in width from about 8.5 to 9.5 mms.

Orig. no. 694/NA 358.143 (Floor Room 5)

Lab. no. 3382

A quantity of shells of pine nuts, apparently pinyon pine, *Pinus edulis*. The shells have all been cracked and the meats are absent. As the shells do not show gnawing by rodents they probably were cracked out and used for human consumption.

Two of the shells show tiny perforations at the tips, and one of these seems to have been ground off to make the hole. This suggests that they may have been prepared for stringing.

Orig. no. 694/NA 358.B3.9

Lab. no. 3383

Three fragments of painted sticks, apparently ceremonial equipment:

1. 6 cms. long by 1.6 cms. in diameter, apparently first colored an orange red and light blue over this, large darker blue dot. One end weathered.
2. Similar piece 4 cms. by about 1.4, outer portion, half-round.
3. Small piece, similar.

These show structure of cottonwood (*Populus sp.*) or willow (*Salix sp.*). The wood is badly disintegrated and more precise identification does not seem practicable. Willow and cottonwood are of the same family and have similar structure, both are soft, easily worked woods frequently used in making ceremonial equipment. The paints rub off easily and are superficial (no penetration of the wood) indicating mineral nature. Under the microscope they show a granular, mineral structure.

Orig. no. 694/NA 358.B3.8

Lab. no. 3384

Four internodes of stems of some monocotyledonous plant, which have been painted with bluish green paint. Most of the paint has now flaked off. These were doubtless for some ceremonial purpose.

The internodes are each about 2 cms. in length and about 8 mms. in greatest width. They are somewhat compressed or flattened but this seems to be

natural rather than the result of treatment or accident of preservation. They are from a solid-stemmed plant with definite, constricted nodes.

Although these internodes are quite well preserved and are very distinctive we have been unable to arrive at any identification of their plant source. The presence of nodes would seem to place them as from a grass, but relatively few grasses have solid stems. One which does is the corn plant, but these internodes do not match at all well with corn.

The paint is mineral as indicated by its forming a superficial crust rather than penetrating the material, and by its crystalline appearance under the microscope.

Summary of Corn

All of the corn cobs in this consignment are of very small size and appear to be "nubbins" or abnormalities. The largest cob (which happens to be the only complete one) is only 9 cms. long, 1.7 cms. in diameter, while the others vary in diameter from 1.5 cms. down to as small as 7 mms., with the average about 1.2 cms. None (except the 9 cm. cob above) are definitely complete and none are over 4.5 cms. in length, but a few of these seem almost complete. The row numbers are usually 8-row and 10-row, but a few have 12 rows and one has 14.

From our collection of over 50 ears of modern Hopi corn we selected the smallest ear for comparison to these archaeological cobs. This is an ear obtained in 1932 from Don Talayesva of Oraibi. It is of the Violet Corn type (Hopi: wie'qtu) listed but not described by Whiting (*Ethnobotany of the Hopi*. Museum of Northern Arizona, Bulletin 15, 1939, see p. 69). This is the smallest variety of Hopi corn and I selected the smallest ear in our collection. The cob is 11.5 cms. in length, the elliptical cob is 2 cms. in greatest diameter, with 12 rows of kernels. Other ears in the variety are as much as 20 cms. long and over 3 cms. in diameter. Thus the largest cob from the consignment of archaeological material is smaller than the smallest ear we have from the Hopi and most of the cobs are considerably smaller.

By any standards the archaeological cobs are very small and it is doubtful if they are typical of any fixed varieties which were grown. Such small cobs are often noted in archaeological material not only from the

Southwest but also from the Eastern Woodlands as well. They appear in late as well as early materials from these areas. They are not a tiny original type from which later larger corns were developed as there is no progressive increase in size through time, and corn from Basket Maker sites is usually larger (than some of the "nubbins"). Also larger corns are usually present in the same consignments (as in the present one). No satisfactory answer for the frequent occurrence of such abnormalities has been offered. I noted a great many such very small cobs in the material from Jemez Cave and speculated on their meaning (see Alexander & Reiter *Report on Excavation of Jemez Cave*, Monographs School of American Research, no. 4, 1935, see p. 62). Franke and Watson have suggested drouth as a possible cause (*An Experimental Corn Field in Mesa Verde*, Symposium on Prehistoric Agriculture, Univ. New Mex. Bull. 296, 1936, see pp. 37-38) but this answer would not serve where such small and large corns occur in the same site and period.

No kernels appear on any of the small cobs so apparently they were removed and utilized. The kernels in the consignment (Lab. nos. 3372B; 3379) are loose kernels and no kernels were attached to cobs. All of these kernels are too large to have been borne by any of the cobs. The kernels are from 7-8 mms. in length, about the same in depth, and about 3 mms. thick on the average. Extremes are as small as 5.5 mms. in length and width and 2 mms. in thickness. The kernels are mostly wedge-shaped but a few are crescent-shaped and may represent a separate type. Apparently two types of corn are represented. Although these kernels are of fair size they are not large as compared to kernels from modern Pueblo corn. They are about the size of those from the small ear of Hopi Violet corn mentioned above.

Remarks on Pumpkin Seeds

The pumpkin seeds (Lab. no. 3381) are of *Cucurbita moschata* the species which appears first in the Anasazi area and which still predominates. They compare well with seeds of the Hopi pumpkin (Hopi: pa'tnga) discussed by Whiting (op. cit. p. 93). Among the Hopi the variety of *Cucurbita moschata* most grown and claimed to be an old variety is the Striped Cushaw. Shells and seeds of this type have been found in Basket Maker sites and in various Pueblo periods.

APPENDIX No. 3. ARCHEOLOGICAL SURVEY, CITADEL DISTRICT, by Charlie R. Steen

INTRODUCTION AND PROCEDURE

The archeological survey of the Citadel group of ruins in Wupatki National Monument started on December 27, 1934, in connection with the excavations at Nalakihu (N.A. 358). R. S. Harris, instrumentman, and a rodman worked until January 10, 1934, when C. R. Steen arrived and began serving as rodman.

The survey was to serve a double purpose--to furnish a topographical map of the northern section of Wupatki National Monument and to locate on the map all of the archeological sites within that area. The original plan of mapping the 12 quarter-sections comprising the northern section of the monument was extended in February to include 8 additional quarter-sections contiguous to it. The completed survey therefore includes: T. 25 N., R. 9 E., secs. 5, 6, NW¼ and NE¼ of 7, NW¼ of 7, NW¼ and NE¼ of 8; in T. 25 N., R. 8 E., Ne¼ of 12, SE¼ and NE¼ of 1; in T. 26 N., R. 8 E., SE¼ of 36; in T. 26 N., R. 9 E., SE¼ and SW¼ of 31, SE¼ and SW¼ of 32.

The map has a contour interval of 10 feet and indicates, with an appropriate symbol, all sites in the area. In addition, the archeologist made larger scale sketches of the house ruins which were located. The scale used for these drawings was 1 mm: 1 foot.

Each site was given a number, according to the system of the Museum of Northern Arizona, which was painted on a convenient boulder on the north side of the site. The numbers correspond to those on the site cards which carry descriptions of the sites and are on file at the museum.

RESULTS OF THE SURVEY

Earth Lodges

The ruins of Wupatki National Monument fall into 2 classes--earth lodges and stone houses. The former are the more numerous and oldest, as earth lodges were occupied up to, and perhaps into, early Pueblo III. The district is liberally sprinkled with the ruins of lodges, found on the mesas, slopes and flats with no evident consideration of either

weather or human enemies. However, they are always well placed in regard to surface drainage, insuring a dry home. The lodge remains appear as stone-ringed depressions, stone circles, and as low stone tumuli. In all, 116 earth lodges were recorded by the survey.

Twenty-seven of the earth lodges showed by their outlines that they were of the "alcove" type of house; the remainder were either rectangular or circular in outline. A few of the lodge ruins show some very interesting features in the form of low stone walls perpendicular or at a tangent to the principal walls. One site (N.A. 2990) consists of a stone circle with 2 opposing arcs appended to it in the manner of wings. The purpose of these auxiliary walls is not apparent from a casual survey of the surface.

In connection with the lodge ruins are a number of smaller circles and tumuli which indicate prehistoric granaries. These structures were often built against the low cliffs of the neighborhood. A typical granary was excavated in January at site N.A. 1186. A stone ring, 4 feet in diameter, marked the pit, which was roughly circular in outline. The excavation showed that the walls of the pit extended perpendicularly from the surface and ended at bed rock, which was encountered at a depth of 3 feet.

Stone Houses

In addition to the 52 stone houses which had already been recorded for the Citadel district, 50 more were added by the 1934 survey. These ranged in size from 1 to 7 rooms. A great variety of masonry types is a characteristic of the houses of this region, due to the fact that there are available 3 kinds of stone which may be used for building purposes: Moenkopi sandstone, Kaibab limestone, and lava. The first 2 mentioned are excellent materials for building as the stones check in parallel planes, but walls built partially or entirely of lava are weak and for the most part are in a poor state of preservation. Walls of alternating courses of limestone and sandstone were seen at site N.A. 342; sites N.A. 351 and 355 offer good examples of sandstone walls with rows of lava blocks thrown in for good measure, and at some of the smaller sites on the prairie, mixtures of all 3 are to be seen.

The typical stone house of the region was a 2- or 3-room dwelling, the rooms quadrilateral and usually in line, with the walls approximately parallel. The builders used the material which was most available, so that on the prairie the houses are usually of limestone, and on the mesas, of sandstone and lava. They were built for the most part on the flats, near

breaks and washes. These small houses probably had no true kivas, as no indications of these ceremonial structures were seen in buildings of less than 4 or 5 rooms.

Larger houses are typically Pueblo III in shape and appearance. Several of the ruins have one or more depressions in connection, possibly kivas. An interesting feature of the walls are the so-called "shelter walls." These walls jut from corners of the houses and extend from 6 to 10 feet. They invariably protect from the prevailing winds and expose the sheltered face to the south or southeast. Presumably these walls protected the people while at out-of-door work.

Round and subrectangular depressions were noted at several of the larger stone houses. These may indicate kivas.

Miscellaneous Sites

Three sherd areas were mapped, and 2 sites of such peculiar nature that no designation was applied to them. The first of these is a large depression, 40 feet in diameter, located in the bottom of a wash. The edges of the concavity are lined with limestone boulders and consist of 2 straight lines at right angles, the outer ends being connected by a quarter circle. A great number of potsherds were found at this site. The second consists of 2 long parallel walls connected at 1 end by a shorter wall, leaving the other end open. Some doubt exists as to whether this is an authentic prehistoric site and not a sheep herder's shelter.

Springs and Water Supply

During the survey a constant watch was kept for indications of ancient springs or other means of procuring water. Only 2 definite springs were located, both at 1 site, N.A. 696. These springs are associated with a small wet-weather pond and 1 at least shows signs of carrying a little seepage as a number of small shrubs are gathered about it. East of Magnetic Mesa, near site N.A. 344, is a propitious location for a spring in an outcrop of Moenkopi sandstone, but no definite signs of water were seen. In Antelope Prairie, a low dam of rocks and adobe was constructed to catch water carried by a small wash. The dam is surrounded by a sherd area 75 feet in diameter. Small wet-weather ponds appear sporadically throughout the area. Several of these held water for a week after each of the 2 snows which fell during the survey, and were used by the

cattle and horses on the range. Aside from these, indications of a prehistoric water supply are lacking.

Evidences of Material Culture

Wherever possible, a sherd collection was made. Many sites showed no surface sherds while at others there were so few that a collection was not made. However, 39 collections were made, 12 from sites previously recorded, 27 from new sites. In addition to the sherds, a few artifacts were found on the surface; these consisted of stone points, knives and scrapers, and 2 sherd spindle whorls.

Petroglyphs

Petroglyphs were recorded at 12 sites. These as a rule were pecked on the lava boulders, with geometric and zoomorphic figures predominating. At 4 sites (343, 359, 696 and 697) intricate pottery designs had been carried out on the rock surface. At 1 other site (N.A. 2840) a few meaningless lines have been pecked on a limestone boulder lying on the ground near the ruin.

Stone Alignments

A most interesting feature of the district is the large number of stone alignments to be found. Evidently laid out to prevent the cinder ash from blowing into dunes, these lines are to be found over the entire monument. According to Colton, the alignments are evidently confined to a light cinder-fall area forming a triangle drawn from Wupatki to Citadel to Crack-in-Rock. Those built on the flats are usually in parallel lines, 4 to 6 feet apart, the lines extending from 50 to 100 feet. As many as 24 parallel lines have been seen in 1 grouping. The lines on the mesas occur singly, and follow, as a rule, peculiar courses. These single lines often follow the curve of the slope of a mesa, or climb it by the shortest route, going over bare rock en route. The lines of stone are usually connected with an earth lodge.

SUMMARY

The archeological survey of the Wupatki National Monument mapped and described 116 earth lodge sites, 50 stone houses, 2 miscellaneous sites, and 3 sherd areas hitherto unlisted, making a total of 171 to be

added to the 52 sites previously reported by Colton. Sherd collections were made at 39 sites, and photographs taken of petroglyphs and interesting house and wall types. Two maps have been made: 1 is purely topographical, with the addition of prehistoric sites; the second shows some of the outstanding geological features of the monument, such as fault lines and important rock formations and outcrops.

APPENDIX No. 4. REPORT OF THE SURVEYOR, by Robert S. Harris

The instruments used on the survey were a W. and L. E. Gurley alidade, number 101046, and plane table and a suitable stadia rod. This alidade was equipped with a vertical arc reading angles to the nearest minute.

At the beginning of the survey the striding level of the instrument was checked and found to have no error. The horizontal cross-hair was checked at this same time by means of the peg adjustment and also found to be correct. The striding level was checked every day during the survey and in March an adjustment was made due to the fact that it was noted to be in error on the afternoon of the previous day. On March 28, the instrument was again checked by means of the peg adjustment and found to have a negligible error.

The method of intersection and resection was used to locate the points in making this survey. Prominent points such as lava outcrops, limestone ledges and similar landmarks that could be seen from 2 or more monuments (section or quarter-section corners) were plotted in this manner. These were taken at strategic points so that by reading stadia on shots up to 800 feet from the monument and shots of an approximately equal length from the triangulation points, the contours for the area could be obtained.

Archeological sites in the area were located in the same manner. Whenever setting up over a point, the orientation of the board was checked by backsights on the section or quarter-section corners which were available and also upon previously plotted points such as the Citadel Butte, which can be seen from approximately 75% of the area, and also the edges of the mesas in the area.

Elevations were obtained wherever possible by direct leveling, and, where this was impossible, by stadia readings. The elevations

were checked at least twice to all points where the instrument was set up and all errors of more than 1.5 feet were corrected. The errors were not more than 0.7 of a foot except in a few cases.

Quarter-section and section corners were checked as to position and found to be accurate as far as it was possible to check them by means of the plane table. In only 1 instance were these found to be in error. The section corner marking the division between R. 8 E. and R. 9 E., and between T. 25 N. and T. 26 N. was approximately 60 feet east of the position obtained by stadia measurements of distance for ½ mile east of it and that ½ mile west of it. These 2 distances were checked by 4 stadia readings and the results was plotted as stated above.

This survey shows several interesting features from a geological standpoint. The Central and North Flats are 2 basins of approximately no drainage. Limestone fissures, of which there are 9 major ones, dot the region to the north of Middle Mesa. These vary in depth from only a foot or 2 to 60 or 70 feet, and 1 whose depth has not been ascertained, a weighted line having been dropped to more than 200 feet into it. The entire area in the northern and eastern part of the monument is underlain with limestone.

Another interesting feature of the limestone is the presence of faults. There are 11 of these, 1 major fault which runs through the entire length of the monument and 10 smaller ones. The bearing of the main fault is about 30 degrees east of north and of the minor ones, about 40 degrees west of the line of the major fault.

APPENDIX NO. 5.. LIST OF SITES, CITADEL DISTRICT, by Dale S. King

There follows a list of the sites surveyed in the Citadel district, containing in tabular form:

(a) Museum of Northern Arizona serial number of the site
(b) Township north of the Arizona base line
(c) Range east of the Gila and Salt River Meridian
(d) Number of section within the township
(e) Quarter section within the section
(f) Kind of house or area: BS, a boulder site which may represent an earth lodge, pit house, or brush structure; D, a depression of unknown function; SH, stone house; A, alcove house; K, kiva; X, sherd area; P, pit house; BG, burial ground.

(g) Material: L, lava; Ls, Kaibab limestone; SS, Moenkopi sandstone.
(h) Estimate of number of rooms
(i) Remarks. B refers to Barrett's numbers; * - sherd analysis.

No.	TN	RE	S	¼S	Kind	Mat.	No. Rooms	Remarks
342	25	8	12		SH	Ls	7	B23, Fewkes Ruin M (?)
343	25	8	7	NW	SH	SS	7	+K.B24
344	25	9	6	SW	SH	SS	2	
345	25	9	6	SE	SH	SS	2	B26
346	25	9	6	SE	SH	SS	3	B27
347	25	9	6	SE	SH	SS	3	B28
348	25	9	6	SE	SH	SS	2	B30
349	25	9	6	SE	SH	SS	1	B31
350	25	9	6	SE	SH	SS	1	B32
351	25	9	6	SE	SH	SS	5	+K.B33. * Ceramic group 7, Klethla Focus.
352	25	9	6	SE	SH	L	18	B34 * Ceramic group 7, Klethla Focus.
353	25	9	6	SE	SH	LSS	2	+K * Ceramic group 7, Klethla Focus.
354a	25	9	6	NW	SH	LSS	3 - 4	B52 * Ceramic group 7, Klethla Focus.
354b	25		6	NW	SH	SS	2	B53 * Ceramic group 7, Klethla Focus.
354c	25	9	6	NW	SH	L	5	B54 * Ceramic group 7, Klethla Focus.
355	25	9	7	NE	SH	LSS	40	+10. Citadel Ceramic group 7, Klethla Focus.
357	25	9	7	NE	SH	L	10	B5 * Ceramic group 7, Klethla Focus.
358	25	9	7	NE	SH	SS	13	Nalakihu. Fewkes' Ruin A.
359	25	9	7	NE	SH	LSS	3	+ K.
360	25	9	6	SE	SH	L	5	Fewkes' B.C.D. B. Fig. 23
361	25	9	6	SE	SH	L	1	Fort (?). Fewkes' Ruin E.
362	25	9	6	SE	SH	L	4	Fewkes' Ruin F.
363	25	9	5	NW	SH	L	1	
364	25	9	5	NW	SH	L	1	
365	25	9	5	NW	SH	L	1	
366	25	9	5	NW	SH	L	2	Two stories
367	25	9	5	SW	SH	L	5	One story
368	25	9	5	SW	SH	L	1	* Ceramic group 7
369	25	9	6	SE	SH	L	5	B. Fig. 25
370	25	9	6	SE	SH	L	2	
371	25	9	6		SH	LSS	6	
372	25	9	6	SE	SH	LSS	6	B. Fig. 24
373	25	9	6	SE	SH	LSS	13	* Ceramic group 7, Klethla Focus.
374	25	9	6	SE	SH	LSS	7	
375	25	9	6	SE	SH	L	3	* Ceramic group 7, Klethla Focus.
377	25	9	6	NW	SH	SS	3	+K. Fewkes' Ruin I. B41. * Ceramic group 7, Klethla Focus.
378	25	9	6	NW	SH	SS	2	Fewkes' Ruin G. B37. * Ceramic group 7, Klethla Focus.
379	25	9	6	NW	SH	SSLs	8	+ court. Fewkes' Ruin J. B43. Lomaki. * Ceramic group 7, Klethla Focus.
382	25	9	6	NW	SH	SS	4	* B Fig. 50. group 7, Klethla Focus.
383	25	9	6	NW	SH	Ls	5	Fewkes' Ruin K. B Fig. 50.
384	25	9	6	NW	SH	Ls	2 ?	Fewkes' Ruin L. B50. * Ceramic group 8, Klethla & Elden Foci.
624	25	9	5	SE	SH	SS	4	* Ceramic group 7
656	25	9	5	NE	SH	L	?	
689	25	8	1	SE	SH		2	
691	25	8	7	NW	SH	Ls	2 - 3	
692	25	8	12	NE	SH	Ls	2 - 3	
693	25	8	6	SE	SH	Ls	3	
694	25	8	1	SE	SH	Ls	2	
695	25	9	6	SW	SH	Ls	2 ?	
696	26	9	32	SW	SH	L	?	
697	26	9	32	SW	SH	L	4	
1176	25	8	14		SH	L	4	P II
1185	25	9	6	NW	A	L	1	6 x 8 ft. alcove 4 x 6 ft. - * Ceramic group 7, Klethla focus.

No.	TN	RE	S	¼S	Kind	Mat.	No. Rooms	Remarks
1186	26	9	31	SE	SH	-	2	Plus 3 circular cists, 6 ft. diam.
1187	25	9	6	NE	P	-	1	Circular pit house, 12 ft. diam.
1188	25	9	6	NE	P	-	1	Circular pit house, partially excavated.
1770	26	9	6	NE	P	L	2	Two pit house depressions
2103	25	9	6	NE	SH	-	1	Built in crack in rock; petroglyphs
2811	25	9	6	NE	BS	L	2	Two circles in shallow Ls fissure.
2812	25	9	6	NE	SH	Ls	1	Plus cist.
2813	25	9	6	NE	BS	Ls	?	
2814	25	9	6	NE	BS	Ls	?	
2815	25	9	6	NE	BS	Ls	?	
2816	25	9	6	SE	BS	L	?	
2817	25	9	6	SE	BS	L	?	
2818	25	9	8	NW	BS	LLs	?	
2819	25	9	8	NW	BS	Ls	?	
2820	25	9	8	NW	SH	Ls	2	* Ceramic group 6
2821	25	9	6	NE	BS	L	2	Two circles
2822	25	9	6	NW	A	Ls	2	Two houses
2823	25	9	6	NE	A	Ls	1	
2824	25	9	6	NE	A	Ls	1	
2825	26	9	31	SW	SH	Ls	4	
2826	25	9	8	NW	D	Ls	-	* D - depression, 40 ft. diam., bordered with boulders.
2827	25	9	8	NW	SH	LLs	2	(Not on map; is in NW ¼ of NW ¼ of Sec. 8.)
2828	25	9	8	NW	A	Ls	1	
2829	25	9	8	NW	A	LLs	1	
2830	25	9	8	NW	A	Ls	1	
2831	25	9	8	SW	A	LLs	2	Two houses. (Not on map: is in NE ¼ of SW ¼ of Sec. 8). * Ceramic group 7?
2832	25	9	7	NE	BS	LLs	?	
2833	25	9	7	NE	SH	LSS	?	
2834	25	9	7	NE	X			On spur of South Mesa. * Ceramic group 6
2835	25	9	7	NE	BS	L	14	14 circles on lava hogback. * Ceramic group 7, Klethla focus.
2836	25	9	7	NE	SH	L	2	* Ceramic group 7, Klethla focus.
2837	25	9	7	NE	SH	L	1	
2838	25	9	7	NE	SH	L	2	Plus 2 circles. * Ceramic group 7?
2839	25	9	7	NE	SH	L	1	Only 3 walls visible.
2840	25	9	8	NW	BS	Ls	?	Petroglyph
2841	25	9	8	NW	BS	LLs	?	
2842	25	9	8	NW	BS	LLs	?	
2843	25	9	8	NW	BS	LLs	?	
2844	25	9	8	NW	BS	LLsSS	?	
2845	25	9	8	NW	A	Ls	?	
2846	25	9	5	NW	BS	L	?	
2847	26	9	32	SW	BS	L	?	
2848	25	9	5	NW	BS	L	?	
2849	25	9	5	NW	BS	L	?	
2850	25	9	5	NW	BS	L	?	
2851	25	9	5	NW	SH	L	4	* Ceramic groups 6, 7.
2852	25	9	5	NW	SH	L	5	
2853	25	9	5	NW	SH	L	3	L-shape.
2854	25	9	5	NW	A	L	1	
2855	25	9	5	NW	P		1	Pithouse (?)
2856	25	9	5	NW	BS	L	2	Two circles.
2857	25	9	5	NW	BS	L	4	Four circles. * Ceramic groups 7, 8, Klethla focus.
2858	25	9	5	NW	A	LLsSS	1	
2859	25	9	5	NW	BS	Ls	?	
2860	25	9	5	SW	SH	LsSS	1	
2861	25	9	6	SE	BS	LLs	?	
2862	25	9	6	NE	A	LLs	1	
2863	25	9	5	SW	BS	L	?	
2864	25	9	6	SE	BS	L	?	

APPENDIX NO. 5

No.	TN	RE	S	¼S	Kind	Mat.	No. Rooms	Remarks
2865	25	9	6	SE	BS	L	?	
2866	25	9	6	SE	BS	L	?	
2867	25	9	6	SE	BS	L	?	
2868	25	9	6	SE	BS	-	?	
2869	25	9	6	SE	P		1	Pit house (?)
2870	25	9	6	SE	BS	L	?	
2871	25	9	6	SE	BS	L	2	Two circles
2872	25	9	6	SE	BS	L	2	Two circles
2873	25	9	6	SE	SH	L	3	
2874	25	9	6	SE	BS	L	?	
2875	25	9	5	SW	A	Ls	1	
2876	25	9	5	SW	X			Surrounds dam, 50 ft. - radius * ceramic group 7, Klethla focus
2877	25	9	6	NW	X			
2878	25	9	6	NW	X			
2878	25	9	6	SE	BS	-	2	Two circles
2879	25	9	5	NW	BS	L	?	
2880	25	9	6	SW	A	Ls	1	
2881	25	9	6	NW	BS	Ls	?	
2882	25	9	6	NW	SH	Ls	2	
2883	25	9	6	NW	A	Ls	1	
2884	25	9	6	NW	SH	Ls	1	Plus cist. * Ceramic group 7, Klethla focus
2885	25	9	6	NW	A	Ls	1	
2886	25	9	6	NW	A	Ls	1	
2887	25	9	6	NW	A	Ls	1	
2888	25	8	1	NW	A	Ls	1	
2889	25	8	7	NW	BS	L	1	Circle
2890	25	8	7	NW	BS	L	?	
2891	25	8	12	NW	BS	Ls	2	
2892	25	8	12	NW	SH	Ls	3	
2893	25	8	7	NW	SH	-	1	Plus ?
2894	25	8	7	NW	SH	Ls	6	1-room houses built against cliff, west side Cedar Canyon.
2895	26	8	31	SW	BS	LLs	?	On small SS mound.
2896	25	9	6	SW	SH	Ls	1	
2897	25	9	6	SW	SH	Ls	4	Four houses utilizing shallow rock shelters as rear walls.
2898	25	9	6	SW	SH	Ls	5	Five houses on east side Cedar Canyon using rock shelters as rear walls. * Ceramic group 5, Black Mesa focus (?)
2899	25	9	8	NE	BS	L	?	
2900	25	9	8	NE	A	LLsSS	1	* Ceramic group 7K ?
2901	25	9	5	SE	BS	L	?	
2902	25	9	8	NE	SH	LLsSS	2	* Ceramic group 7K ?
2903	25	9	8	NE	BS	L	?	
2904	25	9	8	NE	A	L	1	
2905	25	9	8	NE	A	LLs	1	
2906	25	9	9	NW	SH	LLs	7	Two houses: 5 rms in north structure; 2 in south. (Not on map; is in NW¼ of NW¼ of Sec. 9) * Ceramic groups 7, 8?
2907	25	9	8	NE	BS	LLs	?	
2908	25	9	8	NE	BS	LLs	?	
2909	25	9	8	NE	SH	SS	3	
2910	25	9	8	NE	BS	LLs	4	Four circles. * Ceramic group 7, Klethla focus.
2911	25	9	8	NE	A	LLs	1	
2912	25	9	8	NE	SH	Ls	3	Plus ? * Ceramic group 7, Klethla and Elden foci.
2913	25	9	8	NE	A	LLs	1	
2914	25	9	8	NE	BS	Ls	?	Large juniper growing in center
2915	25	9	8	NE	BS	Ls	?	
2931	25	9	5	NE	-	-	-	(No card in survey file)
2932	25	9	5	NE	SH	LLs	6	One room, 5 circles

No.	TN	RE	S	¼S	Kind	Mat.	No. Rooms	Remarks
2933	25	9	5	NE	BS	L	?	
2934	26	9	32	SE	BS	L	?	
2935	25	9	5	NE	SH	L	1	Plus ?
2936	25	8	12	NW	BS	L	1	Circle
2937	26	9	32	SW	BS	Ls	3	Circles in bottom of shallow Ls fissure.
2938	26	9	32	SW	SH	Ls	1	
2939	26	9	32	SW	SH	Ls	4	One rectangular room; 3 circular.
2940	26	9	31	SE	BS	Ls	?	
2941	26	9	31	SE	SH	Ls	1	Plus ?
2942	26	9	31	SE	BS	Ls	?	
2943	26	9	31	SE	BS	Ls	?	
2944	26	9	32	SW				
2945	26	9	32	SW				
2946	26	9	32	SE				
2947	26	9	32	SE				
2948	26	9	32	SE				
2949	26	9	32	SW				
2950	26	9	32	SW				(No cards in survey file)
2951	26	9	32	SW				
2952	26	9	32	SW				
2953	26	9	31	SE				
2954	26	9	31	SE				
2955	26	9	31	SE				
2956	26	9	31	SE				
2957	25	9	8	NW	BS	LS	2	Circles
2958	25	9	8	NW	BS	LLs	?	
2959	25	9	5	SE	A	Ls	1	
2960	25	9	5	SE	SH	LLs	2	* Ceramic group 7, Klethla focus
2961	25	9	5	NW	BS	LLs	?	
2962	25	9	5	NW	BS	Ls	?	Partially covered by cinders
2963	25	9	5	NW	BS	Ls	2	Circles
2964	25	9	5	NW	BS	L	2	Circles on SW slope North Mesa
2965	25	9	5	NW	BS	L	2	Circles
2966	25	9	5	NW	SH	L	1	
2967	25	9	5	NW	BS	L	?	
2968	25	9	5	NW	BS	L	2	Circles
2969	25	9	5	NW	BS	L	4	Circles
2970	25	9	5	NW	A	L	1	
2971	25	9	8	NW	-	-	-	(No card in survey file)
2972	26	9	31	SW	BS	LLs	?	
2973	26	8	36	SE	BS	LLs	?	
2974	26	8	36	SE	SH	Ls	2	?
2975	25	8	1	NW	BS	Ls	?	
2976	25	8	1	NW	SH	Ls	5	One rectangular; 4 circular. Built against Ls on E side Cedar Canyon.
2977	26	8	36	SE	BS	Ls	?	
2978	26	8	36	SE	SH	Ls	2	
2979	26	8	36	SE	SH	Ls	2	* Ceramic group 7, Klethla focus
2980	26	8	36	SE	SH	Ls	2	
2981	26	8	36	SE	BS	Ls	?	
2982	26	9	31	SW	BS	LLs	?	
2983	26	9	31	SW	BS	LLs	?	* Ceramic group 7K?
2984	26	9	31	SW	BS	Ls	2	Circles. Surrounding this site is a series of stone alignments, 25 in number, 50-150 ft. long. Orientation: NNW - SSE.
2985	26	9	31	SE	BS	Ls	?	
2986	25	8	1	NW	BS	Ls	?	
2987	25	8	1	NW	SH	Ls	1	
2988	25	8	1	NW	BS	Ls	?	
2989	25	8	1	NW	SH	Ls	3	Built in front of a small rock shelter.

APPENDIX NO. 5

No.	TN	RE	S	¼S	Kind	Mat.	No. Rooms	Remarks
2990	25	8	1	NW	BS	Ls	1	Plus ?
2991	25	8	1	NW	SH	Ls	2	Plus ?
2992	25	8	1	SE	SH	Ls	1	Built against limestone cliff
2993	25	8	1	SE	SH	Ls	2	
2994	25	8	1	SE	BS	Ls	2	Probably granaries
2995	25	8	1	SE	SH	LsSS	4	* Ceramic group 7
2996	25	9	7	NW	SH	L	-	Three terraces. * Ceramic group 7
2997	26	9	31	SE	BS	Ls	1	

Table 17. Sherd Analyses from Survey

Site number	Black Mesa B/W	Dogoszhi B/W	Sosi B/W	Flagstaff B/W	Wupatki B/W	Tusayan White Ware	Padre B/W	Chevelon B/W	Walnut B/W	Little Colo. White Ware	Tusayan B/R	Citadel Polychrome	Tusayan Polychrome	Tsegi Orange Ware	Deadmans B/G	Angell Brown	Winona Brown	Sunset Red	Turkey Hill Red	Tonto Red	Kana-a Gray	Coconino Gray	Medicine Gray	Tusayan Corrugated	Moenkopi Corrugated	Tusayan Gray Ware	Deadmans Gray	Deadmans Fugitive Red	Prescott Gray Ware	Jeddito Plain	TOTAL	Ceramic group and foci
351					5				11	1			3												7	4					31	7K
352				3		4			12	6	1													7	12	1					46	7K
353		3	2	13	1	4			22	1	3	6		4				5						3	6	14					87	7K
354a									2			1		1										4		2					10	7K
354b		3				4			4																	9					20	7K
354c				6		1			8	3				1				8	3					2	11	6					49	7K
355		10	29	44	1	11	1		22		42	8					12	8	1					35	48	6	12		5		294	7K
357			11	13		3			14			8				1		4						4	9	2					70	7K
368				5	4	1						1	1					4						4	2	5					19	7
373			3	9		4			111			5	1				1			2	1			3	5	2	1			1	51	7K
375				7		3			12	1				2										1		7					43	7K
377*				2	2				6					1				1							3	2					21	7K
378				2		1			2	1																5					11	7K
379	1		2	5		1			6					4										8	6	7	1	1	2		44	7K
382				7		4			6			2		1	1			2							16		2				41	7K
384					1	2			5	1								7								9			4		29	8K,E
624		3	3	12	4	4			5		2	1										1		3	3						41	7
1185				5					1					3				7		2	5				12				1		36	7K
2820			2	3		3		2	1	1																					12	6
2831			3	6		1					3	1						1						3	2		3				23	7?
2834				4	2	2			2					1		1		1						1			1	2			17	6
2835		1		3	2	1			3				1					1							4	5					21	7K
2836				4		1			4			3		2												4		1			19	7K
2838		1	1	1					4		2							2	1						3		2	1			18	7?
2851	3		4	2		1																		1	7		3				21	6,7
2857		1	7	6	4	7			6	1	3		2	2				1						6	1	2	1				50	7,8K
2876		9	5	11		6			3	2								1								4					41	7K
2884				3	6				3					1										3	2						18	7K
2898#	1					2										1								5	1	3	1	1			18	5BM
2900		1	2	1		1																			5						11	7K?
2902		1				4			2									3							3						13	7K?
2906		5	2	7		1	1		16		2	3						5						1	6						49	7,8?
2910			12	3		1			1										1					6	1		2	1			28	7K
2912		1	2			1					1	1		1				3							4	1					15	7K,E
2960			4	5		1			3		3													2	1		1				20	7K
2979				3		1	2		7									5							6				1		25	7K
2983				6					1																						7	7K?
2995		2		3		6	1		3									4							8			7			34	7
2996		9		3		4			6					1										1	6						30	7

*Plus one sherd of Kana-a Black-on-white

#Plus three sherds of Medicine Black-on-red

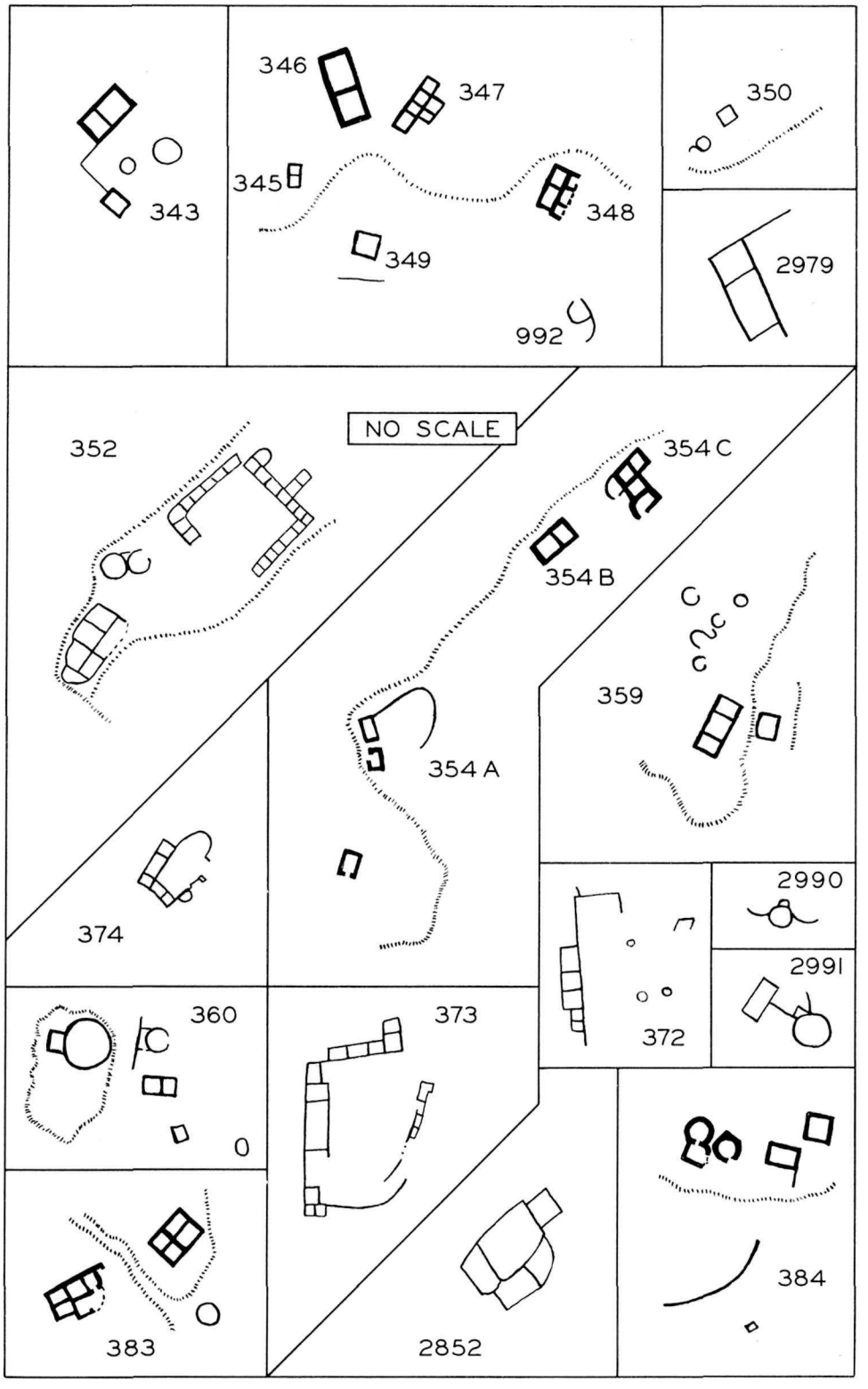


Fig. 81

Sketch ground plans of ruins, Citadel district.

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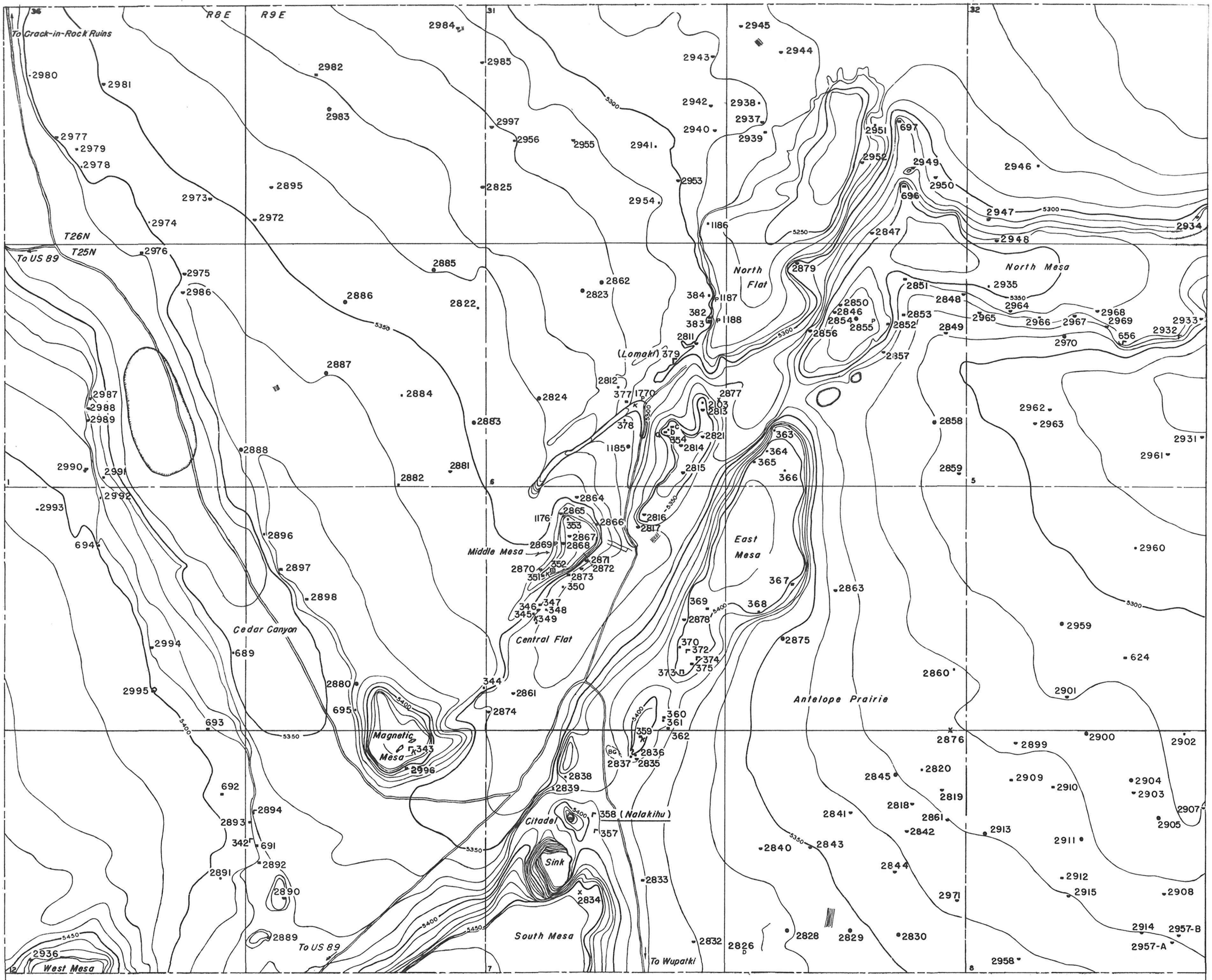
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CITADEL GROUP OF RUINS, WUPATKI NATIONAL MONUMENT —— F-68 C.W.A. PROJECT NO. 4 —— SURVEY BY R.S. HARRIS AND C.R. STEEN, APRIL 12, 1934

SCALE IN FEET 0 1000 2000

CONTOUR INTERVAL - 10 FEET

LEGEND

K KIVA	● ALCOVE HOUSE	⌐ SMALL HOUSE, 6-10 ROOMS
x SHERD AREA	P PIT HOUSE	⌐ SMALL HOUSE, 11-16 ROOMS
BG BURIAL GROUND	• SMALL HOUSE, 1-2 ROOMS	▪ PUEBLO, 17-32 ROOMS
▾ BOULDER SITE	▪ SMALL HOUSE 3-5 ROOMS	▪ PUEBLO, 33+ ROOMS