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TUSAYAN: THE HOPI INDIAN COUNTRY OF ARIZONA

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THE Hopi[1] Indians are a minority group in the great area of Indian country in northeastern Arizona overlapping into three neighboring states and known as "the Navajo country." It includes a block of contiguous Indian reservations of 22,400 square miles, with about 35,000 Indians, of whom the majority are Navajos, and less than 600 whites, who are government employees, traders, or missionaries. The Hopis number only 2800; but, in spite of their small numbers, they perhaps challenge more popular interest than any other Indian group. The interest in the Hopis centers largely about the snake dance, which has attracted more attention than any other Indian dance or ceremonial, and is reinforced by their picturesque pueblo houses perched high on steep-walled mesas rising hundreds of feet above the valley floors and reached only by steep trails or more lately by difficult and precarious roadways.

The Hopi Villages

The Hopi Indian Reservation, as established in 1882, contains 3920 square miles; but even on this, their own reservation, of which they occupy a minor portion, the Hopis are outnumbered by the Navajos. The Hopi villages are situated about 65 miles north of Holbrook and Winslow, the nearest railway stations. If we except the village of Moenkopi in the Tuba Oasis in the Western Navajo Reservation, the greatest air line distance between villages (Walpi and Hotevilla) is only about 18 miles, and nearly all of them can be seen from certain vantage points. The country occupied and utilized by the Hopis was known to the Spaniards as the "Province of Tusayan." Tusayan may be defined as extending east and west across the mesas between the Jadito and Dinnebito Washes, a distance of less than 40 miles with a width hardly half as great—a small area, yet with hardly a rival in the United States as a distinctive geographic unit. The Hopi mesas with their scalloped sinuous contours project "like withered fingers" southward toward the desert from the great Black or Zih-li-jini Mesa, which is centrally located in the Arizona

[1] The name "Moqui," formerly more commonly used, is the name given the Hopis by surrounding Indians, particularly the Navajos. It means "the dead ones" and is resented by the Hopis, whose own name for themselves is "Hopi," meaning "the peaceful people."

part of the Navajo country. The villages are located on the three best-defined projections, called, with reference to their location from the Indian Agency at Keams Canyon, the First, Second, and Third Mesas. On each of the three mesas are situated three villages. The villages, with their population in 1929, are: on the First Mesa, Walpi, 161; Sichomovi, 310; and Tewa, or Hano, 308; on the Second Mesa they are Mishongnovi, 266; Shipaulovi, 116; and Shongopovi, 299; and on the Third they are Oraibi, 422; Hotevilla, 440; and Bacabi, 147.

Surrounding the Hopis on all sides as unwelcome neighbors are the more numerous Navajos, unrelated to them and differing widely from them in customs, traditions, and mode of life.[2] In the past the nomadic, stock-raising Navajos as the stronger tribe have been very troublesome to the Hopis, infringing upon their watering places, monopolizing their pastures, and stealing the products of their fields and their stock.[3] It took the government a long time to secure complete justice between the tribes.

We may suppose, on the support of Hopi traditions, that their early settlements were small or scattered villages located at or near their fields. They seem to have thus pursued their existence quite peacefully, as far as outside interference was concerned, until there came a day when wilder unsettled tribes drifted into the region. The scattered settlements were first assembled into large villages necessitating a smaller part of the male population to remain on guard. Finally they were moved to sites that afforded better facilities for defense but were as near their fields as possible, that is on lower spurs of the mesas or on foothills overlooking little valleys, where nearly all were found upon the arrival of the Spaniards in the sixteenth century.

Seeking protection from Spanish reprisals after their revolt from Spanish rule in 1680,[4] they moved from the foothills or lower terraces up on top of the mesas and built their villages as citadels, risking scarcity of water and depending upon pools in the rocks during sieges. The need for protection has long since passed, but tradition and religious ceremony have become so interwoven with definite locations that the Hopis continue to cling to their barren village sites above the cliffs.

Every modern Hopi village is built on a bare rock surface on the brow of a cliff. The First Mesa is the narrowest, steepest, and most

[2] Cf. H. E. Gregory: The Navajo Country, *Bull. Amer. Geogr. Soc.*, Vol. 47, 1915, pp. 561–577 and 652–672.

[3] Julian Scott: Report on the Moqui Pueblos of Arizona, in Thomas Donaldson: Moqui Pueblo Indians of Arizona and Pueblo Indians of New Mexico, pp. 51–68 (especially pp. 56 and 60), *11th Census Extra Bull.*, Washington, 1893.

Cosmos Mindeleff: Location of Tusayan Clans, *19th Ann. Rept. Bur. of Amer. Ethnology, for 1897–98*, pp. 639–653.

[4] H. H. Bancroft: History of the Pacific States of North America, Vol. 12, Arizona and New Mexico 1530–1888, San Francisco, 1888, p. 349.

sightly. The entire area upon which its three villages rest is not more than ten acres. Immediately back of Tewa, the third village, is a break in the mesa that is difficult to cross. The distance from here to the point of the mesa at Walpi is not more than half a mile, and the mesa is nowhere over 350 feet in width. The entire area is wind-swept, without soil, and completely surrounded by vertical cliffs. At Walpi

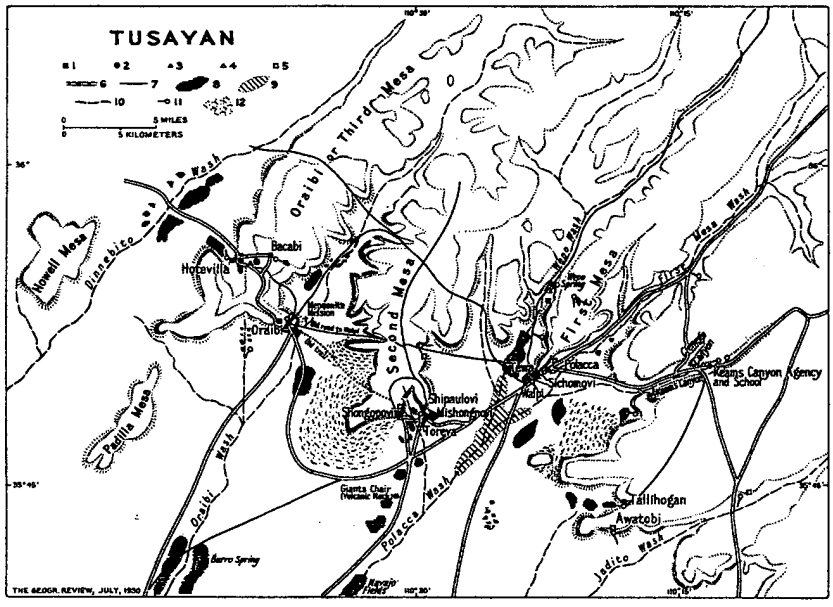

FIG. 1—Sketch map of the Hopi Indian country of Arizona. The numbers have reference: 1, Hopi pueblos; 2, other villages; 3, school and post office; 4, school; 5, pueblo ruins; 6, frequented roads; 7, secondary or abandoned roadways; 8, areas subject to tillage; 9, abandoned fields; 10, most important washes; 11, springs; 12, badlands. Scale 1 :650,000.

the mesa is hardly 2000 feet wide on top, and toward Sichomovi it narrows to about eight feet. The path between these two villages would be a dizzy one but for the fact that the feet of men and beast have through the centuries worn it into a deep groove. The villages are necessarily close together, and Sichomovi and Tewa have flattened out until they have merged. On the Second Mesa, Mishongnovi and Shipaulovi stand on summits of a narrow secondary projection and, like the villages of the First Mesa, are restricted in area. On the other hand, Shongopovi and the villages of the Third Mesa occupy fairly wide summit areas and are more symmetrical in plan.

To quote Mindeleff: "Pueblo architecture is essentially a product of the plateau country, and its bounds are, in fact, practically coincident with those of that peculiar region popularly known as the mesa country. Peculiar geological conditions have produced a peculiar topography, which in turn has acted on the human inhabitants of the

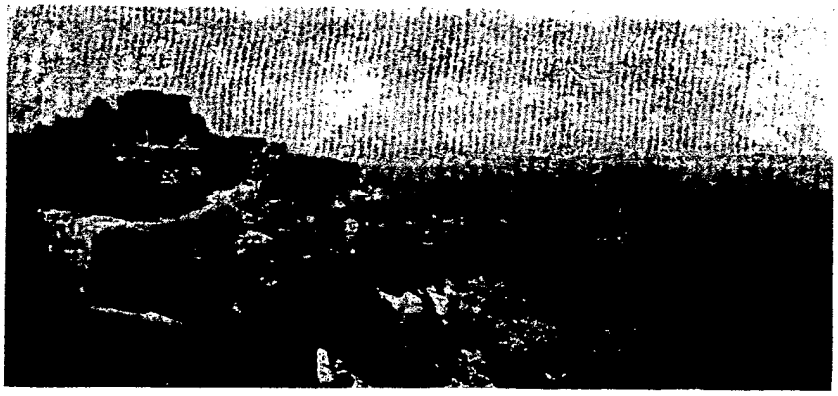

FIG. 2

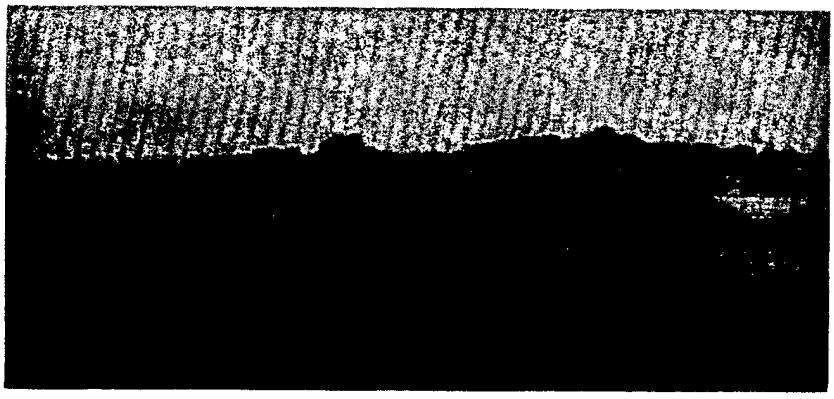

FIG. 3

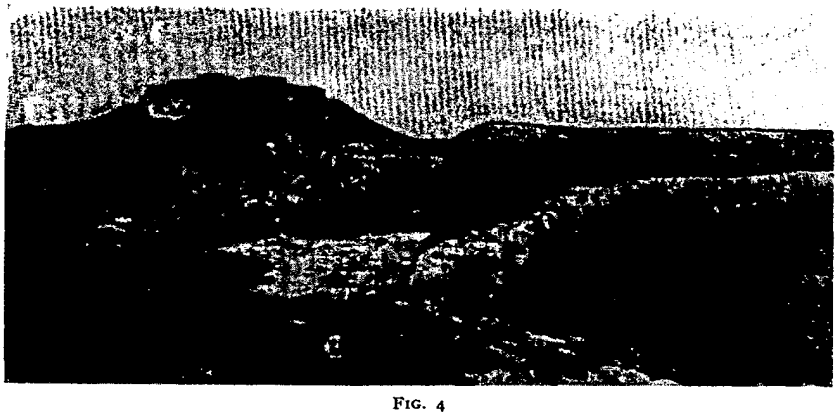

FIG. 4

FIG. 2—Walpi, west side of First Mesa, looking over the Wepo Wash to the Second Mesa in the distance.

FIG. 3—Court at Tewa, First Mesa. Walpi in the distance.

FIG. 4—Shipaulovi, on the Second Mesa. Note the cliff terrace, the sand hills piled against it, and the peach trees growing in the sand.

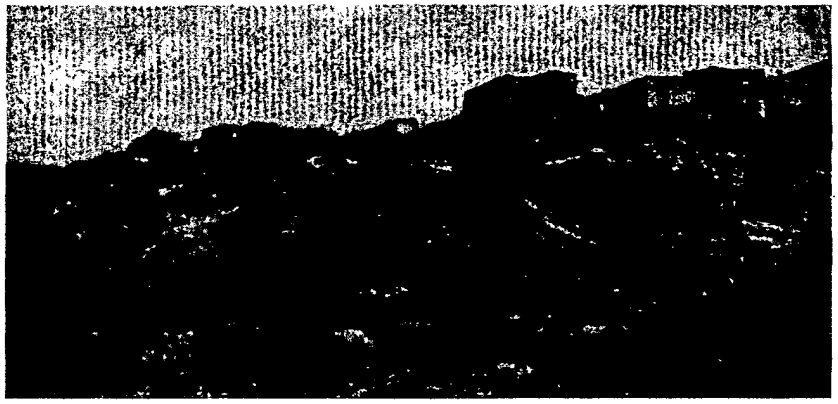

FIG. 5

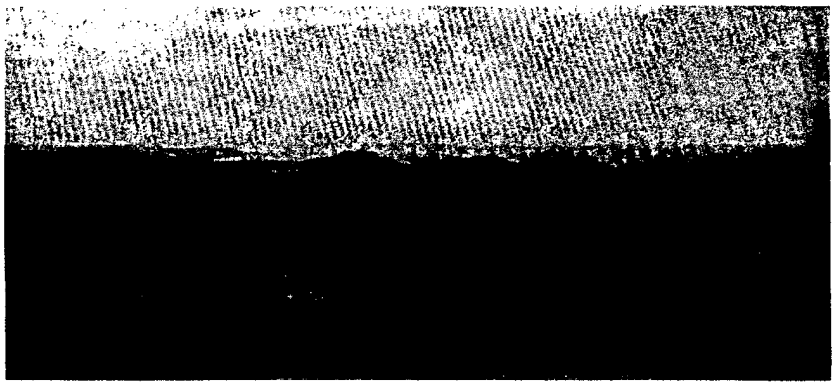

FIG. 6

FIG. 7

FIG. 5—Mishongnovi, from terrace below.

FIG. 6—Looking east from Shongopovi. Entrance to kivas in background. Shipaulovi and Mishongnovi on summits in middle distance, and First Mesa projecting in far distance.

FIG. 7—Court in old Oraibi. The snake dance formerly held here went with the Snake Clan to Hotevilla.

country and produced that characteristic and distinctive phase of culture which we call pueblo art."

The Hopi village, designed for security, was built solidly around a court. More houses were added by building on the roofs of the first; and often a third story or even a fourth story was thus added, the upper stories being terraced back from the court. If the village continued to grow, other courts were added or the houses were built in rows parallel to those on the court. Shipaulovi, the smallest village, is built around a single court. The other villages have one main court, in which are held the various dances or ceremonials; and most of them include one or more other courts smaller or only partly enclosed. Owing to lack of space, the court at Walpi is small and opens on one side to the cliff, making it a precarious place for the crowds who come every other year to view the snake dance. Oraibi and Hotevilla are arranged in irregular rows, and their courts are but partly enclosed.[5] Bacabi, the most modern of the villages, built as late as 1908, was laid out by the superintendent of the agency at the request of the Indians. The houses were built separately; but, as the village grows, the spaces between houses are being filled in, and courts are developing as in the other villages.

The Hopi houses are of stone, the one kind of building material plentifully available. As compared with the later prehistoric ruins of the Navajo country, they are poorly laid and dressed. The ceilings are made in the prehistoric fashion, with poles laid over juniper beams and then covered over with brush and clay. The walls are plastered with adobe and whitewashed with kaolin, which is available in the shale of the mesas. In a corner of the room is a fireplace, provided with a hood and served by a chimney whose exit is often marked by a pot whose bottom has been broken out. Formerly there were no doorways into the lowest story. Entrance to the lower rooms was made through a hole in the roof, which was reached by a rude ladder. The women build the houses. Do not pity them for this; for, having built them, they possess them; and, at that, the husband brings in the materials for the building and also the fuel. He tills the fields and claims their products until he brings them home, when the woman takes possession. Should she decide him unworthy, she may put his saddle and blanket with his few other belongings outside, and he has no recourse other than to go back to his own family.

None of the pueblos has any sewage system or regular place of deposit. Refuse is thrown over the cliff, if indeed it gets that far. The journey up the trails is made unpleasant by the sights and odors encountered as the summits are neared. Altitude, pure dry air, bright

[5] For ground plans of the Hopi villages, see Victor Mindeleff: A Study of Pueblo Architecture in Tusayan and Cibola, *8th Ann. Rept. Bur. of Amer. Ethnology, for 1886–87*, pp. 13–228 (plans, pp. 61–79); or Cosmos Mindeleff, *op. cit.*

sunshine, and sweep of wind act as scavengers to protect the villages somewhat from pestilences, which would undoubtedly depopulate them if they were built in the same way at lower altitudes on the plains. The selective factor may also have favored the villages set on the heights and may have been partly responsible for the tenacity with which the Hopis have clung to them after all apparent advantages have passed. The compactness of the villages with their filth has greatly increased the hazards of disease and rendered it difficult to control. Tuberculosis and trachoma are common, and epidemics of smallpox and measles have sometimes swept through the towns. The worst occurred in 1853–1854;[6] the last serious epidemic of smallpox broke out in the winter of 1898–1899 when many died. An outbreak in the winter of 1917 was effectively checked by virtue of rigid quarantine and wholesale vaccination (800 in one day).

The Mesas

After coming over the highly colorful areas that surround the Black Mesa, the visitor is likely to be disappointed to find that the pueblos are colorless, drab, and gray, subdued as are the rocks of the mesas from whose stones they are built, and blending with the desolate-appearing landscape. The mesas are made of alternate layers of shale and coarse-grained sandstone of the Mesa Verde formation and rest on the argillaceous and arenaceous Mancos shales.[7] These shales, dissected more readily by erosion, form a hilly zone bordering all the mesas. On the leeward, northeast sides of the mesas, sands blown over the summits find lodging and are piled against the mesa walls, reducing the difficulties of the trails; while on the southwest sides only rocky talus is found.

The sandstone layers in the mesas are the cliff formers. Two layers of thicker sandstone are noticeable, especially in the First and Second Mesas. The one layer caps the mesas and forms the flat rock surfaces upon which the villages are built and is about 50 feet in thickness. The second is about 100 feet lower and about 80 feet in thickness. This lower layer forms a pronounced terrace, on the edge of which are the corrals for the animals, especially the sheep. This terrace is widest at Mishongnovi and Shipaulovi, and these villages are situated on separate summits that rise like terraced islands from the main terrace or platform. Between these two thick sandstone layers are thinner layers of sandstone which form ledges, especially at the First Mesa, on which pigsties and corrals for the burros are

[6] Lieutenant Whipple's Pacific Railroad Survey Report is quoted by Thomas Donaldson, *op. cit.*, p. 28.

[7] For detailed description of the Mesa Verde and Mancos formations as found in this area, see H. E. Gregory: Geology of the Navajo Country, *U. S. Geol. Survey Professional Paper 93*, 1917, pp. 73–76.

arranged.[8] The corrals or sties abut against the cliff on one side, and the other side may be left open to the precipice, making a minimum of stone-wall construction necessary. Much of the refuse thrown from above falls into the pigpens. At Hotevilla alcoves of the mesa benches are fenced with boughs, which serve as hanging balconies

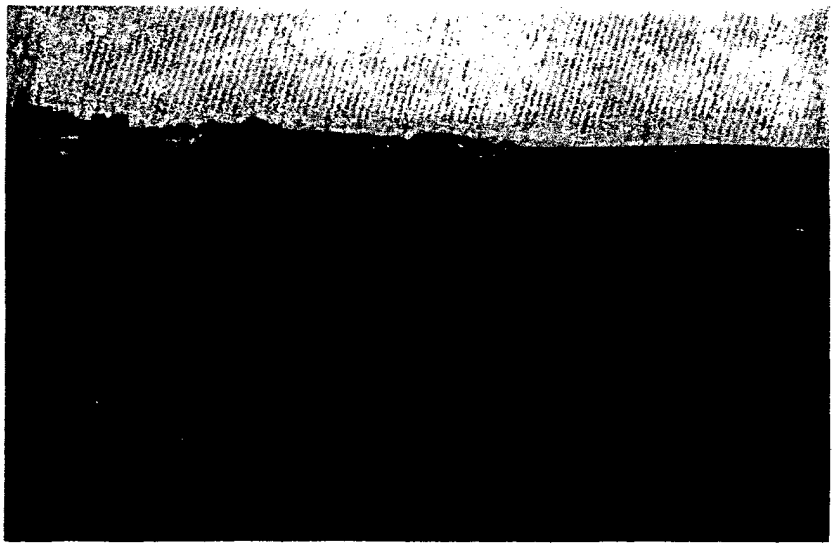

FIG. 8—Animals watering at the spring at Hotevilla. The surplus water goes down to water the terraced gardens below. See Figure 9.

for the burros; and pigs are confined where blocks of sandstone have been split out from the edge of the mesa.

On the First and Second Mesas the trails follow breaks made by joints where stairways have been cut into the rock. The trails are more gradual at Hotevilla and Bacabi; and at Oraibi the sand piled on the leeward, northeast side of the mesa almost to its top has made possible a roadway approach that is easier than to any other village, except as Hotevilla and Bacabi are reached by the continuation of the same road over the top of the mesa or are approached from the west. Even here until recently the roadway up over the cliffs near the summit was perilous. It is possible to ascend to Tewa and Shongopovi by wagon and even automobile; and at Mishongnovi and Shipaulovi a rough roadway extends to the sandstone terrace below the villages.

WATER AND FUEL SUPPLIES

The Hopis obtain their water supply from springs whose source is the contact between the Mancos shale and the sandstones of the

[8] For a splendid photograph of Walpi showing these pigsties and corrals, erroneously referred to as "garden patches," see *Geogr. Rev.*, Vol. 14, 1924, p. 14.

wider-spread Mesa Verde formation. "Water of good quality issues from this horizon at 30 to 40 springs about the edge of the Black Mesa and at other localities where Cretaceous strata are represented."[9] The surfaces of the mesas are the catchment basins for the rain water which does not run off; the coarse porous sandstones are the reservoirs;

FIG. 9—Terraced gardens below the spring at Hotevilla in June, 1928.

and the relatively impervious shales conduct the water to the surface around the bases of the mesas. However, barring improvements by the Indian service, the water supply has been poor indeed.

At the First Mesa the water is obtained from two springs, the most used of which is the "Coyote Spring" at the foot of the Tewa trail. The other is on the opposite side of the mesa. The strongest of all, the Wepo Spring, is four miles to the north but is used only for watering stock or in emergency. Along the road east of the mesa a stagnant pool in the sand, covered with green scum, is now used only for ceremonial purposes. Polacca, the settlement of more progressive Hopis who have left the Mesa, obtains its water from a deep artesian well or from the Coyote Spring. Mishongnovi and Shipaulovi, on the Second Mesa, depend mostly on a spring at the foot of the mesa whose flow has been considerably improved in late years and which has been walled in. The school and post office are located near by, and the place is called Toreva, "crooked," the tradition being that the water comes from a snake which had a hard time getting through the sandstone and made a crooked course in it. On the other side of the villages is a less-used and poorer spring. Shongopovi has two springs:

[9] H. E. Gregory: The Navajo Country, *U. S. Geol. Survey Water-Supply Paper 380*, 1916, p. 138.

one on the southwest side, which is the chief supply for the village; and the other on the east side at the base of the cliffs, where the school is located. The Indians call this place Masepa. At Oraibi on the Third Mesa there is a good well on the east side at the foot of the mesa, where a secondary village has grown up similar to Polacca at the First Mesa. The spring upon which the pueblo formerly depended is on the other side. Hotevilla and Bacabi have the most convenient springs, located just under the capping layer of sandstone, and the villages were located with reference to them. Their flow is slow but sufficient for all domestic needs and for the animals; and in addition there is sufficient overflow to irrigate beautifully terraced gardens, constructed with great labor below the springs.

The landscapes about the Hopi mesas are comparatively desolate, in large measure because of the concentration of population within an area of meager resources easily stripped. The valleys were grazed out long ago by flocks that were held too close to the pueblos; and, as the land became barren, the sands were stirred and drifted with the wind. No wood is now available within miles of any of the villages except the two recently built ones, Hotevilla and Bacabi, though all the mesas were formerly at least sparsely timbered. The Awatobi Mesa, similar in elevation and structure to the others but long unoccupied, has a profuse cover of sage, grass, and scattered juniper. Now fuel must be carefully conserved. Fortunately coal is available; the Indians of the First and Second Mesas have their own mines, and a government mine at Keams Canyon supplies the agency and Indian school located there.[10] At the First Mesa especially, dried sheep manure is systematically piled along the edge of the mesa for the purpose of firing pottery, as it retains the heat much better than wood or coal.

Fields and Crops

The fields of the Hopis are located on the drifting sands in the valley bottoms near the washes, or wherever there is sufficient moisture from some gulch or spring, and are at considerable distances from the pueblos. Before the government came in, it is said that some of the Indians used to go as far as 45 miles to the fields every day. No wonder they are notable runners. Latterly the most distant fields are not more than 15 miles from the villages. Some one goes out to the fields every day, or some go and stay for a number of weeks but return to the villages for dances and for the winter. Temporary shelters are built for those who tend the crop. Sheep herders also go out with their flocks, remaining for some time in one locality and returning each night to a corral and hogan.

[10] For description of coal in the formations of the Black Mesa, see Gregory, Geology of the Navajo Country, pp. 142–144.

The amount of land farmed by a Hopi family varies from two to ten acres and may be scattered in small patches. But a Hopi farm is not a fixed quantity, as cultivation follows the sand drift where the moisture is conserved and the wind helps to keep a surface mulch. But the sand is likely to be blown out of the bare fields into adjacent areas, and so the fields move. Attempts to assign allotments of land to the Hopis have failed dismally owing to the shifting moisture conditions. Land division among the Hopis goes by clans. Cases of land trouble are settled by clan markings.

The principal field crops with both Hopis and Navajos, as with other Indians of the Southwest, are corn, beans, melons, squash, pumpkins, and wheat. With the exception of wheat, these products have been grown by them from prehistoric time. But, while among the Indians of southern Arizona wheat has supplanted corn as the leading cereal, in the north corn remains the dominant crop and staple of diet. The Hopi Indian Agency gives 750,000 bushels as an average crop. Through many centuries of effort the Hopis have developed a drought-resisting variety

FIG. 10

FIG. 11

FIG. 12

FIG. 10—Chief of the Walpi Snake Clan planting corn with planting stick. (Photograph by Emory Kopta.)

FIG. 11—Reed windbreaks protect the corn from wind and sand in its first stages. (Photograph by Emory Kopta).

FIG. 12—Corn stored in Hopi home. (Photograph by Emory Kopta.)

of corn only a few feet high. As compared with an eastern cornfield, the Hopi field at its best is an unpromising sight but usually yields fairly well. The Hopi woman is reputed to know at least twenty ways of preparing corn. Most of it is plucked when still young and cooked in the shucks and allowed to dry. When ready to be used it is heated over, and, although darker in color, in appearance and taste it has lost little. Much of the corn is also allowed to harden on the stalks and is ground into meal.

At one time wild cotton was of considerable importance and was also cultivated. Before the coming of the Spaniards the Hopis wore cotton garments made from cotton they themselves gathered and dyed with unfading mineral and vegetable dyes. The Hopi cotton is a very distinctive species, remarkable for its rapidity of growth and early maturing. In experiments of the United States Department of Agriculture, bolls have been ripened in 84 days from the sowing of the seed.[11]

Only within the last several years have potatoes been grown to any extent, though the soil is suitable, and wild tubers grow in some of the hollows. The gray speckled pinto is the bean most grown. Pinto beans are eaten green until it is time to pull the stalks, when all beans left on them are shelled: none are wasted. With the coming of frost all the green melons are also gathered and kept till as late as January or February.

The Hopi and Navajo get their crops in the face of odds with which the white man would not try to contend. The first attempts of the United States government in farming in Tusayan were complete failures and were laughed at by the Indians. The Hopi farmer has to contend not only with drought but with wind, floods, and the inroads of worms, birds, and mice. The total annual rainfall averages but little over ten inches and is not ideally distributed. The spring months have least rainfall; and May and June, the months when most crops should get their early growth, receive hardly more than one-twentieth of that for the year. Nearly one-third of the rainfall comes in July and August. Most of that is due to thundershowers, which are often so violent that they may well be called cloud-bursts, and much of the water runs off quickly. The dry spring months are also the windy months, but the winds cease with the coming of the summer rains. At this altitude of over a mile the spring months are still cool or cold, and nothing sprouts until early in May. At Keams Canyon the average date of the last killing frost in spring is May 18, and frosts have been recorded as late as June 3 and 4; but the short summers are quite warm or hot. Struggling against such odds through long periods of time, the Hopis have ingeniously adjusted

[11] Frederick L. Lewton: The Cotton of the Hopi Indians: A New Species of Gossypium, *Smithsonian Misc. Colls.*, Vol. 60, No. 6, Washington, 1912.

their agricultural practice to the point where fair crops may be expected.

To conserve moisture, the hills of corn are set about six feet apart. A piece of iron pipe is used to jab a hole about a foot deep, the object being to loosen the hard layer below the surface. Before iron pipes were available the Indians used a corn planting stick about two-and-a-half feet long and an inch in diameter with a broad wedgelike edge. The holes are filled with loose soil to about five inches from the top at which depth the corn is planted in order to protect the young shoots from the wind and make more moisture available. Much seed is used to allow for losses caused by cutworms, birds, field mice, and wind-driven sand; and replanting continues to July. The thickly set plants which survive afford each other protection and support. Rows of reeds are often set as windbreaks to ward off the drifting sands (Fig. 11), and single stones may be used to protect the melon or bean hills.

Some early sweet corn is planted in April or May in very sheltered sunny slopes where moisture is retained in the sand from late winter or early spring rains. This corn comes to maturity in time for the big ceremonial Kachina Dance about July 25. The later corn, called "pig corn," furnishes the main supply. It is planted in June but does not start growing before the first rains, about the first of July.

All fields, before they are planted, are tested for moisture. The Indians are skilled in the selection of patches benefited by underground drainage, and surface drainage is also taken into account. Fields are selected for cultivation which are liable to be inundated during the rains of July and August. Parts of the fields are stripped by the flood waters, and others are buried in silt; but what remains constitutes the irrigated fields from which a crop is harvested. In some instances earthen dams are constructed to direct the floods and prevent excessive erosion.

In late years the cutting of deep arroyos into the older alluvial fill of the valleys has aggravated the Hopi farm problem. The greatest trenching has taken place within the last 10 or 15 years. Before 1880 there was no serious arroyo wash in Keams Canyon, but later the government experimental farm there was largely washed away and had to be abandoned. The school was moved two miles down the canyon to its present site. The wash is now about 25 feet deep and goes through the middle of the old fields and cemetery. The old Oraibi Wash of 30 years ago was no more than five or six feet deep and can still be traced where it was abandoned for the great gash about 35 feet deep and several hundred feet across. Locally it has cut to bed rock, and here there is a constant flow of surface water. It is representative of what has taken place in all the valleys. The accelerated erosion may be due in part at least to overgrazing, as

the country has been overstocked in the last 20 years, but increased erosion has been quite general in Arizona and the Southwest during the same period.[12] With the deepening of the trenches the underground water is drained off or lowered. Where the flood waters formerly spread out over a width of a mile or more, the arroyo may

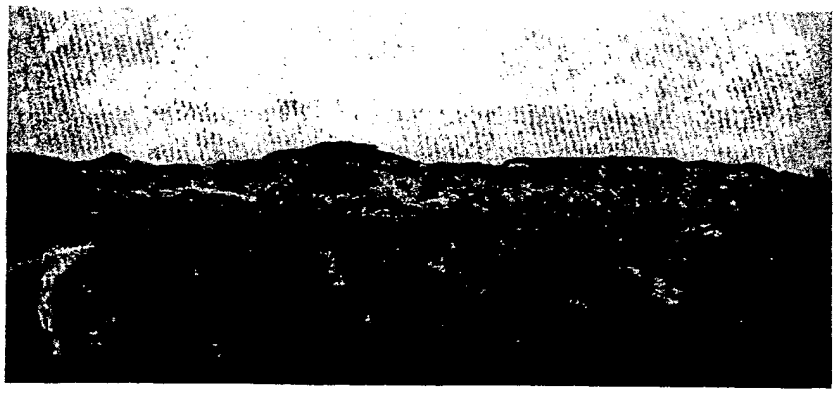

FIG. 13—Approach to Second Mesa. Shipaulovi on summit near center; Mishongnovi to the right.

now carry nearly all the water. The areas with sufficient moisture available for cultivation have therefore shrunk considerably, and their further shrinkage remains a serious problem.

According to data supplied by the superintendent of the Hopi Indian Reservation, about 600 acres of land are now irrigated by wells of which there are now from three to six in each wash. About 100,000 acres are estimated to be tillable on the reservation. Irrigation by well water may perhaps make up for the water losses due to channel trenching.

Groups of fruit trees, mostly peaches, are scattered about in the belts of sandy hills which border the mesas. The total area in fruit trees amounts to about 500 acres. Melon and bean patches are also scattered here and there in favorable situations. Experience has evidently taught the Hopis that on the slopes of the foothills the peach crop may be more surely depended upon. The temperatures have been responsible for the foothill locations, but the moisture or lesser evaporation is responsible for the location of the orchards on the northeastern slopes, the prevailing wind direction being southwest. For the same reason the east sides of the mesas with more sand have most of the fruit trees.

The Hopis have learned through hard experience that, in spite of all precautions against the vicissitudes of the elements, the season's

[12] See J. W. Hoover: The Indian Country of Southern Arizona, *Geogr. Rev.*, Vol. 19, 1929, pp. 38–60, especially pp. 41–45; and Kirk Bryan: Historic Evidence on Changes in the Channel of Rio Puerco, a Tributary of the Rio Grande in New Mexico, *Journ. of Geol.*, Vol. 36, 1928, pp. 265–282; *idem*: Flood-Water Farming, *Geogr. Rev.*, Vol. 19, 1929, pp. 444–456.

crop may not be absolutely depended upon, and they always keep enough corn in storage to tide over from one to two years of complete crop failure. Formerly they would on occasion trade children to Mexico for corn to tide off starvation. In 1780 the Spanish governor reported that as the result of a three-years' drought there were 6696

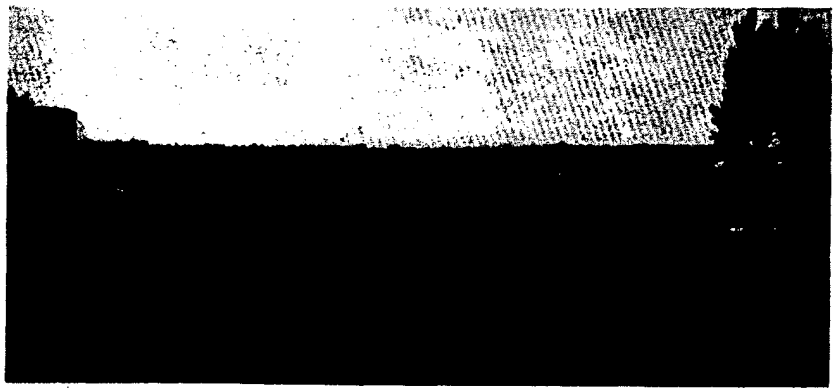

FIG. 14—Dinnebito Wash, the western boundary of Tusayan.

deaths and that the Hopi population was reduced to less than a thousand.[13] However, it is a question whether there was so large a population at this time.

Among the Hopis, as contrasted with the Navajos, pastoral pursuits are secondary to agriculture; but the Hopis have increased their herds considerably in the last 30 years. Improved Hereford stock has been introduced by the government, and the Hopis have made more progress with cattle than have the Navajos. The government has also introduced some fine stallions and is trying to get rid of the burros. The Hopis are now estimated to own about 4500 cattle, 14,200 sheep, 7500 goats, and 3600 horses, burros, and mules. These supply them with meat, wool, skins, and transportation. Hogs, chickens, and slinking dogs are their other domestic animals. Small desert animals, such as rabbits and prairie dogs, are also eaten; and formerly antelope, elk, and deer were captured by being driven into pitfalls or corrals.[14]

As with other Indians of the Southwest, conservation of water is the chief motivation of the religious beliefs and practices of the Hopis and is also the basis for the organization of clans and ceremonials designed to secure the aid of the unseen powers believed to control rainfall. The most notable of these ceremonials is the snake dance held in August, on odd years at Walpi and Mishongnovi, and on even years at Hotevilla, Shongopovi, and Shipaulovi. The ceremonials

[13] Donaldson, *op. cit.*, p. 15.

[14] Handbook of American Indians, *Bur. of Amer. Ethnology Bull. 30*, Vol. 1, p. 566.

held at Hotevilla and Walpi are best known and most visited.[15] The clans with their ceremonials are responsible for isolation and inbreeding and for much of the tenacity with which the Hopis cling to their sightly but unsanitary and inconvenient pueblos.

Hopi Arts

Among the Hopis the art of weaving, so important among the Navajos, is secondary to basketry and pottery. The Hopis were weavers long before the Navajos; but, as the Navajos acquired flocks and learned the arts of spinning and weaving from the Pueblo Indians, the Pueblos, including the Hopis, turned their attention more to pottery and basketry as they came to depend chiefly upon tilling the soil as a means of subsistence. But some of the best weaves are still done by the Hopi and are superior in texture to any of the Navajo work.[16] Among the Navajos the weaving is done by the women, but among the Hopis it is done chiefly by the men.

The Second and Third Mesas specialize in basketry, and each has its own type of weave and decoration. The First Mesa is favored by a convenient supply of fine clay and has accordingly specialized in pottery. The best clays are found in the shale beds that underlie the capping sandstone layer about 60 feet below the top of the mesa. Most of the clay is dug out along the roadway leading to the top of the mesa at Tewa or in the gap in the mesa north of the village. The deposits are here from 12 to 15 inches thick, while thinner beds occur in the shales farther down. The same clays are found around the Coyote Spring at the foot of the Tewa trail where they have slid from the cliffs above. The Tewa women thus have an advantage in the convenience of the best clays and have become the most skillful potters.

Both yellow and gray clay are used; but, as the gray has greater consistency, about 80 per cent of it is mixed with 20 per cent of the yellow. The yellow clay is also used in decorating the pots. Though yellow when applied, it becomes a rich red when fired. A little of the yellow clay burned on the gray surface gives it a buff finish—an attractive feature of the Hopi pottery.[17] The best of the modern pottery is inferior to that taken from the older pueblo ruins, as at Awatobi and the still older ruin of Sikyatki[18] near Polacca, as they have not yet learned to give it the durability which has preserved the older pottery and its coloring through the exposure of many

[15] For description of the snake dance see J. W. Fewkes: Notes on Tusayan, Snake, and Flute Ceremonies, *19th Ann. Rept. of Bur. of Amer. Ethnology, for 1897–98*, pp. 963–1011.

[16] U. S. Hollister: The Navajo and His Blanket, Denver, 1903, p. 87.

[17] Emory Kopta, Phoenix artist, who has lived among the Hopis many months at different times, has kindly offered information and has assisted in checking the manuscript. Mr. Kopta has the confidence of the Hopis as perhaps no other has.

[18] See Victor Mindeleff, *op. cit.*, p. 24.

centuries. Representatives of the Smithsonian Institution found pottery making among the Hopis well-nigh a lost art, their only wares being of the cruder types. Samples of the older pottery were taken from the ruins, the designs were copied, and a Tewa woman, Nampeo, was taught to draw and apply them.[19] She became noted as the most skilled of the Indian pottery makers, and her work is still in great demand. She is now quite old, but her art has been passed on to other women, some of whose work rivals her own.

Navajos and Hopis both have their silversmiths who hammer out beautiful designs in jewelry, especially bracelets and rings, from silver pesos obtained from Mexico. The Hopi silversmiths are fewer, and their workmanship is cruder than that of the Navajos who help to supply the Hopis with these articles.

Movements of the Population, Past and Present

Under the influence of a higher and stronger civilization, bringing with it security, the process of concentration in the pueblos is now being reversed. Lately the villages have begun to flatten or actually to disintegrate in favor of smaller groupings or of scattered homes below the mesas.

By virtue of its location, the agency at Keams Canyon has exerted most influence upon the First Mesa, and on the whole the people of the First Mesa have been most progressive. Hotevilla, the village farthest from the agency, is today the most conservative. Until 1906 Oraibi was the only village on the Third Mesa and was the largest of all. In the census of 1890 Oraibi was reported to have a population of 830, or nearly half the total Hopi population at that time. Today a large proportion of the Oraibi people live outside their pueblo, and it is rapidly becoming another ruin. For a long time Oraibi was also the stronghold of conservatism; but the spirit of progress was stirring, and a crisis was brought about by a series of lean years. From 1880 to 1904 there was a period of great drought ended by heavy rains which swept away farms and cut the Oraibi Wash, lowering the water table.[20] It became urgent for some of the inhabitants to seek their fortunes elsewhere. Dissatisfaction developed dissension and final cleavage. In 1906 the progressive element, who wished to coöperate with the United States government particularly with reference to the education of their children, drove out the conservatives with their chief, Youkeoma (died March, 1929). The evicted element found a new site and built the pueblo of Hotevilla. Several years

[19] See A. V. Kidder's introduction to "Pueblo Pottery Making," by Carl E. Guthe, New Haven, 1925.

[20] Noted by Dr. A. E. Douglass in his account of the latest discoveries in the tree ring studies of the Southwest ("The Secret of the Southwest Solved by Talkative Tree Rings," *Natl. Geogr. Mag.*, Vol. 56, 1929, pp. 737–770). Valuable records have been obtained from pine logs in the Hopi villages (compare *idem*: Climatic Cycles and Tree-Growth, *Carnegie Instn. Publ. No. 289*, 1928, Vol. 2).

later another schism at Hotevilla resulted in driving off a less conservative group, who were also rejected by the Oraibians and were in distress until assisted by the Indian service in locating a new village at the present site of Bacabi. The sites of these new villages are less picturesque; but, as has been described, they are favored by supplies of water and fuel in the immediate neighborhood. However, they are much bothered with drifting sands. In the dry windy season of spring and early summer of 1928 a number of houses at Hotevilla were buried or filled with sand and had to be abandoned.

By 1890 one Indian, Tom Polacca, had shown courage enough to come down from First Mesa and live at its foot. In 1891 the government began the building and equipment of houses for the Indians, 100 houses being at their disposal by 1900; but ten years later not more than half of them were used even temporarily. Doors, windows, and floors were removed and carried up to the mesa. The houses that now remain are rented to tourists at a handsome profit to the Indians. Such was the beginning of the group of scattered houses on the east side of the First Mesa which goes by the name of Polacca. At present about seven per cent of the Indians live off the mesa. Others have built houses or occupied government-built houses on their farm lands.

Oraibi is also largely parent to a third village, Moenkopi, located about forty miles west in the Tuba Oasis. Under the shadow of the Indian agency at Tuba, the Hopi population of the oasis has increased from a single family in 1880 to 365 persons in 1928. Most of these came originally from Oraibi, at first living at Moenkopi only during the growing season and returning to Oraibi for the winter months. Many who farm on the Tuba Oasis still return to Oraibi during the winter.

The Tuba Oasis is the most favored spot in the Navajo country judged from the standpoint of fertility and water supply, although it lies on the margin of the most desert area. Moenkopi itself shares with the other Hopi villages its location on a bare rock surface on top of a rocky bluff. It is situated where the Reservoir Canyon from the north joins the Moenkopi Wash, draining westward and bounded by picturesquely carved cliffs of bright red sandstone and shale. The flow from the Moenkopi, combined with that from Reservoir Canyon and the springs in the canyon wall, is capable of irrigating about 1000 acres on the floor of the Moenkopi Wash,[21] about 600 of which are actually under cultivation.

Tuba, the seat of the Western Navajo Reservation agency, is located about two miles from Moenkopi, farther up on the mesa, where there are three springs with an average flow of nearly 80 gallons

[21] H. E. Gregory: The Oasis of Tuba, Arizona, *Annals Assn. of Amer. Geogrs.*, Vol. 5, 1915, pp. 107–119.

a minute. Tuba and the Tuba Oasis were purchased by the government in 1903 from Mormon pioneers who had settled there in 1876.

Other movements or changes have taken place locally with the Hopi population within historic time as recorded by the accounts of the Indians and by abandoned pueblo ruins. A map by John Sextes of the Royal Society of London, published in 1710, shows ten Hopi

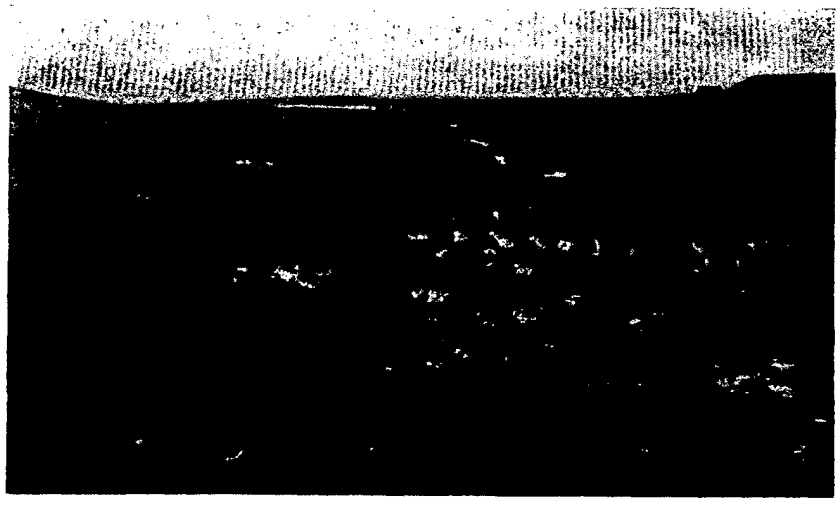

FIG. 15—The beautiful little oasis of Tallihogan, south of Keams Canyon.

villages, only two of which, Oraibi (Orawi) and Walpi (Gualpi) are inhabited today. Oraibi is the most ancient-looking of the pueblos and is probably the only one occupying the same site as when first visited by white men in 1540. Walpi, Mishongnovi, and Shongopovi were first situated on the foothills or on the lower terraces. Prehistoric Walpi was situated down in the foothills to the northwest of the present town; but, according to Indian accounts, it was moved onto the lower ledge of the mesa on the east side to secure more sun and warmth. Here the Spaniards found the village; but after the revolt of 1680, fearing reprisal, the Indians moved on top of the mesa, taking the timbers from the Spanish church with them. The walls of old Mishongnovi are barely traceable on the terrace below the present pueblo. An especially large ruin, estimated to have accommodated 2000 people, is located below Shongopovi near the spring on the east side. According to the Indian story, all but seven families were killed by the Spaniards in revenge for the killing of their missionary. Those who escaped went up on top of the mesa and started the present village.

Shipaulovi, on the Second Mesa, was founded after the Spanish invasion; and Tewa, the third village of the First Mesa, was founded

about 1700 as a home for some hired fighting men. Harassed by Navajos, Utes, and Apaches, they sought aid of the Tewa Pueblo Indians on the Rio Grande, who took possession of the new village and gave it the name of Tewa.[22] The village was provided as an inducement, and they were also granted the valley west of the mesa. Although in close contact with the Hopis for over 200 years, they have not been absorbed and have retained their Tewa dialect. Formerly the warriors, they are now the policemen for the Hopi country and as such are the most dependable and courageous.[23]

The pueblo first approached by the Spaniards was Awatobi, on the extremity of the mesa south of Keams Canyon. According to Hopi accounts the town was destroyed by the people of Mishongnovi and Walpi. They explain this attack by saying that "the town was full of 'singing men' whom the Moquis did not like," probably Spanish missionaries chanting the offices of the Catholic Church.[24] Other larger and older ruins are located on the southeastern side of the same mesa at the Jadito Spring and overlooking the Jadito Wash. The size of the ruins indicates that they must have accommodated upwards of 1500 people. In all there are seven or eight ruins on the larger East Mesa located wherever there is a seep or spring.

The springs at Awatobi and Jadito, like those at Hotevilla and Jacobi, were just below the villages, emerging from underneath the capping layer of sandstone. Though at present hardly more than seeps, they were once perhaps strong-flowing springs. The Hopis say that all these springs were stopped up by them. A short distance north of the Awatobi ruin in a wide canyon under the capping layer of sandstone is the "House-rock" Spring, very good today in flow and quality of water.

In late years a few more progressive Hopis and Navajos have challenged the taboos that have developed about the East Mesa and its springs and have built homes below the House-rock Spring and turned its waters into their fields and orchards, establishing a small but beautiful oasis which they call Tallihogan. With some improvement of the spring the water supply here would be better than that of the other mesas. Add to this the convenience of the water supply, the plentiful fuel on top of the mesa, the abundant fertile soil immediately below, and the cliff with bare rock surface (required by all conservative Hopis) immediately above the spring, and the situation at Tallihogan is certainly ideal for a large Hopi settlement. Taboos as yet are strong; but, as time goes on, economic well-being will gradually obtain the mastery over tradition in guiding the destinies of the Hopi.

[22] Scott, *loc. cit.*, p. 62.

[23] Leo Crane: Indians of the Enchanted Desert, Boston, 1925, p. 137.

[24] J. G. Bourke: The Snake-Dance of the Moquis of Arizona, New York, 1884, p. 90. Compare Walter Hough: The Hopi Indians, Cedar Rapids, Iowa, 1915, pp. 209–210.