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MODERN TRANSFORMATIONS OF MOENKOPI PUEBLO

Shuichi Nagata

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To my parents and my wife

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Process of Economic Change

INTRODUCTION

In the following analysis of the economic history of Moenkopi, we shall pay particular attention to the dichotomy of Hopi subsistence and American money economies. Each of the two economies reveals changes through time in its own institutional set-ups, volume of activities, and interactions with the other. Our problem in this chapter is to present these changes and analyze the process and structure of articulation and integration of the two economies in Moenkopi, which were brought into contact through the reservation system.

Subsistence economy shall be roughly defined as the economy in which production and consumption are geared to survival of certain sub-groups within a community; each group produces for its own consumption. In particular, it is characterized by the absence of outside markets to which the "surplus" products may be directed (Wolf, 1966:3–4). In this economy no universal medium of exchange exists, but exchanges, including barter, of different goods often occur on relatively discrete levels (Firth, 1939:340ff.). The means of production are controlled by the community and unalienable to outside groups. The Hopi economy is of this type, that is, "primitive" and not "peasant" (Firth, 1939:353ff.; Wolf, 1966).

On the other hand, the American economy is a highly developed capitalistic economy which is, in essence, characterized by a universal medium of exchange, capital accounting, free labor, market competition, profit incentives, and, lately, "government."

The dichotomy of Moenkopi economy has thus been on an entirely different plane from what presumably led to the creation of a "peasantry" in the world. In a majority of the "peasant" societies, the dichotomy had already been in existence between a local community and a feudal kingdom, to which the former contributed its produce as taxes or levies. The subsequent dichotomy was established, as Wolf has described (1955, 1957), between such "peasant" communities and colonial powers, the economic structure of the latter being appreciably "backward" in comparison to the modern developed capitalism and hence leading to various forms of exploitation in labor or production (see Wolf, 1959). None of these processes occurred in Moenkopi. To recapitulate, the dichotomy in our problem is unique in regard not only to the condition of contact (reservation system) but the entities in contact (primitive and developed capitalistic economies) as well.

RESERVATION LAND RESOURCES

Traditional Land Use Pattern of the Hopi

Ideally considered, the subsistence economy of a Hopi village community is based on the following four categories of land: 1) village site, in which each house is allotted a lot; 2) common vegetable garden, "just outside of the pueblo"; 3) clan and society lands for farming; 4) "outland," outside the clan lands, originally for hunting but later for grazing (Colton, 1934:22). The last category of land included shrines and quarries of rocks, firewood, timber, coal, and other resources.

In theory all the above categories of land are controlled by the village chief. Though not clearly stated in the available literature, even the clan lands of Third Mesa were thought to have been originally allocated by the chief of the Bear clan, which first settled in Oraibi (Titiev, 1944:61). Each category of land is held by a corresponding rule of tenure. Thus, an individual woman holds use rights over a house site and vegetable patch in the communal garden, and a clan or society over farm land. In this regard it is misleading to speak of clan "ownership" of farm land because land "ownership" in the sense of transferable title never existed in the Hopi theory of land tenure.

All the land in the Moenkopi area was "outland," and the development of farm land tenure by colonists to Moenkopi since 1903 was highly conditioned by the native patterns of use of this type of land. I shall discuss the implications of this in the following

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sections. It is sufficient to mention here that even during the period of farm expansion in Moenkopi, the land around the village was frequently visited by the people of Third Mesa for hunting and gathering purposes. It was regarded as the territory of Oraibi, of which Moenkopi was a colony.

Even after the separation of Moenkopi from Oraibi by a reservation boundary, the Hopi from Third Mesa continued to visit *Shalako* spring and *Patu:pa* pool in Reservoir Canyon for the water used in the Shalako ceremonies and for reed and cattails for the Soyal ceremony in Oraibi. Third Mesa Hopi also went to Moenave for cottonwood fruit, *Pikyaingkolu* (Wildcat Peak) for firewood and timber (TCL), *Pikino* in Reservoir Canyon for rocks, and *Oako* on Coal Mine Mesa for coal.

It was in this general milieu of the Oraibi "outland" that farms were opened by the colonists of Moenkopi. However, the agriculture in Moenkopi did not develop simply as another Hopi economic activity in unrestrained village "outland." The reservation system, which alienated the village from its parental community in the administrative superstructure, emerged as a constant factor to reckon with. In addition, this system was originally designed for the Navajo in the area, who were later integrated into their own tribal government. In the BIA theory the land on which Moenkopi developed its subsistence economy was no longer in Oraibi's territorial domain. It was the government on which Moenkopi had to depend for the ultimate sanction of the productive resources in the traditional economy.

Reservation Control of Land Resources

Perhaps the most critical element in the Indian reservation system is the status accorded to the reservation land. As Oliver La Farge so succinctly stated: "Indian special status consists mainly in the ownership of land—reservations and grants—and income therefrom held in trust for them and tax exempt" (1957:42). The land policies adopted so far naturally varied from one reservation to another and even their general tenets, as maintained by the federal government, did not remain constant. In the present section, I discuss only those features of the policies that have been relevant to Moenkopi.

Apart from the establishment of the reservation in this area, the first policy of great importance to Moenkopi is the General Allotment Act (Dawes Act) of 1887, through which land allotments of 400 acres were made on the alluvial floor of Moenkopi Wash (TCL). The spirit of this act was derived from the then current

policy of assimilation of the American Indian. The general mechanism of the act, on the other hand, was to divide up the reservation land into individual allotments, whose patents were held in trust by the Indian Service for 25 years, and the "surplus" from the allotment was to be opened for homesteading (Haas, 1957:13).

In Moenkopi, however, the allotment lands were surrounded by the reservation that was established almost simultaneously with the allotment. The existence of the reservation and allotment lands contributed to the repeated confusion of the earlier superintendents on both the Western Navajo and Hopi reservations (FDL; KCL). In any event, all categories of land were thus denied to public entry and remain so at the present time.

A serious modification, indeed, a reversal of this policy was brought about with John Collier's Indian New Deal and its cornerstone legislation, the Indian Reorganization Act of 1934, which formally repealed the Dawes Act (Haas, 1957:19–20). This act intended to restore the land basis of the Indian communities in the country and to promote Indian self-determination on the basis of restored land resources.

On the local level of Moenkopi and Tuba City, the new act later led to the transfer of managerial functions of land resources to the Navajo tribe from their BIA, which retained an ultimate veto power. Generally, this resulted in a more stringent control of the resources with the help of the tribal court and police. Thus the quarries the Hopi used to visit as a part of the Oraibi "outland" were closed. The Hopi were denied access to the rock quarry in Reservoir Canyon during the 1950's. Firewood and coal collection have been conducted since then only by evading the watchful eyes of the Navajo. Some Navajo took advantage of this situation and have been selling firewood and coal to the Hopi of Moenkopi. Hunting and fishing activities came under the tribal game regulations and permit system as well. Cutting piñon pines around Shonto for Christmas trees has to be carried out only in the absence of Navajo policemen in the vicinity.

More serious in its effects on the Moenkopi economy was the establishment of the Land Board and grazing committee as local land controlling organizations of the Navajo Tribal Council. Since they are the organs of the Navajo tribe, the Hopi community of Moenkopi is excluded from formal participation. I shall discuss the grazing committee and its relevance to Moenkopi later. The implications of the Land Board to Moenkopi are just as serious. While the allotment lands remained exempt from the supervision of the

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board and continued to be held in direct trusteeship of the BIA, all the remainder of farm land in the area came under the authority and power of the board, which includes assignment of land, settlement of disputes over land and water distribution, and supervision of transfers of assigned land.

In the framework of Moenkopi agriculture, therefore, two kinds of land rights exist at the present time. First, the farm land in the allotment area is held by the allottees or their heirs irrespective of actual cultivation, and the transfer of farming right itself is arranged without intervention of either the Navajo tribe or the government. Mismanagement of the allotment lands is not sanctioned by either of the two groups. Apart from the governmental sanctions on sale, it is the category of land on the reservation for which the right comes closest to "ownership."

Assignment land, on the other hand, is subject to several additional restrictions imposed by the Land Board. The assignment "may be cancelled" in the case of two years' nonuse, failure to pay water use assessments (this clause is inapplicable to the Moenkopi area), or more generally, if "beneficiary use is not being made of" the land (Navajo Tribal Council, 1954). The land whose assignment is revoked or relinquished returns to the Land Board for future assignment. Thus the right derived from assignment is, in essence, usufruct. The tribal court probates inheritance of assignment at the death of an assignee. In this action the court is advised to keep the assignment as an intact "economic unit."

Both allotment and assignment lands are under the ultimate trusteeship of the U.S. government, whose representative on the Indian reservations, BIA, deals with, in the case of the Navajo, "the sale, exchange, partition, patenting and leasing" of land (Young, 1961:263) through the Branch of Realty and with probation of inheritance of allotments by an examiner of inheritance (Young, 1961:264).

AGRICULTURE

Expansion and Contraction of Farm Acreage

The basis of Moenkopi agriculture was founded on a complex of 11 allotments. Soon, however, the reduction in arable land acreage in Third Mesa and general political unrest induced migration of the Third Mesa Hopi to fill the land vacancy left by the Mormon withdrawal (TCL). In 1907 the land under Hopi cultivation reached 385 acres for the population of 150, giving 2.5 acres per person

(TCL). Less than 10 years after the establishment of the reservation, the village population had doubled in size (Gregory, 1915: 119). The appropriation of land for farming by these immigrants first occurred along Moenkopi Wash, formerly in cultivation by the Mormons. In the early part of the 1910's, Moenave, another spot of Mormon irrigation farming, and an area around *Pa:latuika* (dry farming) came under Hopi use (see Map 4). Competition with the Navajo over the farm land resources was not serious in this early period. In fact, the transfer of the Moenave farms to the Hopi was made by the Navajo settlers, who were not interested in small, intensive irrigation farming then. Later, one of the Navajo allotments, 40 acres in size, was sold to a Hopi for an alleged sum of $500 and "groceries to be delivered in [his] convenience."

The period between the 1920's and 1930's is characterized by further expansion of farm acreage in Moenkopi. It proceeded on the basis of individual reclamation. Two conditions for this process can be noted.

First, the appropriation proceeded to the area where irrigation was possible. The alloted tracts of about 70 acres, adjacent to allotments *A 47*, *A 48*, and *A 49* (see Map 4), came under cultivation almost simultaneously with the original allotment lands (between 1904 and 1907). These farms depended on the same irrigation system as the allotment fields.[1] The fields in the *Ma'asau* area (approximately 120 acres; 200 acres according to HvJ, Def. Ex. 196) were turned to Hopi use about 1920. They have been irrigated from the Wash.

The second type of reclaimed area depended on "flood-water farming" (Hack, 1942:26).[2] Another large Akchin field was constructed to the west of the *Ma'asau* area. The second group of this type of field used the flood plains of Reservoir Canyon and another unnamed wash by an old bridge across Moenkopi Wash farther south.

The last type of field includes a small number of dry farms around *Pa:latuika*, which must have been in cultivation prior to 1912 (Gregory, 1916:144; see Map 4). The farms built around the cattle corrals in Red Lake and Coal Mine Mesa and those by

[1] Before merging with the allotment irrigation, these tracts may have been watered by an arroyo that drains to *Tuviktsyala* (see Map 4).

[2] Of these, the farms at *Wikopsi* represent a typical Akchin field. They are located at the mouth of two small arroyos, which forms a comparatively wide, level plain.

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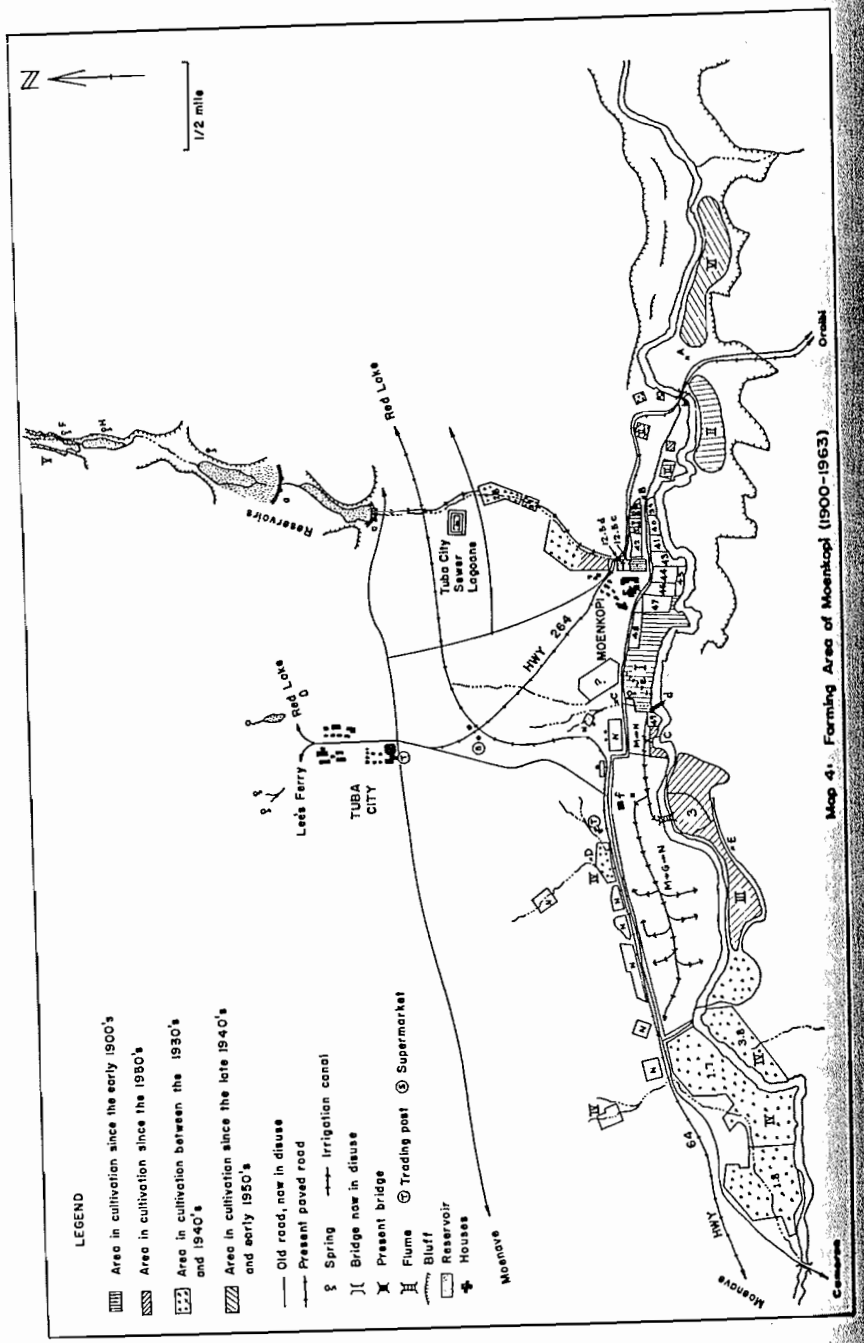

Map 4. Farming Area of Moenkopi (1900–1963)

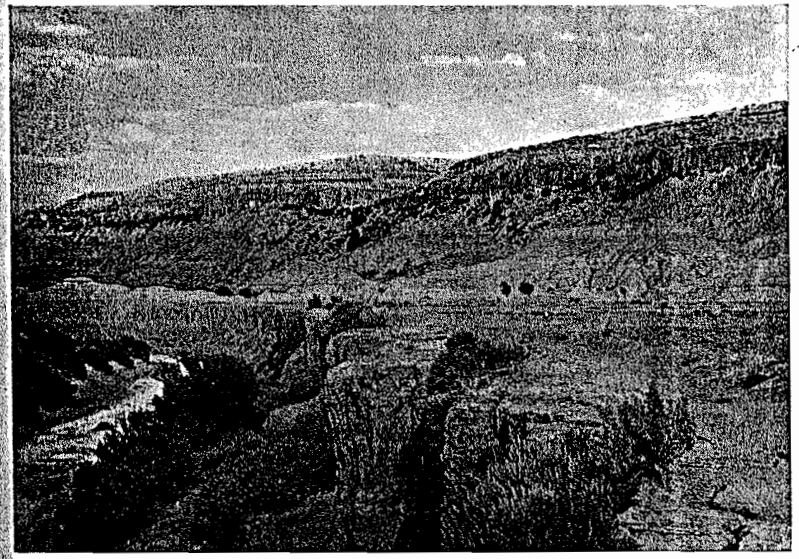

Plate 4. Moenkopi Wash near the fields in Ma'asau.

Dinnebito Wash that belong to one Upper Moenkopi household are all of this type.

By 1937 a major portion of the ecological niche of the area around Moenkopi was thus being exploited by the Hopi farmers. The total amount of acreage rose to about 860 acres, four times as large as

Additional Legend to Map 4

1) Numerals 39 to 48 are allotment numbers. Other numerals indicate the plot numbers in assignment lands.

2) I = irrigated area from the reservoirs; II = dry farming area; III = irrigated area from the Wash through the diversion dam; IV = Akchin fields; V = individually irrigated area from the Wash; VI = area irrigated by springs.

3) A = *Hu:yankikyö;* B = *Pa:latuika;* C = *Tuviktsyala;* D = *Wikopsi;* E = *Ma'asau;* F = *Shalako;* G = *Ma:tsya;* H = *Patu:pa;* I = *Pavaukyaoki.*

4) a = dam and headgate, originally constructed by the Mormons; b = dam first constructed by the Mormons but fallen into disuse after their withdrawal (it was proposed to rebuild it during the 1910's); c = dam constructed by the Mormons but fallen into disuse since the late 1900's; d = diversion dam, originally constructed by the Mormons; e = old diversion dam in the Mormon period; f = government dairy in use until around 1935.

5) M = former Mormon farms; G = former government farms; N = Navajo farms.

Sources: Blout, 1911; Gregory, 1915:118; 1916:Pl. XXVII; Page and Lavantu, 1937; U.S. Geological Survey, 1957; field work, 1962–63.

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the initial allotments. The increase in acreage corresponded to the continuing growth of the population through immigration and natural growth. Per capita acreage in 1937 was about two acres.[3]

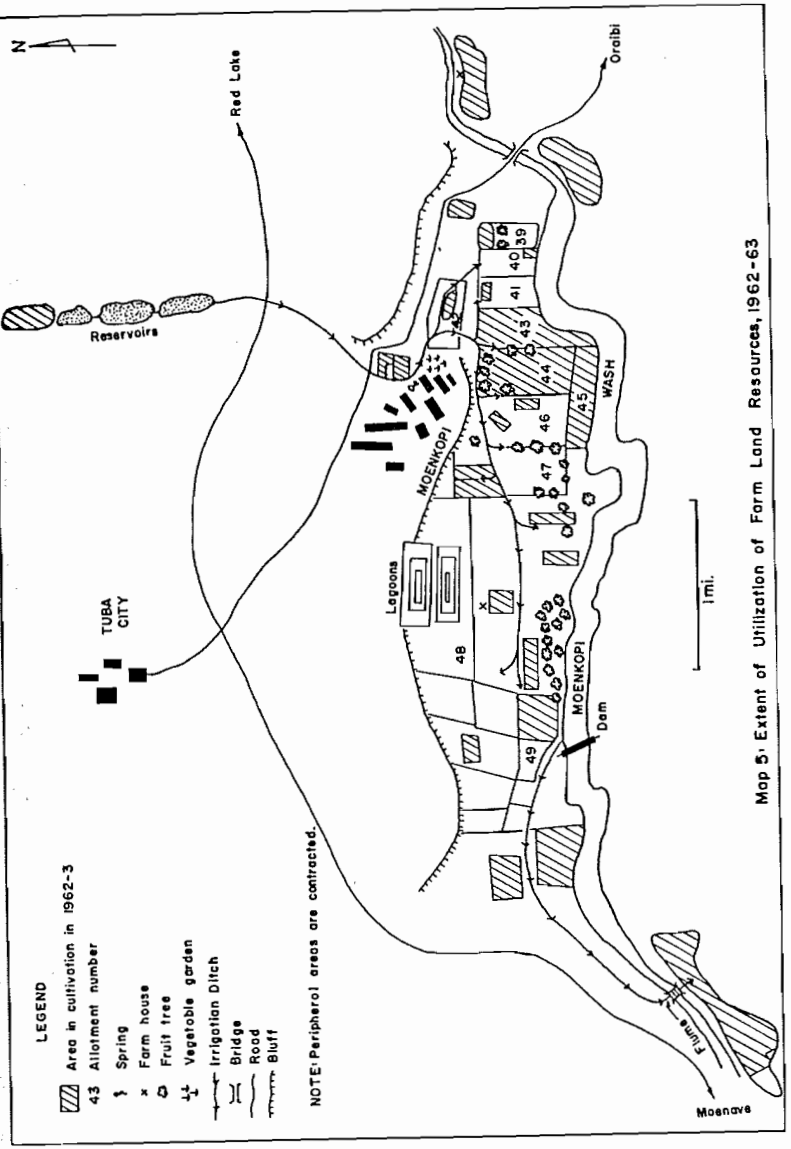
Several factors are involved in this process of farm land expansion. First, the political stability brought about by the BIA made possible the Hopi migration and agricultural exploitation of land resources. Second, rapid adoption of wagons and draft animals during this period facilitated transportation between the distant farms and the village (Forde, 1931:365; Watson, 1945:67–71). Finally, the villagers were yet only marginally involved in money economy through occasional wage work at the local agency and sale of farm and livestock produce. Since the village economy for this period was based chiefly on subsistence agriculture, the increase in farm acreage corresponded in the main to the growth of the village population.

A significant change in Moenkopi economy began with the advent of World War II. While the population continued to increase, the total farm acreage appeared to reach a peak by 1940, when the period of decline set in. Thus the fields at *Wikopsi* were abandoned to the Navajo. The fields in such outlying spots as Red Lake and Coal Mine Canyon were also given up to Navajo herders toward the end of the 1950's. Two areas of flood-water farming were abandoned because of deep arroyo cutting, which decreased the cultivable area of level land. The remainder of the flood-water farms were left out of operation because of a shortage of labor.

On the other hand, new fields were opened during the 1940's and '50's. In 1940 the Tuba City BIA, which had been operating farms for the Navajo Boarding School, released them for the use of the Hopi farmers. They are about two miles upstream from the reservoirs and well watered by a series of springs, including *Shalako* (see Map 4). The farms around *Hu:yankikyö* were individually opened in the post-war period and have not been legally recognized by the government nor by the Navajo Land Board. These are located about two miles northeast of the village and irrigated from the Wash (see Map 4).

At present, about 550 acres constitute the farm acreage of Moenkopi (1962–63), with an average of 0.95 acres per person. However, many plots within this complex of farms have been out of operation for several years, though retained as Hopi farms (see Map 5).

[3] This figure corresponds to the per capita "cultivated" acreage in the Hopi District in 1936 (Human Dependency Survey, 1939).



Map 5: Extent of Utilization of Farm Land Resources, 1962-63

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More recently, some farms were taken out of cultivation for nonagricultural purposes. Thus Allotment No. 48 was turned into two sewer lagoons for the sewage system of the upper segment in 1963. A portion of the farm by the Moenkopi Day School was used for a house site in the same year.

The decline in farm acreage, the movement of the farms closer to the village despite improvement in transportation by popular adoption of automobiles and construction of paved highways, and the conversion of farm land to nonfarming use all represent the dislocation of subsistence economy to the increasing pressure of money economy, which had not only attracted the Navajo to this area since the stock reduction program (Levy, 1962a:796), thus creating competition for land in the immediate environs of Tuba City, but also has extracted a great amount of labor for wage work, thus causing a shortage of farm labor in Moenkopi.

Tenure and Distribution of Farm Land

The discussion of tenure of agricultural land in Moenkopi is complicated by the fact that the native system of land tenure, which was in the process of radical change at the time of allotment in Moenkopi, was superimposed by the reservation system of land control. I shall first deal with the change in land tenure that spread in Third Mesa at the turn of this century.

Emergence of Right of Individual Disposal on Third Mesa. It has already been pointed out that the Moenkopi area, in which the Hopi opened farms, was Oraibi "outland." In regard to the cultivation right in this section of the village territory, the literature indicates "male individual ownership" as a prevalent form of customary right. For Second Mesa during the 1930's, Beaglehole mentions as follows: "Apart from the clan control of land there exists individual ownership of land by the male. This occurs when a man breaks in land from the waste and plants it with fruit trees or cultivates squash or beans on it. The waste land is usually part of the village land, rarely part of the clan lands" (1937:16). For Third Mesa, Eggan remarked that "there were probably always a certain number of fields owned by Hopi men outside clan areas" (Watson, 1945:67–68). Page made the following quote from Stephen's rather cryptic observation for Oraibi: ". . . during the late 1880's . . . 'of the land properties there are still traces that it once was divided on a communal basis for use of families composing the clans and not as individual holdings'" (1954:9). This appears to indicate that individual holdings were already prevalent in the last century.

On rights over farm land in this area, Beaglehole further states:

> With the death of the owner, the land relapses to village waste, or is taken over by clan relatives or by the son of the deceased. If the land goes out of cultivation during the owner's lifetime, another interested in the field may take it over, usually by mutual agreement. Should the owner wish to renew his rights he may secure the return of the land without question. If no attempt is ever made to resume ownership the land is, by tacit understanding, considered the property of him who has taken it over to cultivate (1937:16).

This statement points out that the farming right in the "outland" is essentially usufruct and contingent on continued cultivation. Forde (1931:379) and Colton (1934:22) further believe that male control of reclaimed fields in the "outland" emerged under the influence of the reservation system, while Beaglehole (1937:17) suspects the same for the inheritance by a reclaimer's own children of this type of field. This, however, does not appear to be the case.

My arguments for aboriginality of usufruct by individual males in the outland and its inheritance by their children are based on the following considerations. First, as Colton mentions (1934:22), the outland was primarily used for grazing. From this, Watson suspects that individual "ownership" was partly derived from individual appropriation of grazing ranges (1945:68–71). However, as shall be mentioned, the appropriation of ranges in Hopiland proper is often made by a group of Hopi herders and not by individuals. It appears more reasonable to assume that the farming right in the form of usufruct by an individual was established through an act of reclamation and protected by the village as such for the duration of cultivation even by his descendants (see ter Haar, 1950:85). The fact that such a piece of land was invariably held by men appears to have derived from the traditional division of labor, which excluded women from farming activities. The ultimate sanction of the use right in this section of the village territory resided in the village and its representative, the village chief. Inheritance by the children and not by the matrilineal descendants appears to be due to the fact that the former, especially sons, start working on their parents' land before and stay there even after marriage and that subsequently they inherit at their fathers' deaths the usufruct of the fields the latter opened through continuous cultivation.

What is unique in the land tenure of Third Mesa is the absence of a clan land system as described by Forde (1931) and others. The relevance of the reservation system appears more direct in this respect than in the existence of the right of individual disposal

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itself. During the survey in the 1930's by the Soil Conservation Service, Page discovered the absence of clan lands in Third Mesa. All the farms there were held in the form of "individual ownership" (Page, 1954:11).

The process through which the right of individual disposal of farm land was established in Third Mesa involves three factors: population, available farm land, and sanction structure. First, the population of Oraibi, the sole village on Third Mesa at the time, reached 900 in 1898 (Page, 1940), almost equal to the total of First and Second Mesa populations. At the same time, the land basis of Oraibi agriculture was in the process of rapid deterioration because of the erosion of the Oraibi Wash, on which most of the Oraibi farms were located (Hack, 1942:34; Titiev, 1944:62). The pressure on the land, then, resulted in increased reclamation of the outland, including the Moenkopi and Dinnebito areas.[4] The decrease in available farm land through population increase and erosion cycles must have been a common occurrence in the history of other Hopi communities. The uniqueness of the Oraibi experience is the very context in which the process went on.

Briefly stated, the imposition of the reservation system and consequent restriction of movement, along with the censure of religious practices, were undermining the village authority, which could not control developing factionalism (Eggan, 1964:182). As the clan lands were gradually abandoned, the individual control of farms in the outland became a predominant form of land use. In the face of weakened village authority, the same procedure must have been adopted in the use of the remaining farms in the clan blocks. Confinement on a reservation further made it difficult for Oraibi to shift the location of the community through migration or segmentation. The physical basis of clan solidarity was thus deteriorating long before factionalism precipitated the Oraibi split (Titiev, 1944). The final result was a replacement of the clan land system with individual land right. As the latter became the sole form of right over farm land, its transmission was now executed without reference to clan organization. Since the land right ceased to be sanctioned by any particular village after the disorganization of Oraibi, the right over a piece of land did not revert to the latter as an ultimate possessor of domain but remained as the original reclaimer's. The disputes over the land that ensued were now resolved not by village

[4] Since the Dinnebito fields mostly depend on sand dune farming (Hack, 1942:33), irrigation farming in Moenkopi is irrelevant to the development of right of individual disposal in Third Mesa.

authority but by the BIA, which held final control over the land. More often, however, individual negotiations took the place of formal adjudication by the BIA. Thus all the Third Mesa farms came to be individually held as they are at present.

As this reconstruction of the process (see Eggan, 1950:107) shows, the relevance of the reservation system was crucial, and yet the government, which instituted the system, did not dictate such a change. This is indicated by the fact that in contemporary First and Second Mesas clan lands still exist in juxtaposition to individually held lands (Page, 1954:11).

Through trusteeship of "individual land ownership," the government replaced a Hopi local community as a final sanctioning body of land resources. On the one hand, this provided protection from the encroachment of outside interests. Yet, on the other hand, it did away with the context for further development of the concept of "individual ownership" by choking the process that had been in progress in Third Mesa. The trusteeship was thus a legal fiat thrust into the indigenous movement of changes in land right, which, given market economy and commercial agriculture, could well have resulted in genuine "individual ownership." This did not materialize in Moenkopi, however.

What happened or has been happening in the village is a complicated pattern of adjustment in farm distribution among the kin whose subsistence needs for land are meted out on the basis of an amorphous concept of individual "control" within the framework of overriding supervision by the government.

Farm Land Tenure and Inheritance. The general process of breakdown of clan "ownership" of farm land also affected the land tenure pattern in Moenkopi. All information regarding land rights in the area prior to Mormon control of the Moenkopi valley indicates individual appropriation of farm land. The allotment subsequently froze this type of individual tenure into law. However, as already indicated, the distribution of the allotments clearly reveals a mode of farm land appropriation that must have been extensively employed in this early period. A tract of land was delimited by a group of matrilineally related men and their male in-laws. Within the land demarcated by this group, each member acquired a piece for his own cultivation, claimed it as his, and disposed of it as he saw fit. The group itself was formed for reclamation and probably for defense of the reclaimed territory.

Prevalence of this mode of land appropriation for farming pur-

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poses is also indicated by the fact that the two men of the Patki clan, resident in Oraibi then, demanded an allotment in Moenave during the second allotment project in 1910 (KCL; TCL). They claimed they represented their clan "of seven families and forty-six persons" and expressed a wish to return to Moenave, where they farmed "for four or five years previous to 1907" (KCL, October 1, 1910). Their request was not approved, however, on the ground that they already belonged to the Hopi Reservation (TCL).

It may be speculated that had the mode of reclamation by a group of matrilineally related men and their male in-laws continued, it could have led to the establishment of clan lands. This did not develop in Moenkopi, because the government insisted on the principle of land distribution on the basis of individuals' residence in Moenkopi. This principle came into direct conflict with the colonial position of Moenkopi, which was characterized by fluidity of residence in the component population. No longer could a Hopi live in Oraibi while holding land in Moenkopi. It resulted in the abandonment of a number of farms to relatives living in Moenkopi and, often, to the matrilineage members by the original reclaimers, who decided to settle on Third Mesa after having opened the fields in Moenkopi.

An illustrative example is a Coyote clansman who opened fields with his friends in the Moenkopi valley in the early 1910's. On his marriage to a woman from Bacabi, he gave his Moenkopi fields to his sister's daughter and her husband (see p. 249). The latter, in turn, later divided the fields among their children.

Close association in native theory between a claimant and his right of disposal in the outland resulted in the assumption of this right mostly by men who brought women from other villages through marriage. These women did not possess the land in the area where no clan claim was recognized in farming.

With the disposal right in the hands of the original claimants, their children were frequently heirs, irrespective of sex. Though members of the claimants' matrilineages did inherit farm land, the incidence seems much lower. Two factors appear relevant in the predominance of inheritance by children.

First, the colonial character of the village resulted in distortion in genealogical composition of the resident population. The early settlers in the village brought their wives more frequently than their sisters or more distant relatives. There existed differential availability in possible heirs, and one's children became more likely heirs simply because they were easily available.

Second, the fact that the right over a piece of land in the outland

is contingent on actual cultivation prompted the process of land transmission to one's children, for the land could not be left idle if it was to remain his farm. Given an equal claim by his children as well as by his matrilineal relatives, a man chose whoever immediately needed the land. In Moenkopi those with immediate needs for land were more often the children than the matrilineal relations, since the former, especially the sons, began farming on their fathers' land before marriage. Upon marriage, they often took women from other villages and hence without farms in Moenkopi. Thus they chose to work on their fathers' land even after marriage. On the other hand, women came to seek permission from their fathers or brothers to let their husbands cultivate a piece of land.

Corollary to the second aspect, it frequently happened that as cultivation was continued over years on a piece of land, the cultivator came to assume this disposal right without regard to its original holder. Though my informants often claimed that a certain piece of land belonged to someone and that he was going to get it back from the present cultivator in the near future, this has seldom been done and only one case has been recorded so far. This possibility of establishing the disposal right through the act of cultivation in default of an immediate arbitrator results in overlapping of land rights and consequent obscuring of land claims.

At the present time, an important characteristic of the land right in Moenkopi is this disposal aspect by an individual. The possessor of the disposal right can be either male or female. Though the government as well as the Navajo Land Board formally registers the cultivators as the title holders (allottees and assignees), there is a wide discrepancy between the actual holders of disposal right and registered land holders.

The prevailing flexibility in rights to agricultural land in present-day Moenkopi still persists chiefly due to the governmental sanction on the sale of the farm land and to the position of Moenkopi agriculture in the total economic context.

FARM LAND USE AND DISTRIBUTION. The right of individual disposal, when set in the context of the reservation "dual" economy, produced several interesting features in the pattern of agricultural land use in Moenkopi. The first of the notable tendencies is *frequent entries into a piece of land and withdrawals therefrom by blood and affinal relatives,* one of whom is usually regarded as the "owner" of the land and whose permission is sought at entry. I shall examine this in two of the allotments.

The boundaries of the allotment lands were already obscured by

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1914 (TCL), and those meted out during the period of cultivation subsequent to the allotment were maintained until 1937, when a survey crew from the Soil Conservation Service plotted the entire allotment area. Since then, no mapping had been conducted until for the recent probation of inheritance (1962), appraisal of the value of each allotment was done on the basis of a survey of areas in actual cultivation and improvements laid thereon. In the case of Allotment No. 44, its cultivable acreage is reduced by a portion of the land that covers the present lower village site.

This allotment was originally granted to Nashileowi, the first chief of Moenkopi. She was regarded as the "owner" of this tract. Her husband, Letokshi, had his own allotment in *A 41*, where he farmed and the produce from which he apparently contributed to his marital household. Nashileowi was childless (see Figure 2).

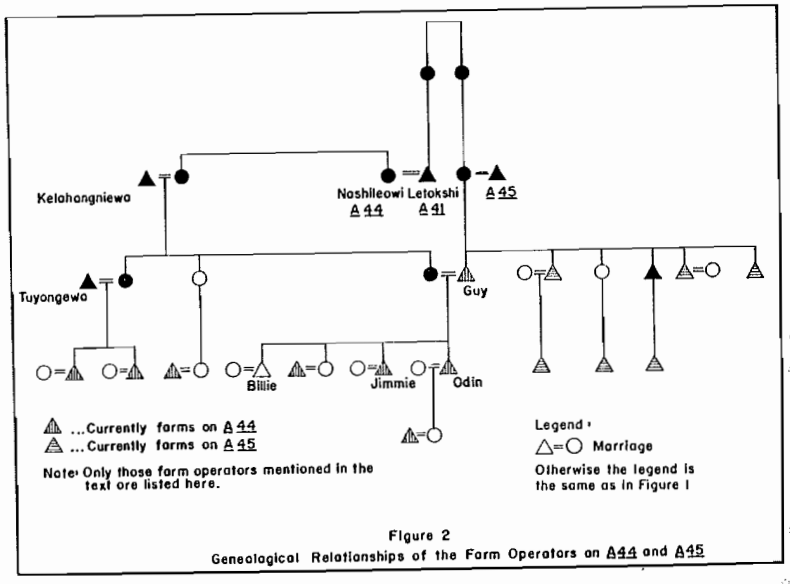

Figure 2
Genealogical Relationships of the Farm Operators on A44 and A45

Thus the actual operators of her allotment consisted of her sister's husband and the husbands of the latter's two daughters. One of the latter two husbands, Guy Talas, also worked on *A 41*, whose allottee, Letokshi, is his mother's mother's sister's son (see Figure 2). Guy never worked on his father's allotment, *A 45* (see Map 4), apparently because too many operators crowded the land and it was already reduced by the gullying of the Wash. A major portion of this allotment lay on the other side of the Wash where irrigation

was impossible. The remaining operators did not have allotments nor did their near relatives.

Nashileowi died "a few years" (TCL) before 1912. It is reported that "By a sort of tacit agreement the oldest of these [three] daughters has been regarded as the present owner . . . although her claim is disputed by one Frank Siyamptewa who is the Chief of the Hopis [of Moenkopi] and nephew of the original allottee" (TCL, December 16, 1912). The daughters are, in reality, Nashileowi's sister's daughters. Further, the "ownership" by the oldest daughter is misleading in this context for it was a fiction convenient for dealings with such outsiders as the government. In any event, with the deaths of Nashileowi's husband and the husband of one of her sister's daughters, the cultivation was undertaken by the latter's two sons. Guy, on the other hand, had two of his sons working for him now in Nashileowi's allotment. The three also worked in *A 41*.

By 1937 Nashileowi, Letokshi, Kelahongniewa, and Tuyongewa (see Figure 2) had all died and Guy took over the control of the allotment. One of Guy's two sons, Billie, was then married to a daughter of the allottee of *A 48*, but he did not move there partly because its land was limited in size by accumulation of silt from a small wash and partly because it had four operators already. Soon, however, Billie found wage work in Flagstaff and left his field in *A 41* unoperated. His plots in *A 44* were soon taken over by his other brother, Jimmie, who had previously worked in Belmont. Jimmie's wife's father gave a portion of the field opened by him to Jimmie at his marriage and thus Jimmie had two plots to work on.

Odin, Billie's other brother, who had been working with his father, Guy, before Jimmie came in, married a woman whose father's father was the allottee to *A 43* and whose step-father's mother's brother was the allottee to *A 46*. Neither of these allotments was entered by Odin because of congestion. There was, however, another aspect to this situation. Odin and his father were politically antagonistic to these allottees and Odin obviously avoided asking for their permission. Odin's sister, who married a man from Hotevilla and who had been away to Belmont for wage work with her husband, came back at the recent death of her mother and obtained a piece in *A 44* from her father, Guy. Her return to the village was only for the purpose of farming; otherwise, she and her husband still stayed at Belmont. Odin gave a piece to his daughter, who married a man from Shongopavi and who now lives in the upper segment site with him.

Another man, who had been working on his father's allotment,

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A 40, acquired a piece in *A 44* at his marriage to Nashileowi's sister's daughter's daughter before 1937, through Guy's permission. He claims the soil in *A 44* is better than *A 40,* but he continued to work on *A 40* as well.

All in all, there are at present eight workers in Allotment No. 44 alone, each holding a little more than an acre. They consist of the members of the chiefly lineage of the Pi:kyas clan and their male in-laws. A sort of compromise pattern was thus created between the traditional mode of land use and that of "individual" tenure.

Though the position of the "owner" of the allotment has been indicated for the entire period, it carried little weight in the actual control of the land. Once an "owner" permits an entry, he seldom evicts an entrant. Such an entrant often establishes the right of disposal in his plot, which becomes an object of inheritance through continuous cultivation.

The cultivation history of Allotment No. 44 has revealed to some extent the solidarity of matrilineal relatives within the chiefly lineage. This trend, however, does not prevail in the history of other allotment or assignment lands. Allotment No. 45, for instance, shows remarkable solidarity of the patrilineal relatives of the original allottee.

The irrigable land in *A 45* amounts to only about five acres. The remainder is on the other side of the Wash and unirrigable. Recently, sand dunes have been drifting down from the bluff on the southern edge of this part of the allotment and have covered a major portion of the level land there.

The original allottee, of the Reed clan, is said to have come from First Mesa and hence he was without close relatives in the village. He married a mother's sister's daughter of the allottee to *A 41.* No entry was made by his wife's people, however. Three of his five sons initially joined their father in cultivation of *A 45.* The wife of one of the three was from Oraibi and so her husband had no choice but to seek a piece of his father's land. The family of another son's wife, though from Moenkopi, was similarly landless. These two sons, however, later built their own fields elsewhere to supplement their small holdings in *A 45.* The third son meanwhile obtained a piece in *A 39* on his marriage to its allottee's sister's daughter (through the allottee's permission). Later three other operators joined in the cultivation of *A 45.* Their genealogical relationships to the original allottee are indicated in Figure 2. At the present time, of the six operators of *A 45,* all but one are patrilineal relatives of the original allottee. The exception belongs to the same Water Coyote clan as the initial three operators. His entry was made through his mother because his father was from Oraibi and without farms, primarily being engaged in sheep herding, while his wife is from Mishongnovi and also without farms in Moenkopi.

As the above two cases indicate, farming in Moenkopi has been characterized by fluidity in the composition of the operators on a given tract of land. This corresponds mainly to the fluid population resident in the village, which divided its economic activities between Moenkopi and Oraibi in the earlier days and between Moenkopi and on- and off-reservation towns in the recent period. It should also be noted that the shift of land rights from the control of clans to that of individuals provided a greater number of choices in acquisition of farm land and thus accomodated the instability of post-marital residence because of the high incidence of inter-village marriages in Moenkopi.

The relationships sought for entry are extremely diversified. However, it is important to note the dominance of kinship. They include, apart from the parental ones (father to son, father to daughter, mother to son, mother to daughter), sibling, affinal, and, with several degrees' removal, patri- or matrilineal relationships. Though infrequently, clan relationships are resorted to as well. A man may give his farms to an adopted son. A common procedure is for a man to obtain the farm belonging to a person he interred.

On the other hand, relationships devoid of kinship correlates are based on political and friendship relationships. These are, however, often spoken of in terms of distant kinship. Dissociation of kinship in entry to land presents an interesting question in regard to the development of "rent" relationship and shall be discussed below.

The above pattern of entries into the land already shows significant deviations from "the [Hopi] theory of land distribution" (Forde, 1931:377). Male members of a matrilineage now work on the land of one of the lineage members, either male or female, and often do not move to their wives' lands. Moreover, an entry to a wife's land is often regarded as a secondary alternative to a parent's and when it is made, one usually does not abandon the piece of the parent's land. Forde already reported cases of men working on their own as well as wives' clan lands on First Mesa (1931:378, 380). In these cases, however, the men's fields on their clan lands are claimed to revert to the clan at their death (1931:378). In Moenkopi a man's holdings on his "parental" land are most frequently taken over by his children, both male and female.

As previously mentioned, land assignment is an assignment of

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usufruct to a farm within the theoretical framework of reservation land tenure. Each transfer of this usufruct requires approval from the local Land Board. In actuality, however, numerous transfers occur without awaiting such actions from the board. Inheritance of assignment lands has been made as frequently without probation by the Navajo Tribal Court in Tuba City. In one of such inheritance cases, a man "gave" a piece of the land he obtained from his adopting father to his brother. In another, a young man gave "permission" to his mother's brother for entry to the land he inherited from his father, the original reclaimer and assignee. This occurred when the young man was incapacitated by drunkenness. However, the mother's brother continued to work there even after he recovered and eventually brought one of his sons onto this land to work with him. As these cases show, the patrilineal transmission of land rights is not a result of imposition of government regulations, which do not, in fact, specify the mode of inheritance of assignment lands.

As already noted, frequent entries and withdrawals on the farm land and the process of establishment of the disposal right through continuous cultivation may lead to overlapping land rights of several individuals on a single piece of land and consequent confusion in regard to its ultimate possessor. Such is the case of a plot near the Moenkopi spring by the present Moenkopi Day School.

This land was originally utilized by the school as a small-scale demonstration farm. It appears that during the 1920's it was released for Hopi use and a man of the Patki clan from Oraibi became its holder. The farm land itself is a tiny two acres but direct irrigation from the spring and the proximity of the village site made the land comparatively more valuable than the outlying farms with greater acreage. The Patki man first gave a portion of the land to a friend in Moenkopi. When the Patki man died sometime before 1937, his son took it over. Through the son's wife, her male clan relative from Hotevilla obtained a portion in the land. Further, through the original Patki man's wife, her male clan relative obtained another piece there. When the Patki man's friend died, his portion went to his daughter and her husband. By 1948 the son had died. As a result three men have been working on this narrow strip of land up to the present time. The son's wife as well as his brother now claim "ownership" of the land but no actual attempt has been made to regain it. In fact, the present operators are political antagonists to the son's brother and it appears unlikely that he will dare to assert his claim, which would inevitably conflict with that of his sister-in-law.

The second feature of agricultural land use in Moenkopi is *fragmentation and scattering of farm land holdings* (see Brophy and Aberle, 1966:73–74, 76). The land holdings of many individual farmers were already diverse when a survey by the Soil Conservation Service was conducted in 1937. The original allottees and their immediate relatives, who held small plots in the allotment area, soon opened fields in other areas. The later arrivals, on the other hand, sought through kinship relationships the use of fields in areas already reclaimed and supplemented these with land they themselves reclaimed. At present, it is not unusual for one farmer to work on a piece in the allotment area dependent on reservoir irrigation, on another piece in the *Ma'asau* area dependent on Wash irrigation, and on a last piece of land in the dry farming area.

Several factors are involved in this seemingly "uneconomic" combination of land and labor. First, the trust ownership of land by the government formed an effective barrier which protected the basis of Moenkopi subsistence economy from the national competitive market. Second, participation of the villagers in the money economy mainly through wage work *dislocated* the subsistence economy to a residual activity within the total economic complex.[5] All through the period in question, no trend for accumulation of land in the hands of any individual has been observed. Third, individualization of economic activities through the above-described land tenure and participation in wage work eliminated the community and its component groups as possible production corporations oriented toward commercial economy. Finally, and perhaps most important of all, in spite of the general advocacy of land reform policies, the peculiar character of right of individual disposal inhibited movement of land capital along channels of demand and supply. This is most clearly seen in the *poorly developed contractual land relationship.*

I have already pointed out the significance of kinship in the disposal right over farm land. Conversely, it is rare to observe "renting" relationships between a possessor of the disposal right and his non-kin user. Such "renting" appears to be on the increase in recent years among families who migrate out of the village for off-reservation employment. However, all these relationships I observed are characterized, in addition to the absence of direct kinship between the parties concerned, by lack of specific terms of "rent" and its duration. The only term involved consists of maintenance of the

[5] Incentives for economic employment of farm land capital, e.g., for commercial production, were thus no longer seriously considered in the allocation of productive labor. The surplus land that resulted from this process has been left idle.

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fields in a cultivable condition, or "keeping the field clean of weeds." Though it is sometimes stated that a portion of the produce from the rented fields is to be given to the possessor of the land, exact specification of the portion was never clearly mentioned to me. More often no reciprocation in kind is made by the "renter," who, in fact, appears to obligate the possessor of the right over the field by his maintenance labor. Thus it seems more appropriate to speak of these relationships as borrowing of land rather than "renting."

As previously mentioned, the present pattern of land use is seemingly "uneconomic." This observation can be derived from the viewpoint of either subsistence or money economies; the acreage is insufficient for subsistence on farming alone, while the cost of production is noncompetitive in terms of production for a national agricultural market. Agriculture in Moenkopi has not been either an isolated, closed form of subsistence economy or a fully integrated segment of the national money economy. Since the founding of the community, it has been in contact with money economy through wage work, sale of farm produce, and cash purchase of a few grocery items. This contact was accompanied by governmental control of basic agricultural capital, which was originally meant to insure the subsistence of the Indians. In this condition of dual economy, it is meaningless to define the "minimum land requirement" in the agricultural sector as a former superintendent once did: "If the average Indian family numbers five, forty acres of good land, with water would be ample, for agricultural purposes" (TCL, October 8, 1907).[6] In short, the boundary of the two economies has been flexible and the subsistence activities have been easily reduced or augmented to accomodate the variable pressures derived from contact with the money economy without serious alterations in the land rights. In the dual economic framework of Moenkopi, then, present land use cannot be discounted as simply "uneconomic."

In summarizing Hopi land tenure more than 30 years ago, Forde mentioned that ". . . the Hopi system of land tenure, while in theory one of clan ownership with inheritance of usufruct by females in the female line, is, in practice, subject to considerable modification . . . [partly] due to the dwindling of numbers and the emigration of individuals to the Agency workshops and to the American towns to the south" (1931:378–79). A significant change in the land tenure system of Moenkopi from Forde's Hopi system

[6] Brophy and Aberle mention the 80-acre unit as the minimum capable of profitable cultivation at present (1966:79).

exists in the above-described right of individual disposal, which itself was a result of expansion of farming in the outland under the reservation system.

The pattern of farm land distribution based on the right of individual disposal quite recently underwent a serious change in the allotment area. In 1962, with a notice from the Hopi Agency at Keams Canyon, the Western Navajo Subagency at Tuba City invited an examiner of inheritance from the Department of Interior to probate the inheritance of allotment lands, the original grantees of which had been dead for more than 20 years. Pursuant to Title 25, Code of Federal Regulations, Part 15, each allotment was appraised on the basis of acreage, topographical features, farming improvements, number of dwellings, and so on (Young, 1961:264; Andre, personal communication). Hearings were held in Tuba City and Moenkopi. In order to identify legal heirs, genealogies were compiled. Curiously, however, the probation did not take into due account the actual operators in each allotment at the time. The genealogical information collected for this purpose was frequently incomplete, and a considerable number of descendants who otherwise would have obtained shares were left out. On the other hand, the blood relatives of the original allottees who had never worked on these lands were included. Not only these but those who left for other villages after marriage and settled there now obtained shares. Cases of remarriage and adoption were often neglected or they alone were considered. It amounted, in short, to imposing an entirely alien rule of inheritance, based on bilateral kinship of the American society, upon the Hopi farmers, who had wrought out a mode of adjustment over half a century of time.

The consequences of the probation were diverse and often disastrous. In some allotments farming operations were brought to an abrupt end. From *A 41*, for instance, two operators, Guy and Odin, withdrew. Guy is the original allottee's mother's mother's sister's daughter's son and this was too distant a relationship to entitle him to a share in the land. On the other hand, only one out of eight inheriting families of *A 41* lived in Moenkopi but no member of this family has farmed the land since probation. This land is still idle.

A 39 was taken away from the matrilineal relatives of the original allottee, who were farming the land at the time, and given to the latter's children, none of whom lived in the village at the time of probation. The operators of *A 39* moved to *A 47*, in which some of them received shares and which had been out of cultivation for

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some years already. In moving, one of the *A 39* operators removed the fence wires and posts from this allotment, while leaving fruit trees planted by the original allottee. Of the original allottee's three children, to whom the allotment was probated, only one started working on a small portion of the land in 1963. Since her family lived in Flagstaff, they came back to the village only for planting.

Through diverse kinship relationships, some of the heirs obtained shares in more than one allotment. Frequently, however, they took the largest share and let those in other allotments rest as they had been. Some heirs with shares in a single allotment refrained from working the land because it was already overcrowded. The extent of each share also fluctuated extensively and in the case of heirs to *A 48*, some received only one-twentieth of the 10-acre tract, which had a total assessed valuation of only $1,410! There were also heirs who had settled in other villages long ago and who, as a result, declared surrender of their shares to the other heirs who had been working on the probated allotments. Finally, some others who were unable to activate their rights because of their residence outside of the village arranged to have their village acquaintances work their shares on condition that they "keep their fields clean."

All in all, an immediate consequence of the probation was to appreciably discourage actual operation in the allotment area, and in 1963, a year after the probation, only four out of 11 allotments were cultivated to any significant degree (see Map 5).

The impact of this action on the concept of land rights was just as serious. Though the ultimate right of supervision still rested with the government, the villagers clearly perceived the changed status in land rights. Now the act of cultivation did not guarantee rights over the land. Conversely, "owners" no longer needed to be actual operators on the land. With this awareness, several political actions were initiated by the two groups of the village (see p. 80–81). It even involved the question of legitimacy of the residential area, and the young chief of the lower segment wondered about collecting rents from the residents upon it.

The brief process of these adjustments to the introduction of a new land right concept through the probation clearly was possible because of greater reliance on wage work in recent years. If the change in the combination of land and labor had been carried out in the sole context of subsistence economy, its effect could have been disastrous, since it would presuppose a comparatively rigid correlation of the two factors of production (land and labor) on the basis of the subsistence needs of each household. In Moenkopi,

however, this change was brought about without many deleterious effects on economic activity as a whole, partly because the area affected was limited to the allotment lands, but more important because the economic structure of Moenkopi itself was dual and the number of wage work opportunities was, at the time, on the increase. It meant a further displacement of subsistence agriculture and greater commitment to money economy.

Farm Labor Organization and Supply

The changing conditions of the dual economy brought about a new pattern of labor recruitment and organization for farming purposes. In the olden days, when the labor was concentrated on the subsistence economy, the entire male population of the village took part in farming activities. Further, it appears to have been common during the early period of the 1910's and 1920's for relatives from Oraibi and other Third Mesa villages to come down to Moenkopi to help with the farming there (see Simmons, 1963:208). With a more rigid administrative separation of Moenkopi from Hopiland and with differing degrees of involvement of all the Hopi villages in wage economy, the labor recruitment from the other villages for farming ceased to exist.

In this early period the villagers cooperated in the harvest of the chief's fields to relieve the chief and his family of this labor (Simmons, 1963:150–52). At present, no labor contribution is made to the chief's family in its farming activity by the villagers.

At the present time, farm labor on a tract of land is mainly provided by the household to which that tract belongs. The only occasions for the traditional type of cooperation of kin in farming are limited to the first day of planting and harvesting phases, when the women of the household give feasts for the helpers. Usually, however, neither of the activities is finished in one day, and the male members of the household continue the work to completion without the help of nonhousehold kinsmen.

One of the characteristics of the dual economy is for an individual or a household to divide its labor force between subsistence agriculture and wage work. The division involves a decision-making process based on diverse factors, economic as well as noneconomic. The optimality question involved in the division in a particular household may be difficult to determine. Yet it appears certain that many households in Moenkopi are now short of farm labor, obviously because of the absorption of the labor into the wage work sector. A majority of the villagers do not have time to collect com-

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pletely the ripened fruit of their trees during the fall season. Much fruit is left strewn on the ground and often rots there. Middle-aged men of the village attribute the cause of inefficient employment of farm land in Moenkopi at present to the growing laziness of the young people (see Rubin, 1961:126–27), although a majority of the latter are employed in wage work and hence have no great interest in farming. While the constraint on the transfer of land imposed by kinship and reservation regulations creates an impression of land shortage, the shortage in farm labor is responsible for another picture that the land in Moenkopi is, in fact, in surplus. The two impressions are shared by many village farmers, with some confusion.

The following modes of accommodation in the households also indicate the intensity of involvement in money economy in Moenkopi. First, many male wage earners return to their farms during after-work hours on weekdays or on weekends. Since the engagement in wage work is no longer seasonal (see Adams, 1963:141), they take days off from their regular wage work for farming during the busy planting and harvesting periods. Second, if old and "retired" males are available at home, the burden of farming often falls on their shoulders. Often a young household leaves the farming of its own fields to the old men of a parental household. The sharing of labor between brother households has also been frequently observed. These labor arrangements usually include such other reciprocations as feeding the old fathers at the home of their children and giving a portion of the field produce to them.

Another type of farm labor recruitment is from the unemployed young men, who return to farming for the period of unemployment. Since the engagement in wage work at present is mostly year-long, the context for seasonal adjustment of farming and wage work activities does not exist in Moenkopi. Although construction labor is now the only occupation that retains seasonality, its season overlaps with that of farming and hence no significant labor contribution to farming can be made by these people.

The shortage of farm labor has also resulted in relative relaxation of the sexual division of labor in farming. Traditionally, women seldom took part in the cultivation of fields. Though shelling of beans and corn from the stalks collected by men in the fields had been women's responsibility and though women had been gathering fruit, they had had no part in any phase of the cultivation of the main crops in the fields. Nowadays, however, a few young women do not hesitate to go out to the fields and help their menfolk harvest

corn or thin corn stalks. A young divorcee of the lower segment has frequently been seen driving a pickup truck to haul her father's corn from the fields; it was also her task at home to chop firewood every afternoon.

On the other hand, with the wide use of grinding machines, the village women have been released from the toilsome work of daily corn grinding and no longer does a tranquil atmosphere of grinding songs exist in Moenkopi. Further, men frequently take the place of women in grinding corn by machine. The release of women from heavy household chores, however, has only infrequently led to their increased contribution to the subsistence economy across the traditional division of labor, primarily because a goodly portion of their released labor time has been absorbed in wage work, in which women have occupied an important position since the very early days of the Tuba City Agency.

It is important to note at this juncture that all these modes of labor recruitment in farming are based on kinship relationship, bilateral or otherwise. The premium placed on kinship for farming has apparently prevented the development of "contractual" labor organizations (Fitchen, 1961:114–15). Although the Sun Chief mentioned working for the Hopi in the fields for wages as early as the 1910's (Simmons, 1963:203), no significant attempt to introduce wage labor in farming has been made in the village so far. Though there are cases of hiring fellow villagers or Navajo farmers on the basis of cash wages, their number is yet extremely limited and has only slightly affected the position of Moenkopi agriculture as subsistence economy.

Commercial agricultural production is only slightly in evidence. Two old farmers from Moenkopi have been conducting full-time cultivation of the crops primarily directed to the local market for sale. Specialization of their agricultural production for sale purposes, however, is severely restricted by the kinds of crops, which consist entirely of traditional subsistence crops. What demarcates them from other village farmers is merely their relative emphasis on salability. They have made no attempt to expand the basis of their operation either by acquiring more land, or by hiring more laborers, or by raising nontraditional crops.

Technology of Farming

The technological aspects of Moenkopi agriculture represent the area of the greatest outside influence. It was the Mormon settlers and later the government that bequeathed a huge complex of irriga-

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tion canals to the Moenkopi farmers. Nevertheless, a characteristic feature of agriculture in Moenkopi is a peculiar lack of integration between irrigation, on which farming has been dependent since the beginning of the village, and the traditional Hopi techniques of dry or flood farming.

IRRIGATION. Though the Hopi always practiced a small scale of irrigation from contact springs on the mesa walls in terraced vegetable gardens near the villages (Forde, 1931:365–66), it never reached the extent and intensity of Moenkopi irrigation. I have already mentioned the traditional type of irrigation adopted in Moenkopi prior to the withdrawal of the Mormons from the area. However, this was immediately replaced by the reservoir irrigation system that the Mormons originally developed. At the same time, a great number of local Indians were employed for labor on the government irrigation farms and must have been acquainted with the principal aspects of irrigation agriculture. At any rate, irrigation in Moenkopi remained highly dependent on government supervision. This still holds true in the irrigation from Moenkopi Wash.

Of the two major irrigation systems that the Mormons developed, the first consisted of three small reservoirs in Reservoir Canyon and a ditch leading to the fields on the alluvial floor of Moenkopi Wash. Gregory observed a dam built by the Mormons in this set of reservoirs in 1912: "The waters of the lower 'lake' or reservoir, with an area of about 15 acres, [are] retained by a dam 350 feet long and 5 feet high. About 75 acre-feet is drawn off during the growing season" (1916:109). Since the government took over the administration of the area in 1903, another dam was constructed for the middle "lake" in order to prevent seepage in the lower "lake," and in 1908 the two dams were raised to the capacity of 350 acre-feet (Long Range Program, 1944:19). Each of the two dams was equipped with an independent gate. During the 1930's "drifting sand threatened to choke the [irrigation] channel, and a stone culvert was built and later extended with corrugated pipe. A new feeder canal was built in 1937" (Long Range Program, 1944:19). Sometime later the culvert was rebuilt with cement. The feeder canal, though improved in spots later, runs its course without a major change since the time of its construction; the course is parallel to Reservoir Canyon and merges with it only by the village, again to prevent seepage. In 1962 a new canal was laid out to connect the "middle" and "lower" reservoirs with stone slabs and cement; it runs on higher ground than the older one.

Another item of the Mormon legacy is a diversion dam on Moenkopi Wash, about a mile west of the village, where a small arroyo joins the Wash through *Tuviktsyala* (see Map 4). The water was diverted from the dam through a canal to the fields north of the Wash, to which it was brought back after a mile's run. The dam and canal were first used for the government farms of about 250 acres. During the time of this school farm operation, a diverse system of canals was added to the main ditch. Between 1915 (Gregory, 1916: map facing p. 144) and 1937 a flume was constructed to lead the water across to the fields in the *Ma'asau* area. The main canal from the diversion dam was paved with cement in 1960.

A trace of a long earthen dam still remains by the present diversion dam on Moenkopi Wash. This may have been built by the Mormons prior to the present one and used to innundate the adjoining fields. There is no evidence, however, that this dam was made use of by the government after the Mormon withdrawal.

Presumably first the Indians (FDL) and then the government attempted to build another diversion dam near *Pa:latuika,* but this project was not completed (Gregory, 1916: map facing p. 144). During the 1910's the government at Tuba City also constructed a series of small reservoirs to impound spring water for the cultivation of the 60-acre school orchards in Tuba City. They were never applied to Indian farming. Only one of these reservoirs still exists in Tuba City, while the others were desiccated.

(1) *Reservoir Irrigation.* Of the above two major irrigation systems, that of Reservoir Canyon was the first turned over to the use of the Hopi allotment fields. The Hopi farmers were entrusted further with its maintenance, which included clearing the ditch or canal and repairing the dam.

It is difficult to know how the Hopi performed these tasks in the early period. In addition to the two tasks of maintenance, it also included that of constantly keeping the water level of the reservoir below the danger of overflow. Whoever noticed this danger was to open the gate to drain the surplus water. These tasks required cooperation among the farmers, and the village chief was to direct the entire work. In theory, cooperative labor on the irrigation system was carried out in the spring and occasionally in the fall after the crier announced the date for work. No rule was established, however, as to the amount of labor each household or any other unit group within the village was to contribute. The work itself continued only for two days.

This organization of cooperative labor, however, was unsuccessful

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for the following reasons. First, the village contained households whose farming did not depend on this system of irrigation. Second, some of those whose farms were irrigated from the reservoir simply refused to contribute their labor because of personal differences with others. Instead, they went out to work on their own accord. On the other hand, some others who did not depend on the reservoir irrigation came out and helped the work to cull a favor from the chief. Still others sent out small boys, who went simply for the fun of it. Consequently, it appears the work that started out as a village undertaking soon ended up as a private enterprise of the chiefly lineage and its associate households, all of whom were dependent on this system of irrigation.

A similar difficulty became evident in the irrigation of individual farms. This was again a matter of unstated, unspecified understanding or agreement. Individual irrigators opened the gate and let the water to their fields whenever they were ready to do so. This started soon after the repair of the ditch from April to May. Before drawing water to the field, it was ploughed by a mule plough only once. Earthen ridges surrounding a plot were raised and repaired to prevent leakages. Then the plots were inundated "brim full" (five to 10 inches deep). Planting began only after the water seeped into the soil and the ground sufficiently dried up. Depending on the growth of the corn shoots, the second or third irrigation

Plate 5. Irrigated fields of Moenkopi in winter.

was done in June or July. On the other hand, irrigation was entirely skipped for a year when the fields were considered to be sufficiently wet.

This mode of irrigation of individual fields continues at the present time without significant change. It should also be noted that the entire procedure is strongly reminiscent of flood-water farming as practiced in Hopiland proper (Hack, 1942:26ff.). Further, the technique prompts salinization of the soil by letting the alkaline-impregnated water stand on the fields until it seeps down into the ground. Although no field has so far been abandoned because of salinization, there are spots of land along Reservoir Canyon that show the surface bleached white with alkaline salt. In any event, irrigation in Moenkopi agriculture is no more than a superficial addition to the traditional farming technique of the Hopi.

Simple or crude as this may seem, the farmers could not avoid the cumbersome question of water distribution among themselves. Innumerable troubles soon developed in this respect.

First, there existed differences in the time at which individual farmers were ready for irrigation. While a general framework of farming calendar might, at this time, still have been given by the solar movements observed in Oraibi and transmitted through informal means of communication to Moenkopi, this was certainly not minute enough to coordinate the economic life of Moenkopi, already diversified because of its involvement in the reservation community of Tuba City. Finally, Moenkopi had a wider range of choice of planting seasons owing, to the shorter period of killing frost than in Hopiland proper.

Consequently, the order of individual irrigation did not always follow the most efficient route as might be imagined from the spatial distribution of farms and the course of the canal. Thus water was wasted by leakage into unprepared fields before it reached the field for which it was intended. Accusations of water theft were exchanged. Some were criticized for leaving the intake gates to their fields open while others were irrigating. The control of reservoir gates by individual irrigators was often neglected, leading to another cause of waste. Navajo and Hopi sheepherders were blamed for allegedly watering their sheep in the canal and soiling the water.

In the face of these novel difficulties, the village chief was almost impotent. Though his position was recognized by the local agency, he was unable to bring about any sanction against the saboteurs of cooperative labor or the pilferers of irrigation water. In turn, the

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chief was criticized for allowing such sloppy use of a gift from the government, which the villagers argued the Hopi should cling to in good faith lest the Navajo take it over. Thus toward the end of the 1920's, it was fairly obvious that a new and more powerful organization was called for.

I have already discussed the political aspect of an attempt at reorganization by the "Village Council." As far as the control and maintenance of the system were concerned, however, the "council" was as ineffectual as the traditional chief. Its effort to regularize the maintenance work by making attendance records of the labor contributors from the village was severely censured by the villagers as a blatant challenge to the people's spontaneity, one of the basic values of the Hopi. The donors of the funds to purchase a batch of tools, including shovels and picks, for the work on irrigation as well as road maintenance were limited to a small number of the residents of the upper segment, who were primarily dissidents to the traditional power. Thus, despite its avowed aim of unification of the village in community spirit, the "council" deteriorated into another faction against the traditional power group, concentrated around the chief in the lower segment of the village. Shortly after the failure of the "Village Council," the two segments, upper and lower, began sending out their own parties for the irrigation work.

The maintenance of the system by the work parties of the two groups has continued to the present time. Between the two, disputes over the distribution of water were not infrequent and there was even an attempt to bring the whole matter to a tribal court (Hopi Hearings, 1955:399).

In 1959, in order to improve the aggravated state of reservoir administration, the Keams Canyon and Tuba City agencies jointly issued a notice to install locks at the headgates of the reservoirs and to leave the keys in charge of the watermasters to be established respectively by the leaders of the two segments (see pp. 79–80). After a series of disputes, the locks were installed but the watermaster was set up only in the upper segment, the chief assuming the position in the lower segment.

Even this measure, designed to bring about responsible management of the reservoir system, was not successful. The people often bypassed the chief of the lower segment or governor and watermaster of Upper Moenkopi by circulating the keys, once borrowed, among the farmers. In order to borrow the keys, they crossed the line dividing the two groups (see p. 80) or, once the gates were opened, they were left open until all the neighboring farms were

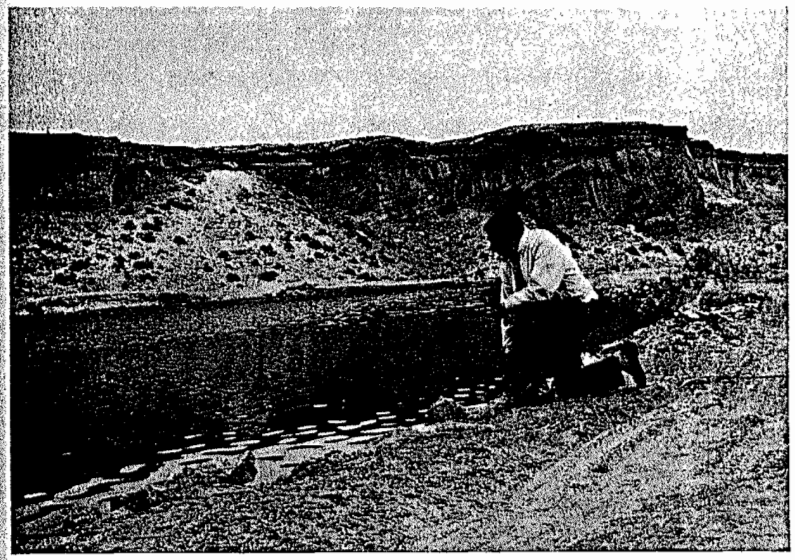

Plate 6. Hopi reservoir shortly before irrigation begins in Moenkopi allotment fields.

irrigated. Farmers watched the time their immediate neighbors would finish their irrigation, thus coordinating the field preparation for irrigation within a small circle of operators on nearby farms. Though the water level is usually low, some chose the fall season to irrigate, thus avoiding personal entanglements. Disputes still flared up but they never precipitated into a serious issue for the village as a whole because the number of people irrigating from the reservoirs was reduced to only about a third of all farmers by this time.

(2) *Wash Irrigation.* At present, there are two types of Wash irrigation practiced by the farmers of Moenkopi. The first type depends on the diversion dam and a long canal, a part of which crosses the Wash through a flume to irrigate the Hopi fields in the *Ma'asau* area. The system was completed between 1915 and 1937 by the government. Since the canal courses through the Navajo farms first, irrigation of the *Ma'asau* fields has to wait for the Navajo to finish their irrigation (see Map 4). Thus cooperation is necessary between the Navajo and Hopi farmers. After the government ceased operation of the school farm in 1955, the need for this cooperation increased and the government remained in a supervisory position for the maintenance of the system. In 1960 the

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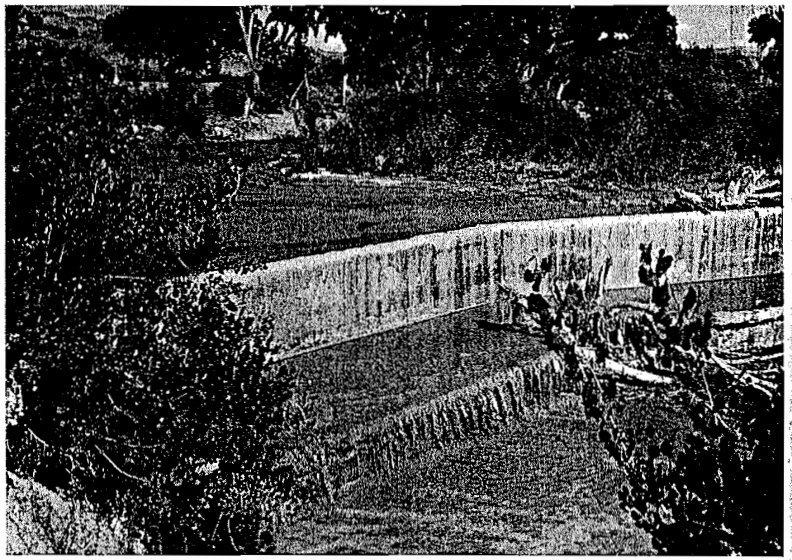

Plate 7. Irrigation dam on Moenkopi Wash.

reinforcement of the canal with cement was carried out by cooperation of the Navajo and Hopi farmers under government leadership.

The following maintenance work schedule is observed at present and its main features appear essentially similar to those practiced previously. Labor contribution for canal cleaning is almost obligatory here, although no specific sanctions have been mentioned against truants. Occasionally, Navajo farmers in the same area are hired on a cash basis by those Hopi who are unable to join the cleaning party. At least a day's labor is expected to be contributed. No formalized arrangement as to setting the date for the work is present. However, since the cleaning work entails only that portion of the ditch that connects it to the main canal and since no Navajo is involved in this part of the canal, informal arrangements are usually made among the Hopi farmers without further difficulty. During this work the date for opening the gate by the flume is decided. The decision also depends on the Navajo farmers, who irrigate first and whose word the Hopi have to await before they start their own irrigation. If infrequently, the BIA announces the date for the Hopi irrigation through a notice at trading posts or the post office in Tuba City.

The irrigation is conducted in the spring, from late March to early April, when the Wash contains enough water. The farmers at

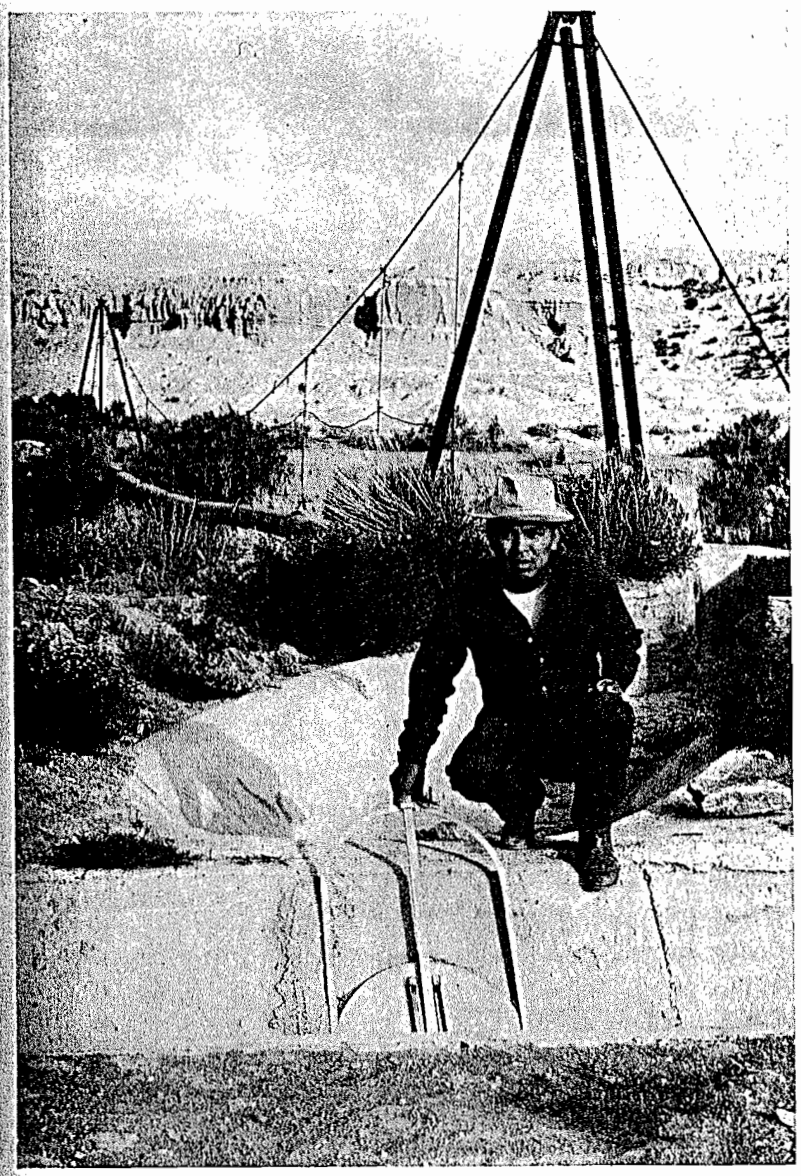

Plate 8. Irrigation canal and a culvert across Moenkopi Wash to the Hopi fields in Ma'asau.

the head and tail ends of the area assume responsibility for opening and closing the gates. Especially the one at the head, who opens the gate and irrigates his fields first, has to be ready to receive

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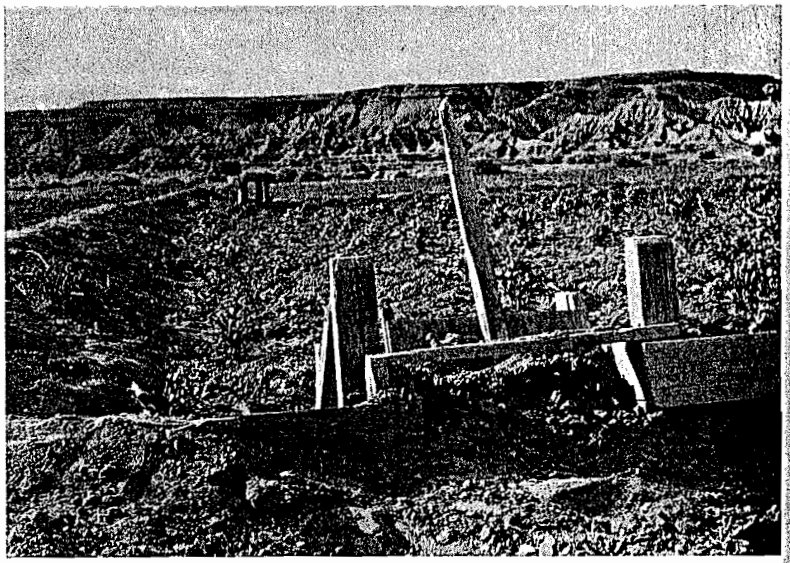

Plate 9. Irrigated field in Ma'asau; note the intake gate.

from the last Navajo farmer. The subsequent order of irrigation in the *Ma'asau* area is also strict and one cannot obtain water if his fields are not ready by the time the water reaches there. The coordination of this work is done through mutual observations on the progress of the irrigation as well as daily, informal conversations in the village and fields.

Each plot is irrigated "brim full" or just enough to avoid overflow and only once. The water level in the Wash is not high enough for irrigation during the summer and fall. Depending on the number of plots in cultivation in a particular year, irrigation in the entire area of *Ma'asau* varies from one to two weeks. A field 10 acres in size takes about two days to draw water and irrigate after the water has reached the intake gate from the flume. While irrigating, the farmers vigilantly observe the fields night and day to prevent leakage as well as theft of water.

The second area that depends on the Wash water for irrigation lies to the northeast of the Moenkopi bridge. The farms in this area stand on an unassigned section of the land and are therefore illegal. No action, however, has been brought against the operators since the beginning of cultivation sometime after 1940.

Seven farmers in this area irrigate their fields with three gasoline pumps, each of which draws water for a distance of about 30 to 40

feet from the Wash through a flexible pipe, about half a foot in diameter. The seven farmers are divided into three pump-using groups on a kinship basis and each group chooses a time for irrigation at its own convenience. No coordination of the work is made among the three groups, however. Moreover, they often choose the fall season because the water seeps better into the soil by its frosting during the winter time. While this theory is only apparent, the farmers in this area are well aware of the complaints hurled against them by the other farmers downstream. This may be a more cogent reason to avoid the spring-time irrigation.

(3) *Spring Irrigation.* During the period of the Mormon settlement and shortly thereafter, irrigation from such springs as *Moenkopi, Ma:tsya, Ta:waki,* and *Tuviktsyala* was the only form practiced by the Moenkopi farmers. The technique of farming from these springs must have been similar to those described by Forde (1931:365–66) and others (Hack, 1942:36ff.). The fields by the present State Highway 264, near the upper segment site, still retain small plot demarcation and terracing, which are characteristic of the spring irrigation farms in Hopiland proper (see Map 2). At present, a few patches in the communal vegetable garden are still in use under this type of irrigation. The people often carry water in buckets from Moenkopi spring to irrigate some of these plots, while others obtain water from a tributary of Reservoir Canyon after it collects water from Moenkopi spring. The significance of these plots is presently nil and many are left unused.

More important of this type of irrigation are the fields in the *Shalako* area above the reservoirs along Reservoir Canyon. Five farmers have been operating on the land of about 40 to 50 acres since 1940. The farms are well irrigated by a series of rich springs that feed Reservoir Canyon.

To summarize the discussion of irrigation, it has been characterized by a disaggregative tendency throughout the history of Moenkopi. There is no coordination among the five distinct systems of irrigation presently used in Moenkopi. Though irrigation has been deemed indispensable for the success of farming in Moenkopi, its operation has been carried out without any community level organization. The Hopi farmers, in turn, exploited available alternatives of not only different sources of irrigation but also of non-irrigation farming. Thus one farmer expressed relief for the fact that he did not have to be dependent on one single system of irrigation.

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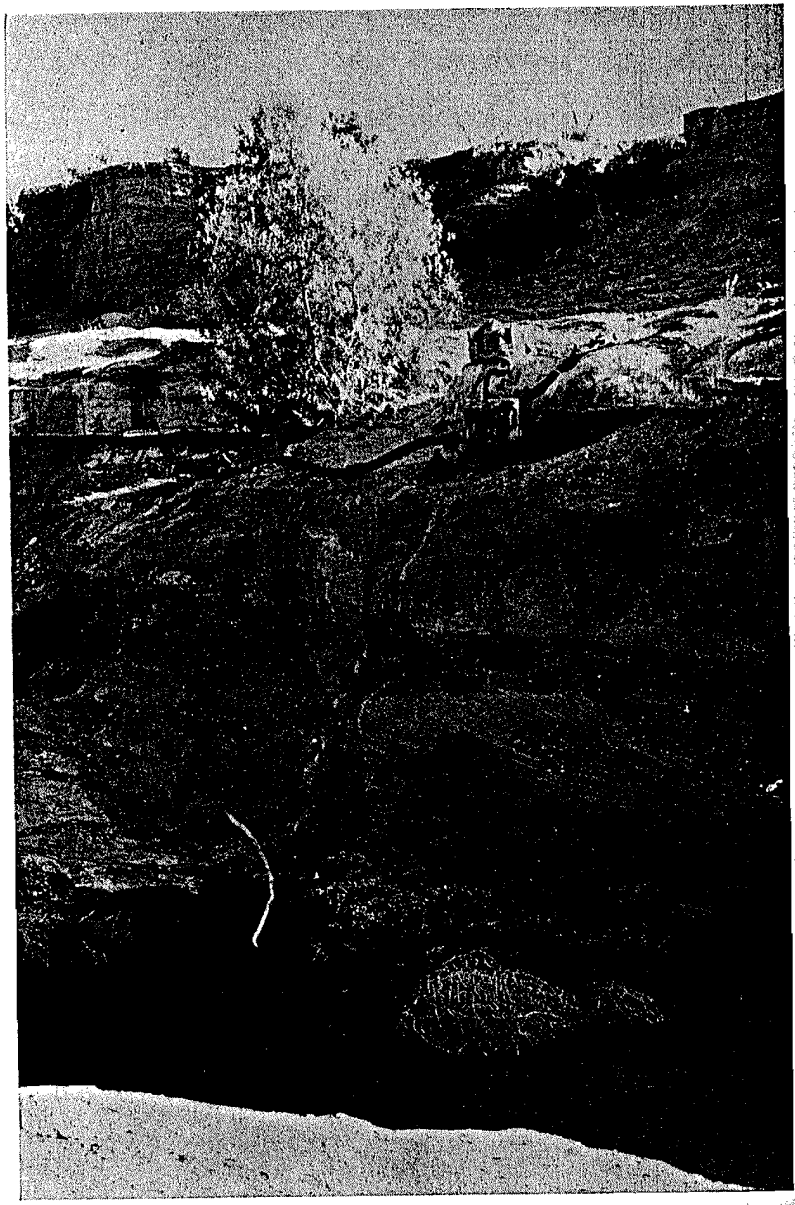

Plate 10. Irrigation pump and a flexible pipe in Hu:yankikyö.

Dozier has argued that the absence of community-wide irrigation contributed to the persistence of the clan system among the Hopi (1960; cf. Kirchoff, 1955; Wittfogel and Goldfrank, 1943:27). The

case of Moenkopi irrigation, then, partially corroborates his argument, since economic cooperation among bilaterally related households is preserved at the expense of community integration for the maintenance of a unified system of irrigation. Disaggregation of the source of irrigation, while vitiating community solidarity, allows the villagers to form the network of interactions based on close kinship relationships and further to take part individually in the outside economy.

Second, the Moenkopi irrigation technique has not been tightly incorporated into the whole complex of Moenkopi agriculture. It is highly reminiscent of traditional flood-water farming. Irrigation in general may be regarded as a technological achievement to partly free farming from the exigencies of nature by controlling the supply of water. Thus, even in Moenkopi there exists the theoretical possibility of expanding agricultural production into double cropping. No such attempt has ever been made, however. In fact, the village farmers are not as aware of increased and stabilized yields from irrigated fields as they are of the additional toil expended in irrigation farming. The total contribution of irrigation to agriculture in Moenkopi is summed up in stability of annual production and lessened chances for abandonment of land due to erosion processes in flood-water farming. In short, irrigation in Moenkopi has remained as a mere adjunct to the traditional flood-water farming technique.

Nonirrigation Farming. As previously mentioned, dry farming has been practiced in the fields near *Pa:latuika* since the 1910's (see Map 4). During the last war, one household in the upper segment took up dry farming fields by Dinnebito Wash and has continued their cultivation until the present time. The fields at Red Lake and Coal Mine Canyon, now abandoned, appear to have been dry farming fields as well.

The farming technique in these categories of fields is basically similar to that adopted in the irrigated fields minus irrigation. The following description of the technical aspects of farming, therefore, applies to irrigation farming as well.

Farming now consists of plowing, planting, weeding, thinning, harvesting, and plowing in that order. The irrigation phase is inserted between plowing and planting and, optionally, between planting and weeding. Plowing after harvests is practiced only in dry farms. All but the plowing operation by tractors composed the traditional pattern of farming as it is still practiced in Hopiland

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proper. Moenkopi farming techniques thus reveal a highly conservative character in general.

(1) *Plowing.* It was the government at Tuba City that introduced *en masse* wagons, plows, and plow harnesses to the Indians as "issues" in return for their labor on the school farms and road constructions during the 1900's and 1910's (TCL). Similar issues were apparently being made in Hopiland proper (Watson, 1945:66). In Moenkopi as well as in Hopiland the use of horse plows was still extensive during the 1940's (Watson, 1945:66–67). In the latter part of the 1950's, however, horses and horse wagons were rapidly being replaced by automobiles (see p. 167) and with this, horse plows disappeared and tractor-drawn plows were introduced. The tractors were purchased in Flagstaff and soon became fashionable in the village. The number of tractor owners, however, remained small and even at present, does not exceed 20. Consequently, the machines were often circulated among related households in the village. Further, those without horse or tractor now hire two village tractor owners for plowing and pay wages to them. The two have also been employed by the Navajo farmers in the vicinity.

The tractors do not appear to have helped alleviate the shortage of farm labor. Due to the fragmentation of farm holdings, there now exist numerous plots into which tractors cannot be brought

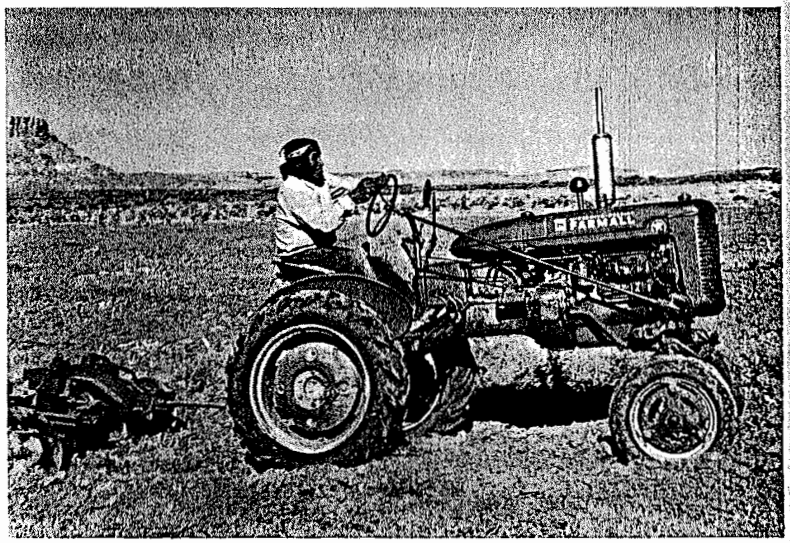

Plate 11. Old Moenkopi Hopi ploughing a dry field after harvest.

for plowing. Further, scattering of the holdings resulted among some farmers in a restriction of use of their tractors in a certain number of their fields, but not in others to which they could not be moved effectively. Partly because of this limitation of tractors for farming purposes, one owner applies his to such other non-agricultural services as removing weeds and drifted sands from the house lots, a service for which he receives payment in cash.

It is not clear what contribution the plowing phase made to Moenkopi agriculture. Traditional cultivation as it is currently practiced in some parts of Hopiland proper did not require intensive plowing. Clearing fields of weeds with a pusher hoe and wooden rake in First Mesa (Beaglehole, 1937:37; Forde, 1931:389) was the only preparation made prior to planting, and the top soil itself was left undisturbed. Beaglehole states, "Native tools are now being superseded by American tools. The plough is of no great value, however, since ploughing renders the soil too light and causes over-quick evaporation" (1937:37). It is generally maintained, on the other hand, that the plowing process, including disking and harrowing, is an essential ingredient of dry farming, since it breaks up earthen clumps in the fields and enhances the capillary action of pulverized top soil (Webb, 1931:360ff.).

The contemporary Moenkopi farmers seem to hold Webb's view on plowing, which would explain the pre-irrigation plowing. At the same time, however, they seem to regard the elimination of weeds and remains of corn roots from previous years as another important aim of plowing. On the other hand, some farmers occasionally skip plowing in their irrigated fields and when they do plow, the operation is for the purpose of rebuilding a new pattern of plot demarcation by destroying all the pre-existing ridges.

Unlike irrigated fields, sand dune fields for dry farming receive plowing treatments before planting as well as after harvest. The exact function of plowing in this type of field is not quite clear, for sands in these fields are already fine enough to need no further pulverization. Yet it appears the esthetic preference of the Hopi farmers for tidy corn fields somehow calls for plowing of dry fields if only to rid them of wind-driven weeds.

(2) *From Planting to Harvest.* Apart from the irrigation and plowing processes, Moenkopi farming has remained unchanged from the traditional pattern. The following, therefore, notes only the features characteristic of Moenkopi farming today.

Though digging sticks or "planters" (*so:ya*), traditionally made of greasewood branches, are no longer in use, the sticks fashioned

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Plate 12. Moenkopi man planting in a dry field near Moenkopi Wash; note the use of a digging stick.

out of steel pipes have been extensively employed in exactly the same manner as the former. Some also have been using thin hoes. The steel implements are obviously more effective in digging in the irrigated fields, whose soil is often harder than the sandy soil of dry farms. One informant mentioned an experiment with an automatic planting machine but it ended in an evident failure. Otherwise no serious efforts for labor-saving have been made in planting. Alternation of planting rows of corn is still practiced in both irrigated and dry farms.

After harvest, corn stalks are left in dry fields for fertilization of the soil as in the customary procedure. In the irrigated fields, however, they are either taken out of the fields to feed horses or simply burned. Some farmers collect corn husks for wrapping of tamales.

Use of fertilizers has not been very common. A few farmers

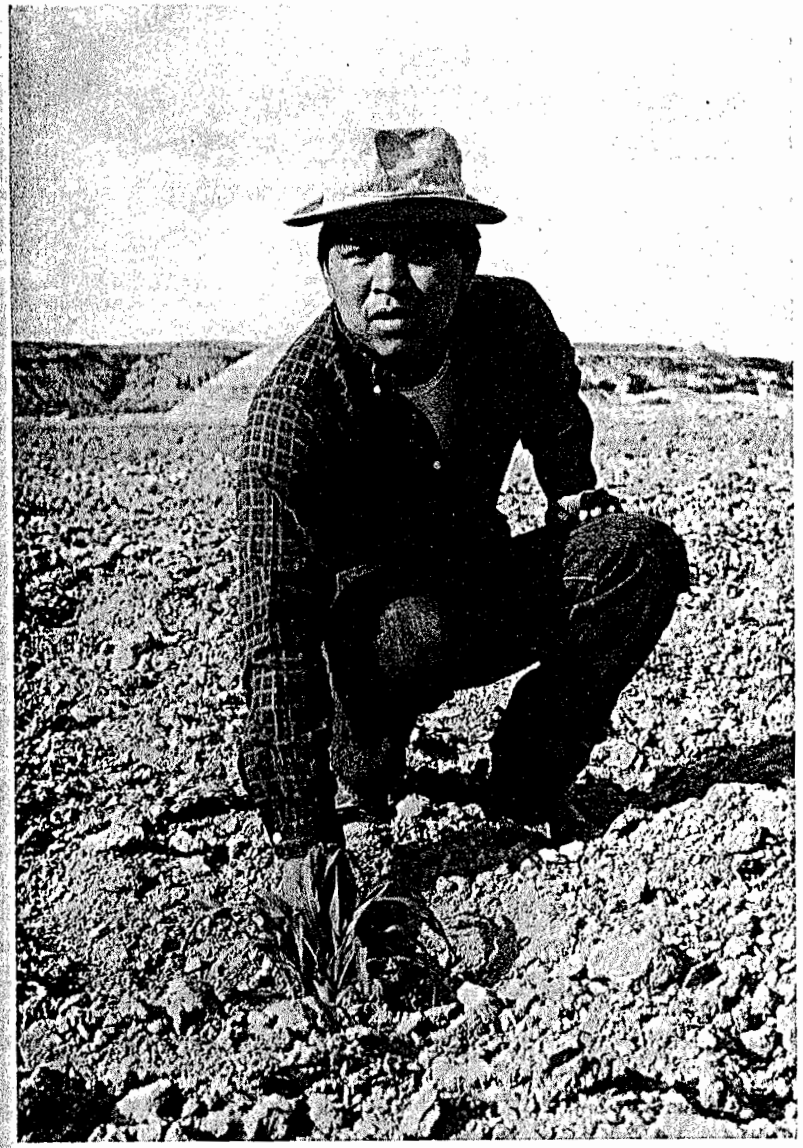

Plate 13. Young Moenkopi Hopi in a Ma'asau field.

bought insect sprays for their vegetable crops. In general, the attitude of the farmers to fertilization of the soil remains little changed and they still abhor a danger of contaminating the fields by the use of chemicals.

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Plate 14. Dry field shortly after harvest.

PRODUCTIVITY OF IRRIGATED AND NONIRRIGATED FIELDS. The difficulties attendant to quantification of data have made it practically beyond my hope to make an accurate comparison of the productivity of the two types of fields. Yet it appears fairly certain that the labor input in a unit of irrigated fields is much greater than in the same unit of nonirrigated fields if only because of the irrigation itself. Further, given the same amount of capital outlay, a greater area can be brought under dry farming than irrigation. On the other hand, as previously indicated, the annual output in the irrigated fields is greatly stabilized due to independence of rainfall, and there is even a possibility of reaping double crops. Finally, the availability of land for the two types of farming may influence the relative rent and hence eventual cost of production. These factors, though isolable in theory, are so fractious in practical analysis that I give the following only as an indication of the village farmers' response to the two techniques of farming.

Irrigated fields in Moenkopi reflect higher relative productivity than the nonirrigated in the density of hills ($5' \times 5'$ to $3' \times 3'$ in the irrigated *vs.* $8' \times 8'$ in the nonirrigated). The farmers are aware of this difference. However, as mentioned earlier, they also assert that the irrigated fields demand greater care and labor than the nonirrigated. No specific preference for irrigated over nonirrigated fields has been expressed. I have already cited the instances of the Moenkopi farmers who left the village and their irrigated fields on marriage for other villages, where they have been engaged in dry farming. Though extremely scanty as evidence, these appear to indicate that the full potential of irrigation farming has not been exhausted in Moenkopi and corroborates once again the previously reached conclusion on the absence of integration between irrigation and the traditional pattern of farming.

To conclude, the absence of a lasting demand for subsistence

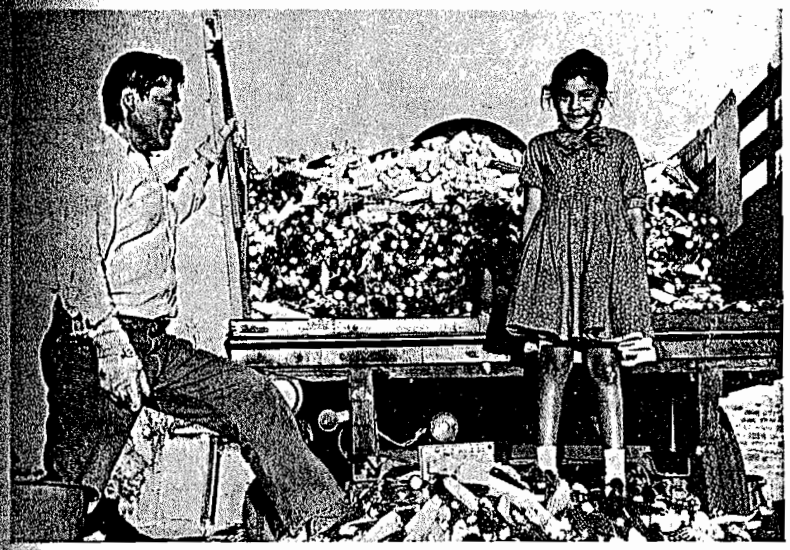

Plate 15. Man and young girl unloading the harvested corn from a dry field.

crops in the area and eventual participation in cash economy through wage work have left the technology of farming extremely conservative. Yet the farmers of Moenkopi are often proud of their farming activities and quote this heritage in comparison with the Navajo farmers in the same area. Though basic technological requirements are the same and the farmers of the two tribes are engaged in similar types of irrigation agriculture, the Hopi are wont to criticize Navajo farming techniques in terms of such relatively trivial points as the depth of planted corn seeds or the process of thinning the hills of corn. Apart from the economic significance, the present farming techniques are thus taken as a mark of tribal identity in this minority community on the Navajo Reservation.

Varieties of Cultivated Crops

Another striking index of the stability of subsistence agriculture in Moenkopi is the kinds of crops so far adopted by the village farmers. In the earlier period, the only crops in addition to the "Indian trinity" were cotton and wheat, which, however, remained marginal in the complex of Moenkopi agriculture.

The Navajo had long known of Moenkopi as "Where Cotton is Cultivated" (Van Valkenburgh, 1941:100). Mindelef (1891:33) and Christensen (1958:85) reported that cotton was typical of Moenkopi in the pre-allotment era. Indirect evidence of cotton in

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the early period is also found in a rock hollow called *Pavaukyaoki*, east of the village, which had been used for weaving (see p. 195). In 1911, however, it was already noted that "at present very little cotton [was] grown by the [Moenkopi] Hopis" (TCL, November 23, 1911), although Gregory found it still in cultivation in 1912 (1915:114).

The subsequent fate of cotton growing is unknown. At the present time no farmer appears to cultivate it. I could find only one farmer with a comparatively recent experience of raising cotton from 1948 to 1951 but never since.

Reference to wheat is still more scarce. Christensen noted it again for the pre-allotment period (1958:85). The Sun Chief mentions it for the 1900's (Simmons, 1963:108). Gregory found it in 1912 (1915:119). Though the cultivation of wheat is still remembered by many residents of Moenkopi, I could not obtain any indication of approximately when it disappeared. I suspect, however, that wheat dropped out of the Moenkopi crop complex much earlier than cotton, primarily owing to the availability of flour through the local trading posts since the early period.

After the withdrawal of the Mormons, the Tuba City Agency succeeded to the operation of the orchards and irrigated fields that the Mormons had developed in the area and conducted a fairly profitable enterprise based mainly on apples and hay (see p. 176–78). With encouragement from the Mormons and government, the Indian farmers planted a number of fruit trees in their fields. These included apples, pears, peaches, and apricots. Many trees still stand in the fields of Moenkopi and fruit is harvested in great quantity. As shall be discussed, however, they have not effectively been directed for sale but are mostly consumed domestically or used in ceremonial exchanges. In particular, there is no indication that fruit growing ever constituted a profitable enterprise as it did on the government school farms. Therefore, I regard fruit in Moenkopi as a variety of subsistence crop that continues to exist along with the other major crops.

The documents for the earlier periods indicate the early presence of the corn-bean-squash complex. John D. Lee noted the Hopi planting corn and melons in their summer settlement of Moenkopi during the 1870's (Cleland and Brooks, 1955). Stephen mentions "corn, beans, squashes, pumpkins and melons" in his letter of 1882 (HvJ, Def. Ex. G-245). A group of surveyors noted "corn, beans and melons" in 1906 (HvJ, Def. Ex. 243).

Corn occupies the most stable position in this complex of subsistence crops at present. Its varieties are blue, white, yellow (*takeji qa'ö,* Forde, 1931:392; Voegelin and Voegelin, 1957:A8.10), and sweet corn (*tawakchi,* Forde, 1931:392–93). Occasionally, Walapai corn (*ko:nin qa'ö,* Voegelin and Voegelin, 1957:A8.10) is planted as well.

Plate 16. Moenkopi woman taking roasted corn out of a stone oven.

How the sweet corn (*Zea mays saccharata* Sturt.) (Whiting, 1950:69) was introduced to the Hopi is not known (Forde, 1931: 392–93). In Moenkopi at present it is the most popular corn, and households which lack labor to plant the other types of corn seldom neglect growing it. Apart from the suspected recency of its origin, the special position of sweet corn appears to be primarily because of the Hopi preference for roasted fresh sweet corn, a favorite item in the early summer menu.

The importance of white and blue corn is derived from its multiple uses not only in traditional foods but also as an object of ceremonial and kinship exchange. In addition, the blue corn is unobtainable in outside markets and it is widely believed that the yellow corn, though on sale in markets, is too hard to make corn meal. In many households white and blue corn often occupy the largest area of all the fields planted in corn.

Aside from these three varieties of corn, the others are optional and not infrequently omitted from cultivation. An informant who has been planting white corn for several years mentioned that its

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main purpose was for sale. However, such a status was not accorded to it by the others who planted it as well.

It is difficult to determine the next most prevalent crop in Moenkopi today. While two varieties of beans (Hopi lima and string beans) are raised in considerable quantity by some households, others do not cultivate either variety. On the other hand, musk- and watermelons are almost invariably planted on every family farm irrespective of the size of the patch.

Hack mentioned adaptability of beans to sand dune farms in comparison to melons (1942:33–34) and gave this as a reason for the prevalence of bean growing in Hotevilla, ". . . where over 60 percent of the cultivated land is watered by rainfall only, and thus is farmed by the method of sand dune agriculture" (1942:33). Some farmers in Moenkopi are aware of this, although no attempt has been made to concentrate beans on sand dune farms. Further, the difficulty of sand dune agriculture in Moenkopi makes the ecological separation of beans and melons difficult and has led to competition in which all present indications are that the melons appear to be driving the beans out.

This is first seen in the allocation of crops to respective fields. The corn plots are relatively stable and seldom are rotated with either beans or melons. On the other hand, the melons and recently sweet potatoes are more often switched around from one plot to another. In this process they tend to invade the bean plots. Thus the rule that "'A melon field always keeps the same'" (Forde, 1931:391) does not apply in Moenkopi. Since no definite pattern of crop cycle is present in traditional Hopi agriculture (Beaglehole, 1937:36; Forde, 1931:391), crop rotation among the present Moenkopi farmers is largely a matter of individual adjustments based on considerations of such economic factors as available labor, domestic needs, amount of yield, and, marginally, salability.

Even in these terms, melons seem more advantageous than beans in contemporary Moenkopi. First, the processing of beans is slightly more cumbersome than melons, since the former require shelling, husking, and drying by women. Further, a tiny quantity of bean is almost meaningless for household consumption. Melons, on the other hand, can be appreciated as delicacies even if they are produced in small number. Finally, they can be sold more easily than beans. All relevant factors considered, melons are more advantageous than beans in the present economic context of Moenkopi. In melon patches, squashes, sweet potatoes, and pumpkins are often added as supplementary crops.

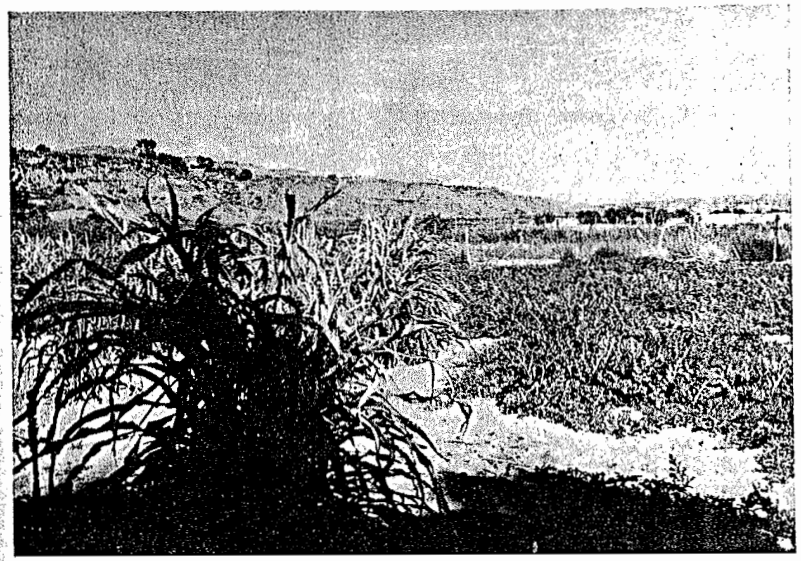

Plate 17. Communal vegetable garden in Lower Moenkopi; note the corn crop in the garden.

As with melons, a similar trend has been observed for vegetables, great varieties of which are now raised in the backyard gardens of Moenkopi homes. Occasionally, plots are prepared for vegetable crops in the corn fields outside the village. On the other hand, perhaps owing to the greater feasibility of home gardens and political antagonism in the village, many of the vegetable patches in the communal garden have been either abandoned or have lost their specialized use for vegetable growing. Some people have been planting corn in these plots. The vegetables now grown are chili, tomatoes, onions, carrots, cantaloupe, cabbages, and potatoes.

I could not decide which of these vegetables represent recent introductions from outside. Yet it seems the cultivation of vegetables in general has been increasing at the expense of wild vegetables, whose use had been limited in kinds as well as in quantity. The seeds of the vegetable plants, except for chili, are mostly purchased from outside and no attempt is made to preserve seed crops of the vegetables. The same applies to sweet corn seeds.[7]

[7] The purchase of vegetable as well as flower seeds seems common in other villages as well. A trading store in Second Mesa has had a display shelf of commercial seed bags for sale.

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To conclude, the kinds of Moenkopi crops have been remarkably stable and dominated by the subsistence plants all through the periods under consideration. No commercial crops have been added. As the contact conditions of the dual economy changed, certain crops became comparatively more prevalent than others, while certain others disappeared. Yet the core feature of the crop complex (corn-melon-beans) has been retained so far.

Disposal of Farm Produce

Native exploitation of the environmental differences between the Tuba oasis and the Hopi highland did not reach a stage of community differentiation of agricultural production, and no institution for the exchange of field produce emerged between Moenkopi and other Hopi villages, including Oraibi. Most of the agricultural produce thus flowed through the channels of kinship and ceremonial relationships as shown by the Sun Chief's visits to his relatives in Moenkopi "in order to conserve our food supplies [in Oraibi]" (Simmons, 1963:93, 108).

In the early periods of the village, the farmers took their early crops to the *Niman* ceremony at Oraibi to display them in the plaza during the dance and to be distributed among the contributors' kin in the audience. This practice is still observed by a small number of farmers in the village, who take the crops to Hotevilla and Bacabi, the only two villages that still give the *Niman* on Third Mesa. After the disruption of the Oraibi ceremonial cycle, however, the majority of the Moenkopi farmers ceased to offer contributions at the *Niman* ceremony and chose, instead, to distribute their field products to their kinfolk in other villages on informal occasions, on the occasions of kachina dances, or such individual kinship ceremonies as birth and marriage.

The general pattern of kinship exchange of agricultural produce remains well preserved in the traditional framework. Three levels of exchange appear differentiable here in terms of frequency and kinds of goods exchanged. First, the exchange is reciprocal, most frequent, and close to sharing between sister households and between those of parent and child. Between brother and sister households, on the other hand, it is usually the former that contributes field produce without reciprocation from the latter. Outside this range of kin, exchanges are formal and assume a ritual character. This is especially true in the exchange relationships between the households of father's sister and brother's son; a brother's son is expected to take meat obtained through hunting or, as has been more frequently the case in recent years, purchased at outside stores, to his father's sister (*kiya'a*, Eggan, 1950:40–41; see p. 236). The latter reciprocates with cooked corn foods (e.g., *piki* or *pigami*). On the occasions of kinship ceremonies (first naming, Kachina initiation, or wedding ceremonies), a large number of clan relatives are involved in the exchange of various goods, including blue corn meal, *piki*, *tugu:viki*, *nokwivi*, or basket plaques and ceremonial bows and arrows. The Kachina ceremonies also provide contexts for exchange of corn, melons, and fruit among the kinsmen.

The amount of field produce expended for these exchanges is considerable. For example, about 50 pounds of blue corn meal is cited as "payment" for the gift of a basketry plaque by a paternal aunt on the occasion of a child's Kachina initiation ceremony (Eggan, 1950:51). The child usually obtains more than one plaque. In one case, a girl was given eight plaques, making the return of corn meal about 400 pounds. Taking 56 pounds for the weight of a bushel of shelled corn, the amount needed for the "payment" would be about seven bushels. Given 20 bushels as the average yield from an acre of irrigated land in Moenkopi and assuming that the size of a household holding is about 3.5 acres, two-thirds of which, about 2.4 acres, are planted in corn, we obtain 48 bushels as an annual yield of corn per household. Consequently, about one-seventh or 15 percent of the yield of corn is consumed for gift exchange. This type of large-scale exchange occurs only when a child is initiated to the Kachina society. However, the occasions for ceremonial exchanges of a smaller scale are far more numerous. Thus considered, the necessity to meet these obligations alone appears to be a sufficient cause for the continued cultivation of white and blue corn. The ceremonial need is thus a dominant motive for continuing farming at present. This illustrates again the fact that agriculture in Moenkopi carries an aspect of boundary maintenance today.

Some produce from the Moenkopi fields has been sold to the local traders and Navajo for cash since the early days of the village (TCL). No distinction was made in this practice between sale and nonsale crops. The traders even bought corn from the village farmers. It is not clear when they ceased to purchase agricultural products from the Moenkopi Hopi. During recent years the Hopi of Moenkopi and other villages have taken the place of the traders as buyers of the Moenkopi crops.

The sale of crops to other Hopi is much less frequent than to the Navajo. In sales to the Hopi, *piki*, made of blue corn, occupies

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a dominant position. However, as the village came to contain households without farms or with an insufficient labor force for farming, cash transactions involving crops increased within the village as well. The Hopi from other villages, especially from Polacca, are said to have been frequent customers of the Moenkopi farmers. I was not witness to this during the field work, however.

Barter as well as cash sale of field produce have been conducted with the Navajo and continue at present. The Navajo bring mutton and jewelry to the homes of their Hopi acquaintances in Moenkopi and barter them for corn, melons, and fruit. I could not determine the current rate of exchange and a few Hopi women who dealt with the Navajo denied the existence of any fixed rate. The relationships between the Navajo and Hopi in barter are often characterized by the Hopi as "friendship" and appear stable enough to last for several years. However, the trans-generational continuity shown between the Navajo and Zuni (Vogt, 1955) does not exist in these relationships, nor is there a tendency to exclude other Hopi or Navajo from these "friendships."

Another apparently ancient form of transaction with the Navajo which involves field produce is entirely unilateral. It occurs on the occasion of the Navajo *Yebechi* dances during the fall and winter. When a dance is ready, a group of masked *Yebechi* dancers visits Moenkopi and collects contributions of melons and sweet

Plate 18. Melons displayed in a Moenkopi house yard for a gift to Navajo *Yebechi* dancers.

corn from the homes in the village. No reciprocation, even in the form of such ritual goods as blessing or prayers for the welfare of the Hopi donors, is made by the Navajo in return for these gifts. The *Yebechi* have visited other Hopi villages as well, and the Hopi frequently present caricaturized *Yebechi* clowns in their kachina dances.

Most of the Moenkopi crops have at one time or another been sold for cash to the Navajo, who visit the village for that purpose. Melons appear to be the most popular item of purchase. The melons, in season, are displayed in the front yards of the Hopi homes and Navajo buyers visit one house after another, inquiring about prices and qualities of the melons, sometimes even haggling.

In barter as well as sale, it has been the Hopi women that have dealt with the Navajo visitors. All the harvested crops are controlled by women; one housewife once told me that "Corn, beans and everything belong to a man when they are in the fields but once they are harvested and brought into a house, they are women's" (cf. Titiev, 1944:181). Transactions are conducted either in Navajo or in English but never in Hopi. Cash payments are made on the spot.

The above exchanges by the peoples of the two tribes have often been interpreted as symbiosis of the Navajo pastoralists and Hopi agriculturalists. However, such an economic differentiation seems to be disappearing in the Moenkopi area for the following reasons. First, a process of mutual diffusion of the respective subsistence patterns has been going on through the interactions over a few centuries. Agriculture itself has become a well-established pattern among the Navajo in many areas (Brugge, 1964). This is especially true in the Moenkopi area, where a large number of Navajo families have been practicing a similar pattern of irrigation agriculture. As a result, the Navajo customers of Moenkopi are mostly from outlying camps where farming remains a minor activity. Navajo influence on Hopi economic life has been comparatively slight and yet it has left a distinct mark on the few Moenkopi sheepherders (see p. 168). Second, participation in cash economy through wage work has assumed an increasing importance in the two tribes. This has tended not only to replace barter with cash transactions but also to direct the Navajo to outside markets and away from Moenkopi.

Thus, there has existed a modicum of competition between the Hopi farmers and outside merchants, including traders and supermarkets on and off the reservation, for the Navajo consumer mar-

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ket. Soon after the harvest, some Hopi women have taken their melons and fruit in pickup trucks, driven by their husbands, to distant Navajo camps for sale. These trips, apparently an established practice since the last war, do not last more than a day and often terminate before all of the produce is sold.

The present sales activities in general are neither planned nor organized in terms of the available stock of farm products. Consequently, it is a common occurrence in the village that households find themselves in short supply toward the springtime, a lean season of the year. One housewife mentioned the lack of storage facilities as the reason for rush sale of melons and fruit. However, the fruit could be stored for winter consumption by drying or by making preserves, a practice known but no longer common in Moenkopi. Melons certainly pose a problem and yet it has been occasionally noted that they last well into winter. No preservation efforts are expended on vegetables except for chili, which seldom lasts over a year, however. Only the blue corn has been in surplus as it has been customary among the Hopi (Spicer, 1962:195).

Housewives do not appear particularly concerned with the stock of their agricultural supply. Foods are now easily available by purchase in the stores of Tuba City and Flagstaff. For the last 10 years, a vendor of agricultural products from Phoenix has been frequenting Moenkopi and other Hopi villages as far as Second Mesa in a bus loaded with eggs, vegetables, and many kinds of fruit. The service of this "Fruit Man," as the villagers call him, has been highly appreciated in Moenkopi, where he appears once a week almost all the year round. Thus, the Moenkopi Hopi have been buying all the crops they themselves produce except for blue corn. It is not infrequent that even sweet corn is included in this purchase and canned corn on the market appears to be their favorite. The purchase of subsistence crops, including canned corn, watermelons, squash, and chili pepper, was already noted in Hotevilla during the 1930's (Brainard, 1935:245–48).

I have mentioned that Moenkopi farmers do not distinguish between sale crops and those for domestic consumption. Of equal importance is the fact that the crops for sale are not the surplus as distinguished from those for home supply. Though two early agents in Tuba City referred to the sale crops as "surplus" (TCL), it is clear from the above description of their sales activities that the present households in Moenkopi sell their farm products irrespective of the adequacy of their own supplies. Absence of differentiation between sale and nonsale crops and resultant dependence on outside markets for subsistence materials they themselves produce have been observed among other groups of Indians who came to be involved in exchange economy through the products of their subsistence economy (see Mintz, 1959:21–22).

LIVESTOCK INDUSTRY

Reservation Control

The Indian Reorganization Act of 1934 provides a most convenient point of reference in the discussion of government policies regarding Indian grazing activities.

Prior to the act, governmental efforts were confined to improvement of the Indian stock by the introduction of breeding animals (TCL; KCL) and by construction of rainwater catches (TCL) and later windmills. The pre-IRA government, however, did not control the size of the herds or range for the Indian stock. The Indian range was generally regarded as coterminous with the reservation, and the government intervened in disputes over the range territory that occurred mainly between Indian and non-Indian herders.

The individual allotment of grazing land was similarly regarded as unfeasible. In 1903 a superintendent wrote:

> I look upon the allotting of the grazing land as thoroughly impracticable and out of the question, for the reason that there is not enough grass on any quarter section; aside from the land scarcity for farming purposes, to support fifty head of sheep, and the scarcity of water will make allotment of grazing land impossible from the fact that the few only would have watering places and many would perish from the want of water (FDL, January 16, 1903; TCL).

Thus the government left the reservation land as an open range for the use of Indian livestock. Subsequent development of the livestock industry by the Indians, however, created the danger of depletion of the range resources and deterioration of the economic value of the stock animals through unplanned overstocking and overgrazing.

In order to rectify this, the Indian Reorganization Act initiated two basic programs: the establishment of land management districts and the institution of the permit system. This stock reduction program was carried out jointly on the Navajo and Hopi reservations.

Thus, in 1936 the original plan for 18 land management districts was laid out with "about 1,000,000 acres each" (Young, 1961:155).

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In 1937 the plan was adopted and resident supervisors were appointed by the BIA to manage the districts (Adams, 1963:46). With the establishment of the districts, the movement of livestock over the district boundaries was prohibited. In 1937 also the Navajo Tribal Council, empowered by the federal government, placed the first grazing regulations in effect (Young, 1961:155).

The livestock count was executed on the two reservations in the same year and the carrying capacity of each district was determined. The capacity has been calculated in sheep units (SU). A head of cattle is given four sheep units and a horse five (see Brophy and Aberle, 1966:122). The excess stock was eliminated without compensation to bring down the stock to the capacity level. In 1940 the first grazing permits were issued on the basis of capacity and the 1937 count (Young, 1961:155).

After the last war, the government transferred some of the regulatory functions of reservation resources from the BIA to the Navajo tribe. Thus, in 1953 the Navajo Tribal Council, with the authorization of the Secretary of Interior of 1952, established grazing committees (Young, 1961:158; Adams, 1963:48; Shepardson, 1963:60), which replaced the district supervisors.

At the present time, a grazing committee is in charge of issuance of new permits and probation of inheritance as well as sublease of the older permits (Navajo Tribal Council, 1962:15, 17). The present regulations further specify such details as the location of corrals within a half mile radius from a windmill (Navajo Tribal Council, 1962:23). The maintenance of the windmills, once a responsibility of the BIA, is now charged to the Navajo tribe.

It is generally assumed by the BIA and Navajo tribe that a permit, composed of a number of sheep units, also includes a right over range sufficient to graze the permitted number of stock. Thus the "customary use area," established through continuous use of a range on the permit basis, is respected by not only the Indian herders but the government and tribe as well. However, in order to allow a flexible use of the available range within a district, the government or tribe has not attempted to plot the use areas or freeze their distribution. Thus a theoretical framework of open range system is still maintained within each district.

Through the stock reduction program, Moenkopi came to belong to District 3 with 1,773,397 surface acres, the largest of all the 18 districts on the Navajo Reservation. Its carrying capacity was set at 47,288 SU (Young, 1961:170), which stands at present. The Moenkopi herders were assigned 3,487 SU in 1942. In 1943, however, the units were increased to 3,497 and this has remained unchanged to the present time.

The inclusion of Moenkopi in District 3 meant not only alienation from the Hopi District 6 but also submission to the jurisdiction of a local Navajo grazing committee, from the participation in which the Hopi have been excluded (see p. 59). I shall discuss the consequences of these actions on the Moenkopi livestock industry in the following section.

Livestock Ownership and Usufruct Rights to Ranges

OWNERSHIP AND INHERITANCE OF LIVESTOCK. Since the introduction of sheep, horses, and cattle among the Hopi, they have been regarded as the property of individual males (Watson, 1945:68). The cattle, in particular, have been individually earmarked and branded since the early period in the area (TCL). The brands have been inherited with or without modification.

Individual ownership of livestock appears to have derived partly from the fact that a number of men in Moenkopi and perhaps elsewhere in Hopiland acquired their first herds through purchase in cash saved from their work in the government. The Moenkopi livestock industry thus had an intimate association with the money economy from the beginning. The exclusion of women from ownership, on the other hand, was mainly due to the herding practice which has been strictly a male activity. Thus a father may give a portion of his herd to his sons or nephews for the latter's service in herding (Page, 1940:45). The sons who have not rendered such service are often excluded from inheritance. A male in-law may own stock which his father-in-law has given him in return for the former's help.

There are cases, however, in which attribution of ownership between a married couple is not so explicit. Thus, if a man has only daughters, the husband of one of the latter usually runs his herd after his death, but the herd itself is regarded as belonging to the household as a whole. In one case, a man with only daughters gave his entire herd to a grandson, when he reached old age. The herd itself had been run by his son-in-law until the grandson came of age. His other daughters had gone to California after marriage and when one of them had to pay hospital bills for her husband, the old man told his son-in-law to sell two head of cattle and send the proceeds to her in California. This appears to indicate that though women may be excluded from direct ownership of the

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animals, they still retain a right to draw benefits from the sale of the livestock.

Watson noted women's ownership of livestock (mainly sheep) in Oraibi and New Oraibi but observed that the stock was tended by husbands or brothers (1945:68–69). Beaglehole mentions for Second Mesa that the inheritance of livestock (mainly sheep) is ". . . customarily . . . by his sisters, brothers, and clanspeople generally, the widow, sons and daughters inheriting none at all . . . today children as well as the close clan connections inherit from the father; that is, there is a tendency to allow members of the bilateral kin group to share in the disposal of the goods" (1937:11). No case of livestock inheritance by a man's sisters or brothers has been noted in Moenkopi. Nor do Page's cases of cattle inheritance at Oraibi during the 1930's show Beaglehole's customary type of inheritance.

The exclusion of Moenkopi women from livestock ownership stands in sharp contrast to the Navajo practice. Navajo women often run sheep flocks by themselves. Further, they butcher and skin the sheep. The Moenkopi women have been seldom seen doing this; when butchering is necessary, they either let the men do it or hire Navajo women in return for hides and the inside of the sheep.

The introduction of the permit system, however, has brought about some confusion in the rules of ownership of livestock. This is chiefly due to separation of the herding activity from the criterion of stock ownership, now to be accompanied by possession of permits. Thus two women have come to own permits since the system was adopted. One of them inherited her father's permits. Since she was working as a clerk at the Tuba City Agency, she was well versed in the bureaucratic procedure of probation. Thus she registered all the permits under her name. On the other hand, her brother had been running the cattle until he was incapacitated by an accident. Now the herd is tended by their father's mother's brother's son with the latter's herd. This arrangement was derived from the fact that their father and the present herder's father used to tend the cattle together. The second Moenkopi woman obtained the permits from her Navajo husband at his death. She has not yet owned a herd on these permits, however.

Appropriation of and Usufruct Rights to Ranges. The customs relative to range rights have never been formulated explicitly among the Hopi. Page mentions, "The establishment of the original claims to range rights was a simple process of 'first come first served'. As long as the stock were not allowed to enter the cultivated areas they were free to graze near the villages" (1940:37). Though Watson reports the occurrence of grazing within the clan blocks (1945:68), it is not clear if the latter area was originally for farming. In Moenkopi, at least, the farming area has so far been well demarcated from the established ranges.

Because of the differences in herding practices between Moenkopi and Hopiland, it is difficult to speak of individual tenure of range land (Watson, 1945:69; Page, 1940:35) among the Moenkopi cattle herders. The latter have formed into several stable groups, each of which concentrated the herding activities around its own corral and range. Thus the ranges for cattle have been appropriated by groups instead of individual herders. Since all the available ranges were already appropriated during the 1930's, a newcomer usually joined one of the pre-existing herding groups on its range.

On the other hand, sheep ranges appear to have been appropriated on an individual basis. This again depended on the herding practice among the sheepherders, who usually remained close to the village.

Boundaries of the ranges have never been clear and a great deal of overlapping has occurred. Even today, it is not rare for the herds belonging to different herding groups to graze on the same range. In theory, however, the ranges already appropriated are respected by the herders, who seek permission from the original users before entering. Thus a Hopi herder from Hotevilla was met with threats of eviction from the Navajo herders when he and his brother moved their herd from the crowded range on Oraibi Wash to the range west of Dinnebito Wash in 1935. The Hopi cattlemen then offered services to the Navajo, e.g., procuring Hopi medicine, running errands as far as Winslow in a "jalopy truck," repairing and improving the roads of the range. It was only after offering these services that they were allowed to graze their herd on the Navajo range. Much the same procedure has been adopted among the Hopi herders as well.

The inheritance of range right per se does not exist among the Hopi herders of Moenkopi nor in Hopiland. The heirs usually make use of the area where the inherited herds have been grazing.

The content of the range right, finally, consists of the actual use of a certain range for herding purposes. No lending or borrowing of the ranges alone exists; one may have a flock without a range but never a range without a flock. A range is open to use by others when a herd or flock ceases to graze on it.

The permit system has not changed the basic characters of the

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range right except that one cannot claim a right to graze outside his own land management district.

Changing Volume of the Livestock Industry

Livestock operation by the Moenkopi Hopi was virtually nonexistent around the turn of the century. Only one man, a Navajo captive raised in Oraibi, built a sheep camp on a bluff south of Moenkopi Wash, about a mile east of the village. Otherwise, grazing activity was limited to Navajo sheepherders who had been increasing in the area and who often came into violent conflicts with the Mormon and gentile cattlemen over range distribution. In 1903 a superintendent mentioned that "the main reliance of these Navajoes for a living is their sheep" (FDL, January 16, 1903).

The number of Hopi sheepherders increased little during the first two decades since the establishment of the reservation in 1900 and probably did not exceed five. Even in 1937 the tally of Moenkopi stockowners showed only five sheepherders.

The range for these sheep was limited to the vicinity of the village, and the main watering spot was the Reservoir Canyon swamp area, where a sheep dip vat had been constructed (Gregory, 1916: map facing p. 144). A conflict was reported by Page (HvJ, Def. Ex. 230b) between the herders of the two tribes over the use of this area in 1937. However, apart from the upper reaches of the canyon, long in use as a Navajo range, the ultimate supervision by the government of the reservoirs contributed to securing Hopi access for watering purposes.

Saddle and draft horses must have already been prevalent in Moenkopi during the first decade of this century, since wagons issued by the government were extensively employed as an important means of transportation between Moenkopi and Oraibi, for freighting and farming. Horses do not seem to have been commercially raised, however. Burros were less common, perhaps because of the greater need for transportation in Moenkopi than elsewhere in Hopiland.

It appears fairly certain that cattle raising began much later than that of sheep. The first reference to cattle appears in 1909 (TCL), but they belonged to a Navajo. The existence of "a few cattle" on the Western Navajo Reservation as a whole is mentioned for 1910 (TCL), but tribal affiliations are not indicated. In 1911 "15,000 cattle" are reported for the entire reservation of the Western Navajo, along with "160 to 320 acres of grazing land each," allotted to the Hopi of Moenkopi (TCL). It is doubtful if these allotments were ever approved in Washington, since subsequent events do not give any indication of their official existence. In any case, it appears safe to assume that the Moenkopi Hopi came into the cattle business during the 1910's, shortly after the Navajo did the same in this area.

Three modes of entry into the business appear to have been common. First, the original herd was obtained from the local Navajo through trade of field produce or direct purchase in cash saved from government wages. Second, original herds obtained through purchase or inheritance in Oraibi were brought to Moenkopi. Page mentions in this connection that Oraibi had had very few cattle prior to 1902, when four Hopi "traded about $400 worth of goods and turquoise for cattle [in Jemez pueblo, New Mexico]" (1940: 45). At least one Hopi from Moenkopi brought a portion of this herd to Moenkopi during the 1910's. Finally, some sheepherders switched to the cattle business. Although this mode of entry into the cattle operation became popular only recently, one Hopi from Hotevilla had already made the change in 1927 and brought his cattle herd to the Moenkopi range during the 1930's.

All the cattle the Hopi came to own were beef cattle. No attempt has been made by the village stockmen to engage in dairy production. The raising of cattle was always been for commercial purposes. Consequently, with the rise in needs for cash, the number that came into the business increased and competition arose between the Navajo and Hopi herders over the available range land. Such conflicts between the two tribes are reported for 1914 (TCL) and for the 1920's (HvJ, Def. Ex. 230b).

These early conflicts were mainly due to the scarcity of stock water available to the herders. Before the government initiated construction of windmills around 1915, most of the stock water in the Moenkopi area was obtained from the tributary canyons of Moenkopi and Dinnebito washes or charcos (stock tanks to collect rainwater). The Navajo regarded the first source of stock water open to any herder's use, but some Hopi herders constructed camp houses and later even farms. These actions invited the violent resentment of the Navajo herders who feared the complete appropriation of water by the Hopi herders.

After the windmills became available, however, the limited water spots lost their former critical significance, and eventually most herders became dependent on the troughs constructed adjacent to the mills. Although disputes over the ranges thus decreased in frequency, the forage condition of the area was still so precarious that

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the herders were often forced to abandon one range and move elsewhere for better forage. This was another factor that contributed to the maintenance of flexible range rights among the Indian herders.

The state of range use by the Moenkopi herders shortly before the stock reduction shows little indication of overgrazing. In 1930, 1,300 head of sheep and 300 head of cattle grazed mainly to the south of the village, on Moenkopi Plateau and Coal Mine Mesa, which area was set aside for the Hopi herds through an agreement with a Tuba City superintendent (HvJ, Def. Ex. 196). In 1937, 1,000 sheep and goats, 300 cattle, and 40 horses were counted (2,400 SU), and 6,000 forage acres were regarded necessary to carry them. The subsequently proposed 65,000-acre area, deemed enough to provide the necessary forage acreage, however, consisted of the ranges that had already been in use by the Hopi herders from Moenkopi (HvJ, Def. Ex. 280b) and hence no serious problem of reduction was posed (HvJ, Def. Ex. 230b; see also Map 5).

In regard to conflicts between the Hopi and Navajo herders over range use, Page reports in 1937 that "There do not seem to be many outstanding complaints" (HvJ, Def. Ex. 230b). In fact, the 1937 count of Moenkopi stock was far less than the total amount allowed by permits subsequently issued on the basis of carrying capacity of the range. Hence, if most of the Moenkopi herders lost portions of their herds at the reduction, it was mainly because they could not round up their entire herds on short notice and thus were unable to have them registered *in toto*. However, from 1936 to 1942 overstocking was a fact in District 3, to which the Moenkopi range belonged (Young, 1961:171). Thus it was obvious that the increase of Navajo stock was the primary source of strain on the range capacity.

The significance of the stock reduction program to Moenkopi, then, lay more profoundly in the institutional innovations which came to affect the position of this Hopi community on the Navajo Reservation. First, the land management district system, which separated Moenkopi of District 3 from the Hopi Unit of District 6, was to prevent stock movement over the district boundaries. Some Hopi herders were frightened at the prospect of total alienation from Hopiland proper. In 1942 a Hopi superintendent reported: "Now it seems that some of the Moenkopi Hopis want to . . . move back to Old Oraibi bringing their livestock with them. One member from Moenkopi moved back to Oraibi with one hundred sheep before we were aware of the plan . . ." (HvJ, Def. Ex., III, 897).

Seeing a danger of ruination of the whole project, the Commissioner of Indian Affairs immediately wired back to refuse grazing permits to this Hopi herder (HvJ, Def. Ex., III, 898).

Second, freezing of the grazing permits within each district meant that the Hopi could no longer move their herds from Hopiland to Moenkopi even if they were to reside in the village by marriage. Since the livestock was owned and disposed of by men, grooms from Hopiland were forced to either abandon their herds to their kinsmen or to make other arrangements there. Livestock operation was thus closed to future newcomers to the village, and as land resources for farming were exhausted, Moenkopi reinforced further its image as a source of wage labor to the Hopi of Hopiland proper.

The Moenkopi herders were confronted with a unique problem of their own. While fencing appeared to secure their range from further Navajo encroachment, the herders had to comply with the regulations promulgated by the Navajo Tribal Council, in which they were not represented. Incentives for expansion of the stock operation, often spurred by competition with the Navajo herders, were now severely curbed by the limit set on the number of their permits. As the Navajo council came to assume greater functions in the management of grazing, the Hopi herders were deprived of opportunities for maneuvers which had been open to them when it was in the hands of local superintendents (see HvJ, Def. Ex. 196). Cut off from one of the major sources of increase in labor and capital for livestock business and subjugated under the control of an alien tribe, it did not take long for the period of decline of Moenkopi livestock operation to set in.

Tables 1–4 (see also Figures 3–5) show the subsequent changes in stock holdings and number of operators with permits since the stock reduction. They also indicate several trends in the Moenkopi livestock operation since that period. First, there is a general decline in holdings as well as number of operators for the entire period. The extent of the decline, however, depends on the kinds of stock animals. Thus, sheep and goats decreased more rapidly than cattle or horses. By 1950, while the cattle showed only a small decrease (134 SU less than in 1942), the sheep and goats represented only about half of the 1942 figure of 1,101 SU. If the 1940's were the period of decline in sheep, the 1950's were so for cattle; while the number of sheep has been maintained to the present at the level reached by the middle of the last decade, cattle holdings in 1958 were only slightly more than half what they had been in 1950, and they remained at the 1958 level until 1962 with slight fluctuation.

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TABLE 1. Livestock Holdings of Moenkopi (1937–62)

Year	Sheep	Goats	Sheep and Goats	Cattle	Sheep Units	Permitted SU
1937	667	77	744	414	2,400	
1942	1,041	60	1,101	469	2,977	3,487
1943	1,080	70	1,150	518	3,222	3,497
1944	835	31	866	472	2,754	"
1945	601	11	612	420	2,292	"
1946	576	8	584	438	2,336	"
1947	517	12	529	414	2,185	"
1948	528	11	539	437	2,287	"
1949	507	13	520	411	2,164	"
1950	494	11	505	335	1,845	"
1951	468	7	475	323	1,767	"
1955	375	10	385	372	1,873	"
1956	290	9	299	365	1,759	"
1958	381	28	409	245	1,389	"
1959	336	15	351	286	1,495	"
1961	338	18	356	250	1,356	"
1962	376	16	392	274	1,488	"

Source: Land Operations Office records, BIA Western Navajo Subagency, Tuba City.

TABLE 2. Number of Livestock Operators (1937–62)

Year	Sheep and Goats	Sheep, Goats, and Cattle	Cattle
1937	3	2	33
1942	7	3	27
1943	6	3	26
1944	7	2	25
1945	7	3	25
1946	9	1	25
1947	8	1	21
1948	8	2	24
1949	8	0	25
1950	8	0	26
1951	8	0	23
1955	3	2	28
1956	4	2	30
1958	2	1	24
1959	1	0	26
1961	2	0	27
1962	2	0	28

Source: Land Operations Office records, BIA Western Navajo Subagency, Tuba City.

TABLE 3. Average Individual Holdings of Sheep, Goats, and Cattle (1937–62)

Year	Sheep and Goats	Head	Cattle (sheep units)
1937	148.8	11.8	47.2
1942	110.1	15.0	60.0
1943	127.8	17.9	71.6
1944	96.2	17.5	70.0
1945	61.2	15.0	60.0
1946	58.4	16.8	67.2
1947	58.8	18.8	75.2
1948	53.9	16.8	67.2
1949	65.0	16.4	65.6
1950	63.1	12.9	51.6
1951	59.4	14.0	56.0
1955	77.0	12.4	49.6
1956	49.8	11.4	45.6
1958	136.3	9.8	39.6
1959	351.0	11.0	44.0
1961	178.0	9.3	37.2
1962	196.0	9.8	39.2

Source: Land Operations Office records, BIA Western Navajo Subagency, Tuba City.

TABLE 4. Horse Holdings in Moenkopi (1937–62)

Year	Number of Horses	Number of Owners	Number of Owners of Horses Alone	Average Holdings	Permits for Horses
1937	126	42	13	3	
1942	103	43	14	2.4	168
1943	124	52	21	2.4	
1944	122	51	22	2.4	
1945	121	50	22	2.4	
1946	126	49	20	2.6	
1947	106	40	16	2.7	155
1948	128	46	18	2.8	
1949	143	50	21	2.9	
1950	93	36	7	2.6	
1951	105	39	10	2.7	
1955	103	37	12	2.8	
1956	88	34	9	2.6	
1958	37	28	8	1.7	
1959	46	28	4	1.6	141
1961	55	29	4	1.9	
1962	46	23	2	2.0	

Source: Land Operations Office records, BIA Western Navajo Subagency, Tuba City.

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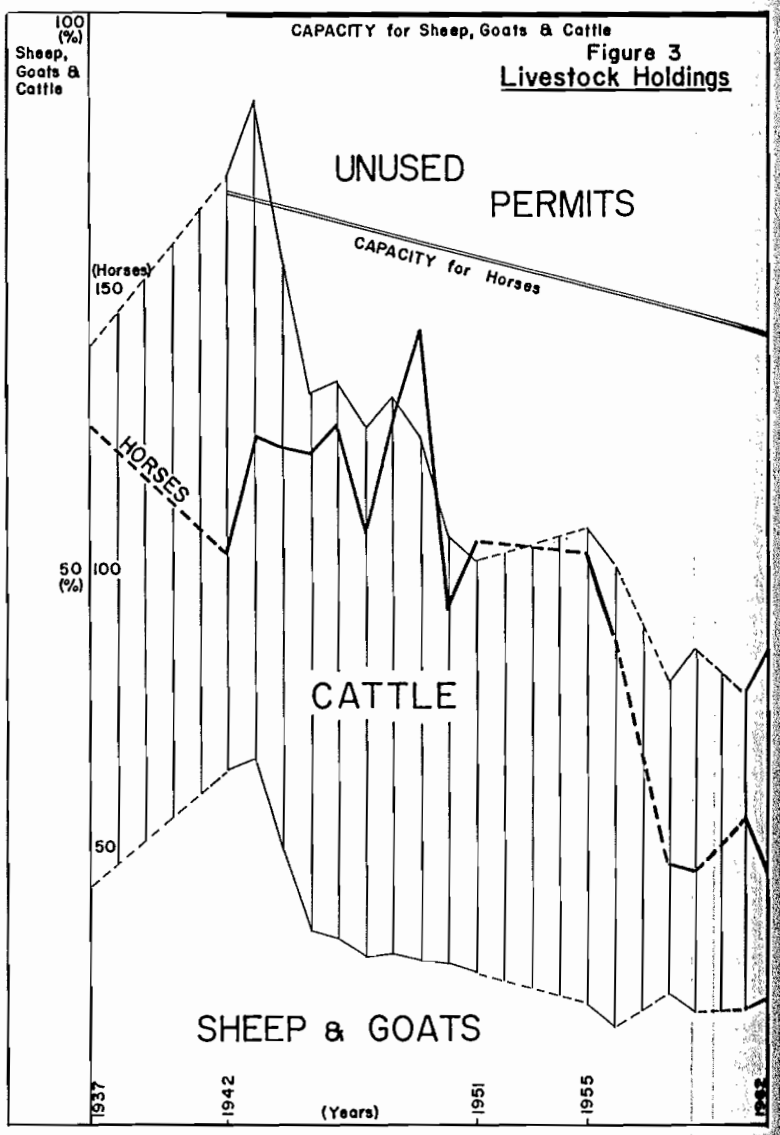
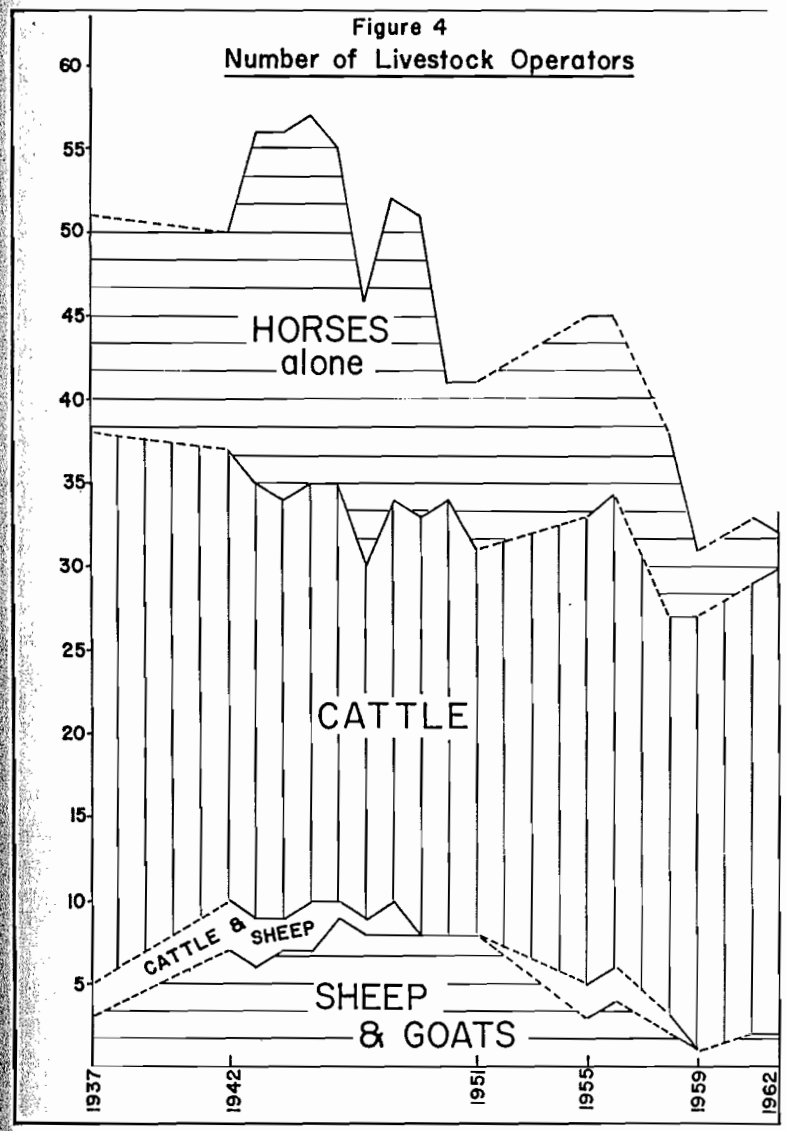


The rapid decrease in sheep and goat holdings during the 1940's is not reflected in the number of operators; however, there is a sudden drop in sheepherders from eight in 1951 to three in 1955, and at the time of my field work in 1962–63, only two sheepherders were noted for the whole village. The number of cattle operators,



on the other hand, showed a slight increase for the last two years (1961 and 1962).

The recent increase in the number of cattle operators is primarily because of the modern economic conditions in Moenkopi. First, while sheep need to be tended daily, cattle can graze wild during a

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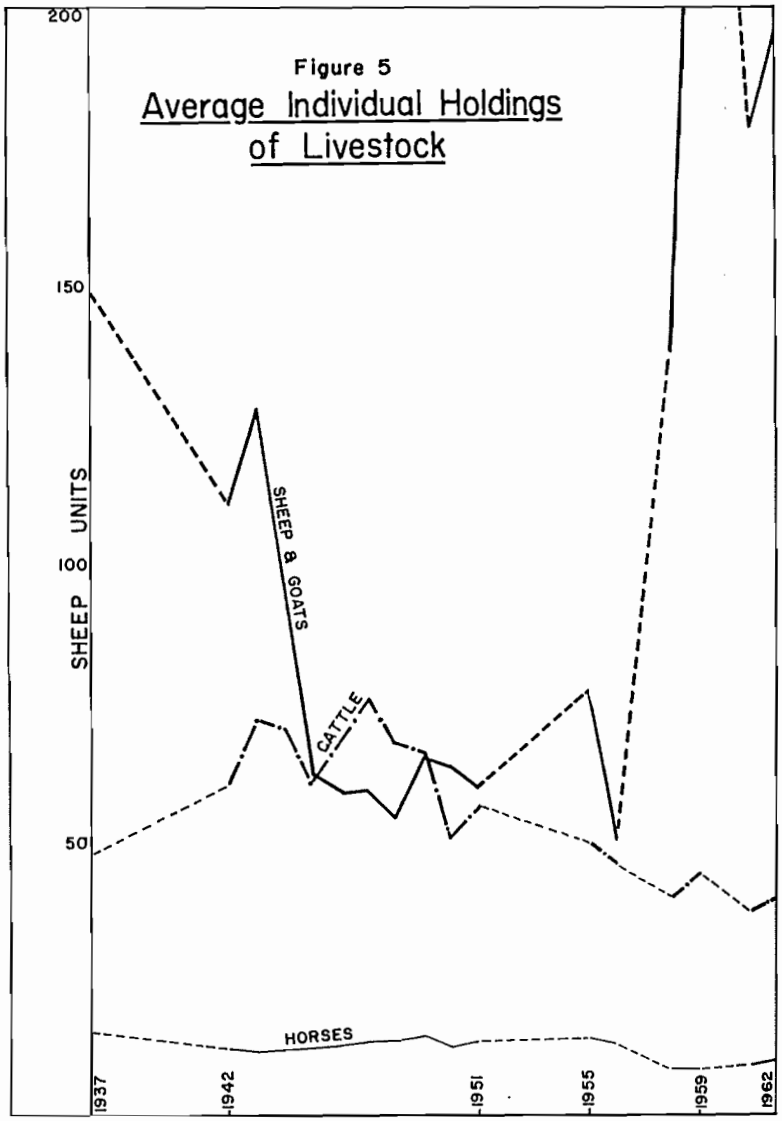

good portion of the week (Kennard, 1965:27). Further, running cattle can be made easier through cooperation in herding groups, while sheep herding has not been operated on this basis in Moenkopi. Thus cattle-keeping does not deter men from working for wages on weekdays. Finally, as shall be discussed later, market

demand for the two animals and their respective liquidity favor cattle under present economic conditions in Moenkopi. These factors induced many sheep operators to switch to cattle, while some young people lost no time in trading their inherited sheep for cattle.[8]

The government appears to be encouraging this trend, partly because of considerations of local Indian welfare and partly for conservation purposes. While sheep do not move very extensively, their utilization of the range grass can be more thorough than cattle and well-balanced utilization of the range cannot be expected as much from sheep as from cattle. Thus, while the total cattle holdings have been diminishing, the number of cattle operators has been growing, with a consequent reduction in individual holdings.

The simultaneous running of cattle and sheep has never been popular in Moenkopi. Although there were some who held both animals during the 1940's, they were the result of living in grazing camps. During the last decade, however, this practice as well as holdings of the two animals disappeared. Of the three that appear in the census for this type of holding, one belongs to Hotevilla, though grazing in District 3, while the other two adopted the Navajo pattern of herding and gave up living in Moenkopi.

Another notable trend in the last five years is the decrease in holdings of horses. This is clearly indicated in the number of those who own only horses. The latter dropped from 20 during the 1940's to 10 during the 1950's and to less than five in 1959. Their horses were saddle or wagon horses for transportation and their disappearance coincides with the influx of automobiles (see Kennard, 1965:27).

Combining all trends, there emerges an over-all decline in the livestock industry of Moenkopi, which had never reached the maximum number of permitted sheep units. Since 1958 about 2,000 SU or 57 per cent of 3,497 were left inoperative.[9] Undoubtedly, this decline is a result of Moenkopi's intensive participation in the wage economy. At the same time, one cannot deny the inhibiting effect of the cumbersome restrictions imposed on stock-holding by the government and the Navajo tribe. An old cattleman of Moenkopi

[8] Kennard has observed a similar trend in Second Mesa for 1961 and gives a similar explanation (1965:27).

[9] District 3 itself has remained well within the carrying capacity since 1943. Other districts which stayed within their respective limits for the same period of time are Districts 7, 11, 13, and 18 (Young, 1961:171).

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mentioned that he had to butcher the sheep given him by his Navajo friends in return for plowing service, because the sheep did not belong to District 3. Such a case as this occurs not infrequently.

Discrepancy in actual stock and permit ownership, owing to the introduction of the permit system, has already been pointed out. The control by the Navajo tribe of the livestock operation also resulted in a great deal of reluctance on the part of the Moenkopi Hopi to follow faithfully the regulations in the transfer of permits either as inheritance or otherwise. Many do not take the trouble of changing titles to the permits after the deaths of original holders. Frequently, the relatives, mostly sons, run the stock under the deceased permittees' names. For the period of 20 years since 1942, only seven cases of legal transfer (mostly inheritance) have been recorded, and the rest, whenever noted, were either left inactive or kept by close kinsmen for their own use, without bringing the matter of formal transfer to the Navajo committee.

Herding Practices and "Outfits"

Herding practices in Moenkopi have shown a significant difference from the practices in Hopiland proper. In Moenkopi sheepherders have operated individually and cattle herders in groups. In Hopiland, especially on Third Mesa (Watson, 1945:74), the reverse has mainly been the case. Page mentions, "Cattle groups are not organized as are the sheep herding. This is due to the Hopi practice of not herding cattle" (1940:36). Beaglehole observed the same: "At the other two mesas [First and Third] . . . the usual practice is for cattle to graze wild, and for several men to pool their small flocks of sheep and goats" (1937:49).

Two factors appear to be involved in the absence of group herding of the flocks in Moenkopi. First, the number of sheepherders has always been small, 10 being the maximum maintained from 1942 to 1946. A few among them also tended cattle and their sheep were herded on the ranges close to the camp houses built near their cattle corrals. The rest of the sheepherders maintained ranges close to the village and used corrals either within or near the village. As among some sheepherders of other Hopi villages, their herding was a matter of daily commuting between the village and ranges.

Individual sheep herding in Moenkopi indicates Navajo influence. Among the latter, sheep flocks are tended by the flock-owning families (Kluckhohn and Leighton, 1948:59). The Navajo in the Dinnebito area once lodged a complaint against the Hopi sheepherders from Third Mesa because the latters' sheep invaded Navajo ranges, and they evaded the charges by transferring the blame among the members of the group (HvJ, Def. Ex., III, 663, 690). In Moenkopi, however, one sheepherder built his own herding camp with the help of some Navajo sheepherders and has been living there most of the time. He is fluent in Navajo, wears an "Indian hat" (Adams, 1963:80), and visits Moenkopi only on ceremonial occasions. He has even adapted the Navajo value of prestige based on the size of one's flock and boasts of his holdings to outsiders, when actually most of the villagers are turning away from sheep. Another man left the village around 1950 to live in the camp he built, married a Navajo woman, and has been tending his own as well as his wife's sheep. This man does not come to the village even on ceremonial occasions.

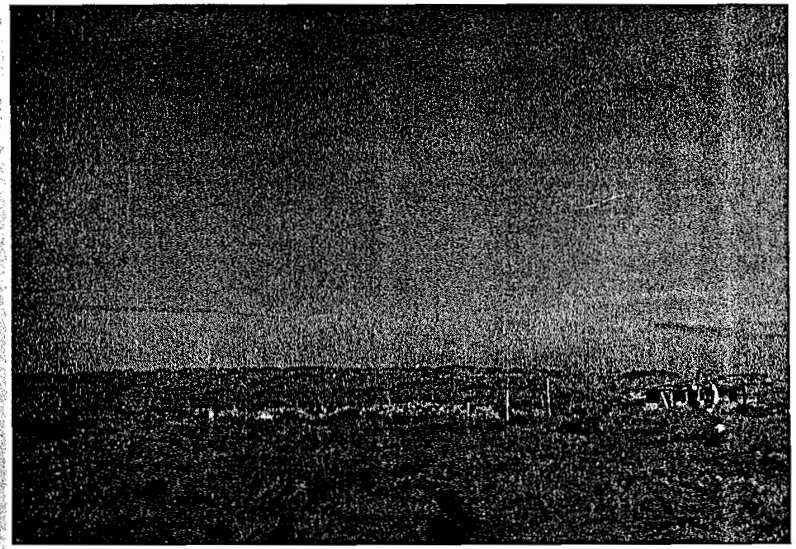

Plate 19. Sheep corral and a herding hut of an old Moenkopi man.

As previously mentioned, the cattlemen appeared in Moenkopi after the sheepherders appropriated the ranges near the village. In addition, the cattle operation required a larger area for range than the sheep. Thus they were compelled to seek the ranges farther out. In their search for ranges distant from the village, however, the Moenkopi cattlemen met the Navajo cattlemen who had already been using a large portion of the land. The Moenkopi cattlemen had to graze their stock on the Navajo Reservation in theory and

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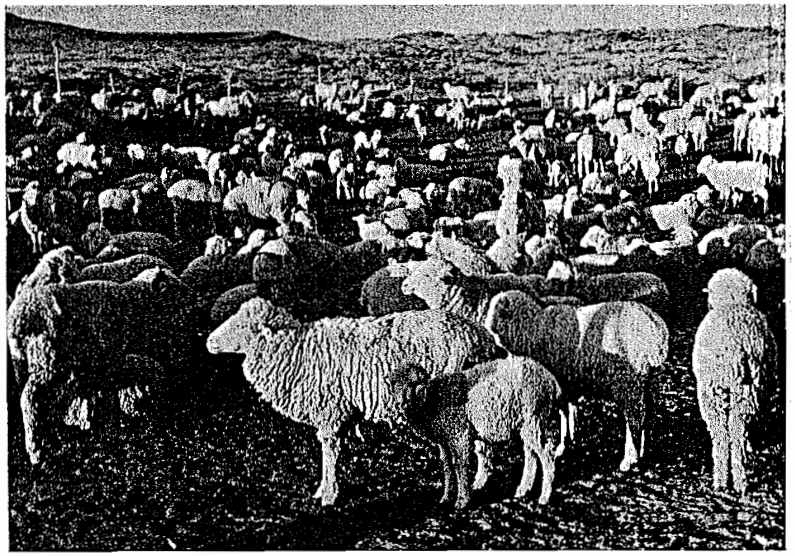

Plate 20. Sheep in the corral.

in the area already occupied by the Navajo in fact. Therefore, they could not rest in peace with the "practice of not herding cattle" (Page, 1940:36).

All the cattle operations so far recorded are in the form of group herding. The groups are formed most frequently by patrilineal relations (by brothers or by fathers and sons). The largest group, Outfit No. 1, was thus formed by eight partilineal relatives during the 1930's with a huge corral on Coal Mine Mesa. The group gradually absorbed the herds of other distant kinsmen as well as those of "friends." Smaller groups were organized on the same principle. Though much less frequently, male in-laws and such matrilineal kin as sisters' sons were also included in the groups.

The emphasis on patriliny in the cattle-herding groups of Moenkopi has been unique among the Hopi livestock operators. The group composition of sheepherders in Hopiland, for instance, does not reveal such patrilineal bias. Page mentions a sheep-herding group formed by an uncle and his nephews (sister's sons) or of friends.[10] I cannot determine if the patri- and matrilineal emphases are respectively associated with cattle and sheep-herding groups. However, the recent trend of switching from sheep to cattle in Moenkopi revealed a clustering, if for a short period of time, of

[10] Watson and Beaglehole do not specify relationships of group members.

matrilineal relatives, who once herded sheep independently, into a cattle-herding group (Outfit No. 5). The group was soon dissolved. The experience of this outfit, then, may indicate a peculiar difficulty of group formation by matrilineally related cattle herders.

The cattle-herding groups vary in size from three as minimum (Outfit No. 5) to 17 as maximum (Outfit No. 2). Outfit No. 2 is one of the oldest herding groups in Moenkopi (see Figure 6) and

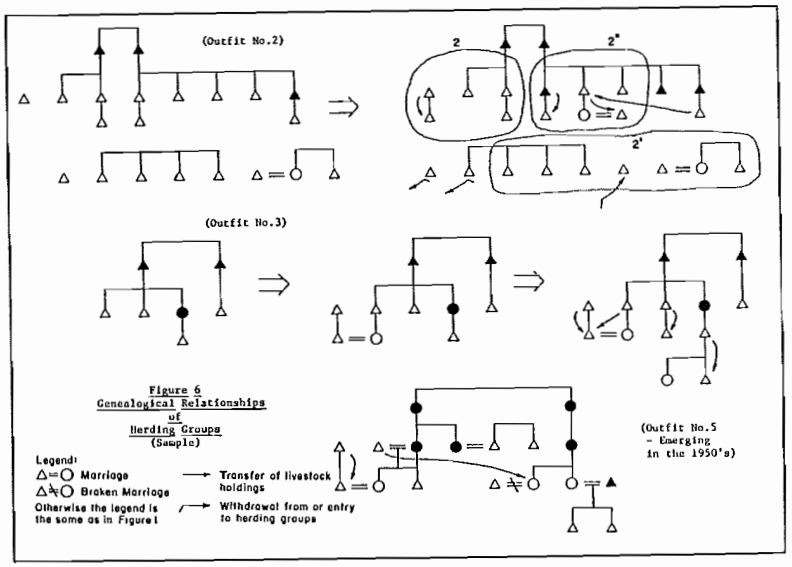

Figure 6
Genealogical Relationships of Herding Groups (Sample)

was begun by a man with BIA training in the mid-1920's. Their first corral was built on Coal Mine Mesa (see Map 6). As the group became larger, they increased the capacity of the corral, where the cattle sale began to be held for all Moenkopi as well as the Navajo stock in the area. However, as its size continued to grow, internal dissension broke out and in the late 1940's, it split into three groups, each of which built its own corral. This is the sole outfit that, starting around the same period with the other three, yet experienced such fission.

The other groups have been stable and while the corrals of two of them were later moved to other locations, the groups' organization remained fundamentally the same. Within each of the cattle-herding groups, however, there are occasional accretions and removals of members due to personality difference or difficulty in work arrangements, and it occasionally happens that a man goes from one corral to another, seeking the most favorable group he

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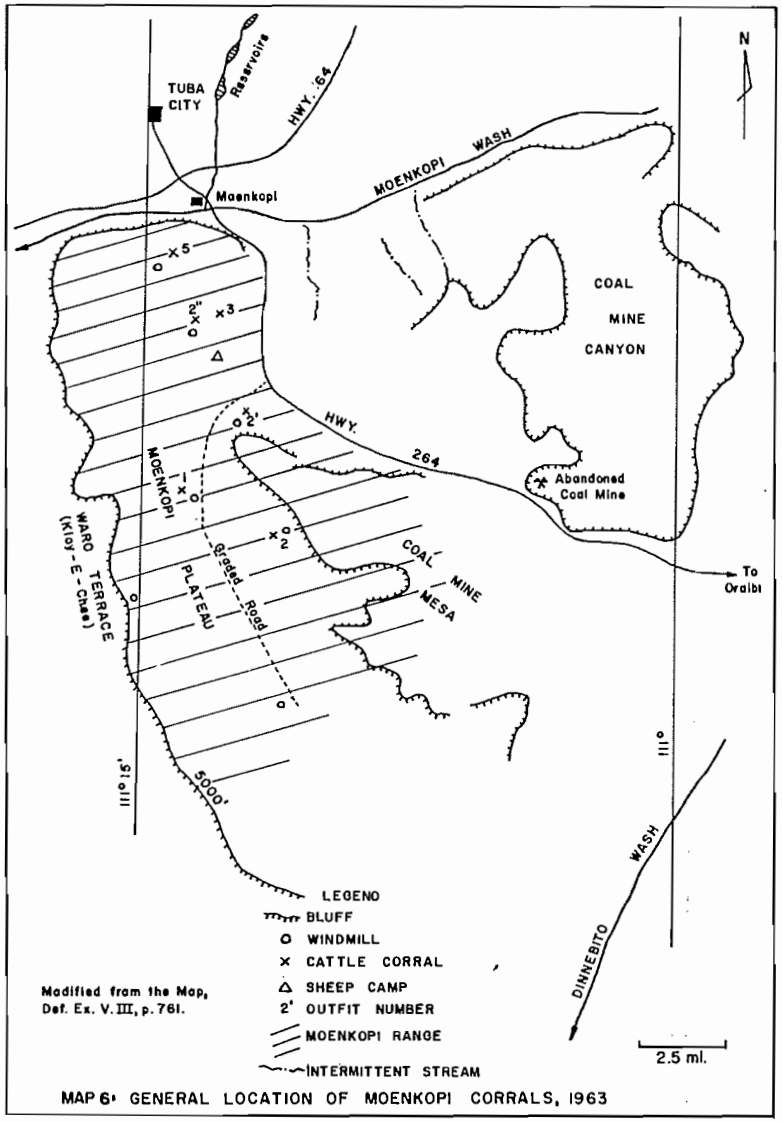

MAP 6. GENERAL LOCATION OF MOENKOPI CORRALS, 1963

can find. Those who have newly acquired cattle stock join one of the outfits already in existence. Thus, from the original four, there are now six outfits that properly belong to Moenkopi.

The locus of activity of each herding group has always been its corral, whose location was chosen with regard to the local water supply or windmills. At the present time, five outfits are distributed around three windmills on Moenkopi Plateau and Coal Mine Mesa. No outfit is now dependent on the natural water supply (see Map 6).

The group's task, now as formerly, consists of constructing and maintaining a corral, tending the joint herd, especially directing its seasonal movement to favorable pasturage within its range, and other chores (branding calves, rounding up for stock counts, conducting sales). These activities were once performed from the camps built by the corrals, where the cattlemen stayed almost all the year round, going back to the village only for reprovisioning. They even opened farms around the corrals. A few members of Outfit No. 5 built a solid rock house with a stove and kitchen. A number of men who stayed in the camps also ran sheep.

This camp herding, which developed before the stock reduction, disappeared as more labor was absorbed in wage work at Tuba City and elsewhere after the last war. In place of the camp living, it is now common for the group members to take turns inspecting the herd movement on weekends or during after-work hours. Otherwise it is left grazing wild. Thus, at present, labor shortage is a fact in livestock operation as well as other agricultural pursuits.

The competition with the Navajo herders over available range land had also existed on the Hopi Reservation. However, the Hopi herders there developed a somewhat different type of adjustment to this pressure. Page observed the following two methods of Hopi cattle grazing during his survey for the Soil Conservation Service in the latter half of the 1930's (1940:36). One is "to buy out Navajos living close [to] the village" for more range, while the other was to hire Navajo herders. The second method was especially common among the Hopi Tewa. On Second Mesa he found three cases of hiring Navajo herders for sheep herding alone, and two on Third Mesa for cattle herding (1940:46). Despite the long period of interaction with the local Navajo, the Moenkopi cattlemen adopted neither of these practices. One, who has had a Navajo herd his cattle since 1935, is originally from Hotevilla and has been a resident of Moenkopi since his marriage to a woman of the village. He is a brother of one of the two Third Mesa cattlemen Page observed.

The Navajo employee had already been herding the stock of other Navajo when the above three Hopi moved to the area by Dinnebito Wash. The Hopi decided to let this Navajo take care of their herds on his range in about 1935. This arrangement differs from the First Mesa practice in which the Navajo herd the Hopi stock on the Hopi ranges (Page, 1940:39, 42). The Hopi and Nav-

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ajo herders also made the agreement whereby "what we [Hopi] would be able to carry to him [Navajo herder], we would: firewood in winter, corn, melons or flour and other groceries once in a while." When they sold cattle for, say, $600, $10 to $50 in cash or $20 worth of groceries were given to him. Beyond these, no explicit terms of the contract were made. The relationship has continued even after the stock reduction, and at the present time the cattle of these Hopi herders are taken care of by the original Navajo herder as well as by his son-in-law. This arrangement recently acquired an added significance as the Moenkopi men were progressively taken to wage work and deprived of the time for herding. In spite of the advantages, however, this is the only case of such an arrangement between the herders of the two tribes.

Sale of Livestock

Since the introduction of the livestock industry, stock sale has provided a major source of cash income in Moenkopi. Although sheep often contributed to domestic consumption as one source of meat (Kennard, 1965:25), cattle have seldom been slaughtered for sheer subsistence needs. Their importance lay in the cash income derived from them. While the local trading posts have been the major buyers of lambs, wool, and hides from the sheepherders, cattle raisers often sought their market outside the reservation.

During the 1910's and 1920's, when the Hopi cattle operation had just begun, buyers came from outside through permission of the local BIA. However, in the late 1930's some Hopi were driving their cattle to outside markets by themselves, and a California paper once reported three Hopi youths from Hotevilla arriving at a town in California after a long drive in the summer of 1935. While such a feat has never been performed by the Moenkopi cattlemen, hauling cattle to Phoenix through contracts with a Flagstaff trucker was a common practice during the late 1940's. Outside cattle buyers also entered the reservation from Phoenix or Cortez and Denver, Colorado, and sales were conducted in designated corrals. Since the stock reduction, the BIA made a special effort to improve the marketing of Indian livestock on the reservation. Finally, about five years ago, a white buyer settled in Tuba City in order to concentrate on cattle buying, and thus, many Hopi cattlemen who ceased to haul since around 1955 have been dependent on him as the only constant buyer in the area.

Engagement in cattle sales obviously familiarized the herders with price changes, and many quoted experiences with price differentials in different areas. When they hauled cattle, price quotations from a slaughter house in Phoenix were consulted in a newspaper.

At present, a lamb is said to be sold to a local trader for $10 to $15.[11] The price for wool and hide has not been obtained.

In contrast to sheep, one informant gave the price of a spring calf at $10 to $20 in 1919 and mentioned that he used to sell 60 to 70 calves in one year. Even if this was a pre-reduction year, the number sold appears exaggerated. At the present time, the same informant said that six calves a year from his herd of 15 head was the best yield he could obtain. His average is two calves a year. The price of a spring calf now ranges from $70 to $85, while yearling steers can be sold for slightly more than $100 a head.

Many cattlemen in Moenkopi mentioned the difficulty in recent years of keeping calves long enough to sell at optimum price. Two indicated as a reason theft by Navajo, while another suspected the same by his own people. Others accused the open range system of fostering such unscrupulous behavior. Generally, however, shortage in labor due to intensive wage work appears to be the main cause for lack of constant management of the livestock operation and, consequently, for the low calf yield.

The potential profits possible in cattle raising are thus offset by the low level of calf production from small herds. On the other hand, the low prices offered to sheepherders are complemented by the increase in size of an average flock (250), in addition to the traditional use of sheep in ceremonial and kinship exchange. Thus considered, it is not the cash income alone but the labor expenditure for herding, opportunities for wage work, and availability of a relatively wide and seasonally less variable market to meet the demand for cash in emergency that are also taken into consideration in the recent preference for cattle.

WAGE WORK

Since the beginning of the BIA administration in Tuba City, Moenkopi was intricately tied to this agency town through employment in government enterprise. Two conditions contributed to creating this relationship. First, Moenkopi's proximity to Tuba City involved the village as a segment of the new reservation community. Second, the agency conducted a large scale of economic enterprises which the Mormon settlers originally developed in this oasis environment. The government was thus early established in the minds

[11] One herder mentioned $4 to $5 per lamb in bad years.

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