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THE ORAYVI SPLIT
A HOPI TRANSFORMATION
PART I: STRUCTURE AND HISTORY

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Arrested Hostile leaders under guard at the Hopi Agency in Keam's Canyon, in late October or November, 1906. While most avoid the camera, one man's face is visible, in left-center: this is Yukiwma, principal factional leader at the Orayvi split, and later chief of Hotvela. Photograph by Jo Mora, courtesy of John R. Wilson, Tulsa, Oklahoma.



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On the cover: "In Oraibi Plaza" by Louis Akin (1868–1913), 1904. Courtesy of former Arizona Governor and Secretary of the Interior Bruce E. Babbitt.

ABSTRACT

The split of Orayvi, the largest Hopi town, in 1906, continues to resonate as a profound event in Puebloan cultural history, exemplary for anthropological explanations of fission in small-scale, kin-based human societies. Multiple hypotheses have been offered (sociological, materialist, ideological, and agential), each pointing to alternative, often mutually exclusive, causes. But effective analysis of the split crucially depends upon accurate data and apposite conceptual tools. The received picture of Orayvi, both empirically and analytically, is seriously flawed, notably owing to neglect of the archival record. With particular attention to demography, social forms, and material conditions, this monograph seeks to redress those flaws, both structurally and historically. A new assessment of social structure focuses on the interplay of matrilineal kinship with Orayvi's "houses" and ritual sodalities. An examination of material conditions, especially in Oraibi Wash farmlands, draws on unconsidered survey and allotment records. The exact population of Orayvi in 1906 is reconstructed from an array of census sources (presented in detail), and correlated by houses, kinship groups, and ritual sodalities. An extended appendix (Part II) presents a series of unpublished documents. The work's principal aim is to produce a comprehensive picture of the Orayvi split's sociology, economy, demography, and history. As a "total social fact," the Orayvi split resists reductive explanation to just one set of factors, and requires detailed attention to contexts both structural and historical, material and cognitive.

chief in Soyalangw]); Tuvahēpnōm (Rabbit, wife of Lomalewtiwa [Maasaw, One Horn society chief]); Kyelnōmtiwa (Sand, Tsa'kmongwi); Talasngōnsi (Piikyas, wife of Kyelnōmtiwa); Palatsqa (Piikyas, son of Talasngōnsi and Kyelnōmtiwa); and Posiwngōnsi (Maasaw, DD of Loololma). Thus ritual office and ties to prominent clanhouses loom large in these allotments too.

Without examining additional Sections, what appears most interesting about Mayhugh's and Murphy's allotments thus concerns what they suggest about Orayvi's social structure and its configuration of property in cornfields. In the area of the floodplain selected for discussion, most allottees on both occasions had close associations with Loololma's and Tawakwaptiwa's Bear clan family, and that family's Soyalangw ceremony and sodality. The allotments discussed are within or close to the area identified by Bradfield and Levy, and though he is geographically inexact, probably also Titiev, as Bear "clan land". Rather than by matrilineal ties, however, the individual allottees are most obviously associated through ritual, affinal, and conjugal connections to the Bear clanhouse and other prominent houses associated with sodality chiefship (Snake, Patki, Lizard, Sand, Badger, and Parrot), including children, affines, and siblings of affines in those houses. This pattern clearly resonates with the house model of social ties, as a more adequate conceptualization of Orayvi social structure than a lineage model.

POPULATION

The obverse aspect to land restriction for the materialist hypothesis is population pressure. Bradfield (1971: 62) concluded that Orayvi's total population before 1865 was never more than 700 persons (his later account [Bradfield, 1995: 428; 448, n. 28] reiterated this position without alteration). Bradfield's inferences of late 19th century Hopi and Orayvi population patterns may appear plausible from his mode of exposition, but they are not well grounded historically. As shown below, his use of historical sources was highly selective, and mostly ignored Spanish-era documents. Bradfield (1971: 62) and Levy (1992: 115–116) hypothesized substantial

immigration to Orayvi from other villages in the late 19th century. Ethnohistoric evidence for this immigration, however, is lacking (with the exception of the Second Mesa move in spring 1906). There are sharp, culturally emphasized distinctions among Hopi dialects (that continue to cause dissension over linguistic standardization): families immigrating, say, in the 1870's–1890's would have been markedly differentiated from Orayvi Hopis by their accents, for observers like Peter Staufer and H.R. Voth, who were both fluent. Voth's diaries from the 1890's and early 1900's reported no influx of immigrants or the presence of speakers of different Hopi dialects. I thus agree with Cameron (1999: 76), who concluded that population increase (which she did think was present) was not caused by late 19th-century immigration.

Older Hopis do identify population pressure as a factor in the split, calling attention to a historical prophecy or predication that once the house rows extended beyond a certain point, the population would need to disperse. No Orayvis appear to have died in the smallpox epidemic of 1898–1899 (Whiteley, 1988a: 90–91). Again, specific evidence of a hitherto-unknown internal population increase in the two decades before the split is lacking, however; and I do not find Bradfield's historical assessment persuasive. While it is impossible to reconstruct an entirely reliable diachronic picture, there are indications Orayvi's population in the late 19th century was lower than it had been for much of the previous three centuries. The great majority of Hopi population estimates from the late 16th century forward are higher than for 1900. Upham modelled pre-European Hopi population at 29,305 in 1520 (Rushforth and Upham, 1992: 94–95). Even if he is wrong by 75%, that would still yield a total population of more than 7,000—more than three times the 1900 total. The Coronado documents of 1540 suggest a Hopi population of ca. 8,000, from which I infer the Orayvi area contained 1,500–3,000 inhabitants (Whiteley, 1988a: 15). In 1583, Luxán, a generally reliable chronicler of the Espejo expedition (in contrast to Espejo himself), estimated Hopi population at 12,000 (Hammond and Rey, 1929: 105–108). In 1664, a record of

the Franciscan missions indicated 1,236 souls at Orayvi, 900 at Awat'ovi and Wälpi, and 830 at Songòopavi and Musangnuvi (Brew, 1949: 17). After the Pueblo Revolt, population surged from an influx of Rio Grande refugees. How many joined Orayvi's orbit—and how many survivors of Awat'ovi's destruction in 1700 removed there too—is indeterminable, but some did (cf. Whiteley, 2002; Thompson, 1950: 31–32). Even after many refugees returned to Jemez, Isleta, and elsewhere in 1716, and before the return migrations of the 1740's (including of Payupki, the Tiwa community on the west side of Second Mesa, overlooking the Oraibi Valley), total counts in the 1740's and after are much higher than for the late 17th century (e.g., Brew, 1949: 29–34). In 1745, Fray Carlos Delgado, who led the repatriation of Payupki to Sandia, reported of the six extant towns (Wälpi, Musangnuvi, Songòopavi, and Orayvi, with two new additions—Supawlaví and Hanoki), "I can assure your reverence (since I saw it, and the count was made by me and my companions) that there are 10,846 persons among them, including young and old" (Hackett, 1937, III: 414). In 1760, again from first-hand observation, Father Juan de Lezaún reported, "more than eight thousand Indians" in five Hopi pueblos (Hackett, 1937, III: 469). In 1775, Escalante reported a Hopi population of 7,494 (E.B. Adams, 1963: 135). Given that Orayvi was the largest Hopi town, it is probable that its size exceeded 1,000 people: "It is like the capital of the province the largest and best arranged of all and perhaps of all the Interior Provinces. . . . Its population approximates eight hundred families" (Morfí, 1782, in Thomas, 1932: 108)—which at six to the family would yield 4,800 people. The only very low estimate during this period, and unlike *any* of the others, is Anza's figure of 796 for all Hopi villages in 1780; Hopis suffered from drought and smallpox that year, but as Brew (1949: 37) noted, Anza's estimate is "ridiculous", reflecting the brevity and circumstances of his visit.

For the mid-19th century, Hopi totals were reported at 2,450 in 1846; 10,950 in 1850 (Orayvi's share was 5,000); 6,720 in 1851, prior to a smallpox outbreak in 1852; 2,000–2,500 in 1856; and 2,500 in 1861 (School-

craft, 1851–1857, I: 244, 519; III: 633; Whipple, 1855: 13; Donaldson, 1893: 15, 35; Correll, 1979, II: 41). Even if we use one of the lowest of these figures (Charles Bent's in 1846), 2,450 total Hopis (or 350 families in Bent's estimate, i.e., at seven per family) would still suggest a population for Orayvi of 1,000–1,200, since it typically accounted for roughly half the 19th century Hopi totals. Major H. L. Kendrick's estimate in June 1856 followed a visit from his base at Fort Defiance (Correll, 1979, II: 42–45):

The so-called "Seven Pueblos of Moqui" are situated some 90 or 100 miles to the west of us. . . . At present there may be some 2000 or 2500 inhabitants in these seven Pueblos. They say that their numbers are decreasing, which is undoubtedly true (Kendrick to Meriwether, 6-12-1856, quoted in Correll, 1979, II: 41–42).

Pueblo Agent John Ward's similar estimate of 2,500 in 1861 (NB: after the smallpox epidemic of 1852) reported 800 at Orayvi (Donaldson, 1893: 35).

In 1863, Kit Carson reported 4,000 Hopis, based on his time spent in the villages during the Navajo roundup (Donaldson, 1893: 34). The same year, Charles Poston gave an estimate of 4,000–7,000 (Donaldson, 1893: 33), and in 1869, Special Agent Vincent Colyer reported a total of 4,000 (Donaldson, 1893: 36). Kendrick's, Carson's, Ward's, and Colyer's figures were based on firsthand experience. From their restudy of historic Hopi population estimates, Rushforth and Upham concluded:

From 1664 until 1851, the Hopi population averaged about 6,400 (plus or minus 25 percent) and was distributed among six villages (five, after Awatovi's destruction). Oraibi was the largest of the villages, containing perhaps as many as one-fourth or even one-third of the total Hopi population. . . .

The end of Hopi population stability occurred in 1852. . . . Some time during the period from late 1851 to November 1853 . . . , another severe smallpox epidemic devastated the Hopi. . . . The smallpox epidemic . . . thus, resulted in a major demographic transformation of the Hopis (Rushforth and Upham, 1992: 108; 113).

Even despite severe famine in the mid-late 1860's (Whiteley, 1988a: 38), and *possibly* smallpox ca. 1868 (Beadle, 1873: 587), total Hopi population remained near or above 2,000; after a visit (to First Mesa) in 1873 with Mormon explorer Jacob Hamblin, Beadle (1873: 586) estimated 3,000 in total. In

1879, Mormon Wilford Woodruff spent several days at Orayvi, reporting a population of "about 1,000 people", and noting, like Bourke (below), from his visits between 1874 and 1881, a large number of children (Woodruff, 10-23-1879). Woodruff was accompanied by Ira Hatch, who had lived in Hopi villages as a missionary (Peterson, 1971: 181-182), whom Bourke (1884: 363) characterized as the "shrewdest and brightest person" in the Mormon community at Sunset, and who spoke Hopi "with fluency".

Bourke's own account of Orayvi population stated:

Personally, I have made several trips to Oraybe: the first in October 1874, with General Crook, and the last in October 1881. . . .

The population of Oraybe cannot be far from 1500. . . .

A number of half-ruined and abandoned houses would seem to attest the gradual diminution of population, but there was nothing to strengthen such an idea if one turned to the herds of burros, goats, dogs, and naked children.

Of the last, we saw and counted eighty-five on the roofs of one street. . . .

Looking back into the broad valley, we scanned an expanse of broad acres of corn, melons, and beans, and pumpkins, and in every house store-rooms, piled high with these products, spoke of plenteous harvests. . . .

Altogether, Stroul [his companion] counted 203 children, of both sexes, between one month and eight years of age. The count was made with great care and under the best advantages, and I am persuaded is somewhat under the real number in the town. We did not see many horses, but there were numbers of burros and good-sized herds of sheep and goats. Saddles and bridles for horses and donkeys were in every house (Bourke, 1884: 329-333).

Bradfield (1971: 62) argued that Bourke's note about children indicated a rapidly growing population. Perplexingly, however, Bradfield failed to present Bourke's concurrent actual population estimate (1500) for Orayvi (as well as his report of abundant harvests). Bradfield speculated that Orayvi's population grew from "660" in 1866 to "900" in 1890; two thirds of that growth owed to natural increase, he claimed, and one third to a purported migration from Songöopavi following a smallpox epidemic of 1866-1867. But Bradfield stated no concrete evidence for *any* of these assumptions: for the claimed rate of natural growth (which depends on unsupported inferences from selected population

figures), for the supposed epidemic of 1866-1867 (as opposed to that of 1851-1853, for which evidence is very good [Donaldson, 1893: 53]), or for a supposed move from Songöopavi.

In 1885, Navajo Agent John Bowman estimated Orayvi at 1,050 out of a Hopi total of 2,139 (Census of Moquis Pueblos Indians, 1885), and in 1890, Orayvi was estimated at 905-ca. 1,000, out of a Hopi total of 1,996 (Clark, 1893: 49-50). In the same year (1890), Navajo Agent Vandever (1890: 168) reported 2,200 Hopis in all. From first-hand observation (probably supported by discussions with Alexander Stephen and Thomas Keam), Fewkes estimated Orayvi's population in 1891 at 1,200 (Fewkes, 1922: 275). Mayhugh's (2-14-1983) figure of 853 people (excluding nine allottees at Mùnqapi) may have been undercounted (see chap. 9). Superintendent Burton reported Orayvi as "nearly 1,000 people" in 1902 (Burton, 4-29-1902) and "1,000 people" in 1904 (Burton, 7-15-1904).

Bradfield's account of Mùnqapi and Kiqötsmovi population was similarly speculative, rather than based on identified historical records. He inferred a major migration in 1907-1912, following his sense that the Orayvi Wash had completely downturned by 1907:

The secondary migration has commonly been attributed to loss of morale on the part of the people who stayed on at the old pueblo. Its real cause I suggest, was loss of farm land in the lower third of the valley due to the dissection of the wash. Some families moved down to Kyakots'movi, at the foot of the mesa, so as to be nearer to the fields in the upper two-thirds of the valley upon which they were now largely dependent for a living; others moved away to Moencopi in search of new farm land (Bradfield 1971:45).

Social and economic causes of migration to Mùnqapi may well owe in part to pressures on Orayvi resources, but plausible population figures from 1902-1914 indicate no precipitous increase just after the split. Bradfield's explanation of relocation by Friendlies to Kiqötsmovi seems rather forced, and it is unclear why he would dismiss the social causes of that gradual post-split movement, which are stated as mere matters of fact by many Hopis involved, i.e., religious conversions and personal disagreements with the

autocratic and, after his return from California, increasingly contrarian Tawakwaptiwa (cf. Titiev, 1944: 94). It is also hard to see how removal to Kiqötsmovi would have much enhanced access to lands in the upper Oraibi Valley, and indeed in late 1909, Tawakwaptiwa sought to drive out from Kiqötsmovi most of those who had taken up residence there (see above). Bradfield was evidently unaware of the impact of the allotment program of 1908–1911, and its role in re-arranging use-rights in the Oraibi Valley. As noted above, the returned Hostiles moved from Orayvi to Paaqavi during this period, and, via the allotment program, secured rights to farm in the upper Oraibi Valley—intentionally separated from the Friendlies, most of whom received allotments south of the Mennonite mission. Although allotment was suspended in January 1911, the question of ratification remained unresolved for several years, with continuing effects on actual land use.

Bradfield (1995: 429; 448, n.29) inferred a population of 100–120 Mũnqapi residents at the split, supplemented shortly thereafter by 80 Orayvi emigrants, and asserted that about 140 people migrated from Orayvi to Kiqötsmovi in 1908–1911. He cited no source for any of these inferences either, however, and not even a reference to Levy's (1992) study of Orayvi population. At Mũnqapi, the 1900 census recorded 86 people (see chap. 10). By 1902, 150 Hopis were recorded, and others continued to move in: 150–200 were noted in 1903 (Godfrey, 1988a: 44, citing 1903 letters by Western Navajo Superintendent, Milton Needham). A government buyout of Mormon settlers from Tuba City in February 1903 (Whiteley, 1988a: 37) allowed wider Hopi access to farmland, and the opening of the Moencopi Day School in October 1905 (ARCIA, 1906: 193) may also have attracted more residents from Orayvi. In 1905, the village was listed as having "about 150" inhabitants, with 38 Hopi pupils enrolled in the new Moencopi Day School at its opening in October; again in 1906, the total reported was 150 (ARCIA, 1905: 180; 1906: 193, 481). In December 1906, Mennonite missionary J.B. Frey, who had been living at Mũnqapi since 1905, reported that Mũnqapi "has 200 inhabitants"

(he listed Orayvi at 800) (Frey, 12-18-1906). And in 1908 (before the allotment census of that year), the total figure for Mũnqapi was 182, but with an almost identical number of pupils, 39, enrolled at the Moencopi Day School as in 1905 (ARCIA, 1908: 80, 143); the latter would again suggest there had been no sudden increase after the split. In 1914, Gregory (1915: 119) estimated the Mũnqapi population at 210–225. In short, the pattern of increase was much more gradual than Bradfield's projection.

Superintendent Lemmon's (8-30-1906) record, one week before the split, showed Orayvi's population at 924 (presumably including the ca. 50 recent migrants from Second Mesa). I believe that figure is a little too low. But at ca. 875 (close to Bradfield's 1906 total, taken from *Old Oraibi*, of 880), Lemmon's count may represent a *decrease* over the previous two decades, notably in the wake of migrations to Mũnqapi. Bradfield's idea that Orayvi in 1906 was in a population boom unheard of in its history is not supported by the historical record.

CIRCUMSCRIPTION

If a pure relationship between population size and ecological carrying capacity was not the cause of hitherto uncountenanced pressure, other historical forces, largely neglected in the anthropological record, had recently impinged upon Orayvi's domain, however. Following U.S. annexation of New Mexico in 1848, influences on the remote Hopi were for a long time indirect (cf. Whiteley, 2004a). The most significant was intermittent conflict between the U.S. Army and the Navajo, especially after the establishment of Fort Defiance in 1851. I noted above Bradfield's inclusion, in the updated version of his thesis, of the effect of Navajo livestock on the erosion of the Hopi Washes. This is a very important issue. However, as with the greater part of Bradfield's "historical" accounts, his claim that Navajos occupied Black Mesa with their livestock from the 17th century forward is quite simply wrong. Bradfield (1995: 426) depended for this position on two sources. The first was an article by Hoover (1931) on Navajo nomadism, written before any systematic ethnohistoric research on changing Navajo human geography. Brad-

field's only other source was the Navajo Land Claim research of the 1960's, which sought to prove Navajo occupancy of Black Mesa by interpreting tree-ring dates from sites purported to be Navajo. Notwithstanding that some of this research has subsequently been reproduced in a few academic sources (e.g., Kemrer 1974, Brugge 1994), its conclusions are highly questionable, not least because of its context in adversarial litigation between Navajo and Hopi. Its dendrochronological methodology, cultural inferences, and use of the documentary record, were convincingly refuted by Florence Ellis (e.g., Ellis, 1974b), and indeed the Indian Claims Commission dismissed the archaeological findings:

The Commission has concluded that the weight of this archaeological evidence failed to overcome the many historical accounts written during this early American period which do not show any substantial Navajo tribal movement into the overlap area prior to the establishment of the 1868 Navajo Treaty Reservation (Indian Claims Commission, 1970: 304-305).

In short, Bradfield's almost exclusive dependence on this research was ill-advised, both for the beginnings of Navajo appearance on Black Mesa and for the chronology of Navajo pastoralism.

Prior to the mid-19th century, Navajo residence sites were concentrated in regional areas, the westernmost of which lay at Canyon de Chelly. Raiding Pueblo and Hispano villages occurred throughout the 18th and 19th centuries, from the Rio Grande west to Hopi (e.g., Reeve, 1958, 1959, 1960, 1971; McNitt, 1972). That pattern was predicated on residence in defensible locations distant from the raiding targets. As W.E. Freeland put it, in the context of harassment of Hopis below Burro Springs by Navajos in 1911:

... it is my understanding that before the coming of the white man that the Hopis, while living in mortal dread of raids by the hostile tribes, were able to keep the settlements of these hostile peoples about the distance of a night's march from the villages. This would be about 40 or 50 miles as the Hopi is particularly noted for his running long distances. ... The Hopi's position was impregnable and he could easily make a night march and be back at his mesa fortress before there was time for any counter attack. ... (Freeland, 11-14-1911).

Throughout the 18th century, Navajo population was much lower than in the late 19th

and it was located considerably farther east. In 1786, during peace with the Spanish, Navajo population was estimated at:

[S]even hundred families more or less with four or five persons to each one [ca. 2,800-3,500 total population] in its five divisions of San Matheo, Zebolleta, or Canon, Chusca, Hozo, Chelli with a thousand men of arms; that their possession consists of five hundred tame horses; six hundred mares with their corresponding stallions and young; about seven hundred black ewes, forty cows also with their bulls and calves. ... (Garrido y Duran, 1786, quoted in Reeve, 1960: 204).

Canyon de Chelly was first occupied by Navajos in the 1750's, as they moved south and west from Dinétah, old "Navajo land", in northwestern (modern) New Mexico, and from the Cebolleta area near Mount Taylor, owing to Ute and Comanche pressures (Brugge, 1972; Reeve, 1960: 202). In 1796, Lt.-Col. Antonio Cordero, "a veteran of the New Mexico presidial forces who participated in a number of campaigns against the Apaches" (McNitt, 1972: 36; cf. Matson and Schroeder, 1956), compiled a thorough report on all Apache groups, including the Navajo, whose westernmost location, as in Garrido y Duran's report of 1786, was Canyon de Chelly (McNitt, 1972: 36, n. 14; cf. Reeve, 1971: 105)—80 miles east of Orayvi.

From raiding and their own husbandry, which was evidently on a very small scale through the 18th century (Kelley, 1986a: 308), Navajos built up livestock holdings significantly in the early to mid-19th century, fostering a *rico* system, with some headmen holding very large herds (cf. Kelley, 1986b: 18-19):

The Nabajos are an industrious, intelligent, and warlike tribe of Indians, who cultivate the soil, and raise sufficient grain and fruits of various kinds for their own consumption. They are the owners of large flocks and herds of cattle, sheep, horses, mules and asses. It is estimated that the tribe possesses 30,000 head of horned cattle, 500,000 head of sheep, and 10,000 head of horses, mules, and asses; it is not a rare instance for one individual to possess 5,000 to 10,000 sheep, and 400 to 500 head of other stock (Bent, 1846, in Schoolcraft, 1851-1857, I: 243-244).

When Fort Defiance was established north of Windowrock in 1851, the U.S. army's relations with Navajos were intermittently peaceful and hostile. In 1855, New Mexico territorial governor, David Meriwether, sought a lasting treaty that would acknowl-

edge the true extent of Navajo territory. Though unratified by Congress, the ensuing Treaty of Laguna Negra was treated very seriously by all parties, including the principal Navajo leaders (McNitt, 1964: 195; McNitt, 1972: 261). The agreed western boundary, at the "Meriwether line", ran from the confluence of the Chinle Wash with the San Juan River on the north to the confluence of the Zuni River with the Little Colorado River on the south (McNitt, 1964: 198-199; for the boundaries, see McNitt, 1972: 437). The line, a little to the west of Ganado, seems to have been a genuine reflection of western Navajo extent at that juncture. Navajos were gradually beginning to move farther west, especially during periods of hostility with the soldiers at Fort Defiance, however.

The Ives Colorado River expedition of 1857-1858 traveled eastward from the Hopi Mesas to Fort Defiance, encountering the first, sparsely populated Navajo settlements near Steamboat Canyon (Ives, 1861: 28). In 1858, W.D. Whipple, cartographer to a military expedition from the fort, produced a "Sketch of the Navajoe Country" (see Wheat, 1960, vol IV: 100);

[I]t is an excellent map so far as it goes. It shows in the west the Moqui (Hopi) towns, and the "Grazing Ground of the Navajoes" is outside (just west of) the "Boundary line of the Navajoe Country as fixed by the Meriwether Treaty" (Wheat, 1960, vol. IV: 101).

These indications of western Navajo extent coincide with the Hopi conception of their own historic boundary line, arranged with Navajo leaders, that passes just west of modern Ganado. This resulted from an agreement around 1850, and was underwritten by the exchange of *tiiponis*, or sacred palladia between prominent leaders in both tribes (e.g., Nequatewa, 1936: 52-59; MacGregor, 8-6-1938). That agreement has frequently been cited by Hopi representatives in court testimony involving land disputes with the Navajo over the last five decades. The *tiiponi* received by the Hopi leaders is still maintained by patrilineal heirs to the Snake clan *momngwit* at Wälpi; it was presented to the court in the 1960's during the Healing vs. Jones case (that addressed Hopi and Navajo aboriginal use areas), and has been produced before U.S. Senate hearings on Hopi and Na-

vajo land rights (cf. J. and S. Page, 1982: 209).

At the height of the Civil War, in July 1862, Brigadier General J.H. Carleton, commanding the Union Army in New Mexico, effectuated a brutal plan to defeat the Navajo and Apache. Those who surrendered were to be transferred to a military reservation for four years at Fort Sumner on the Pecos River in eastern New Mexico; all males who resisted were to be shot. Kit Carson led the devastating Navajo campaign. By December 1864, 8,354 Navajos, approximately two-thirds of the entire Navajo population, had surrendered. Carson's campaign forced fleeing Navajos westward: perhaps 4,000 fled across the Colorado Plateau, including near the Hopi Mesas (Correll, 1972: 33). Some sought refuge on Black Mesa in the upper reaches of the Hopi Washes, as Navajos had occasionally done during military campaigns of the Mexican period (e.g., Brugge, 1964), but it was only after release from Fort Sumner in 1868 that Navajos really began to encroach upon Hopi lands and waters, with a serious impact on erosion. The 1868 Navajo Treaty Reservation was placed in the heart of contemporary Navajo country, straddling the recently created border between New Mexico Territory and Arizona Territory: its western edge lay just east of Ganado, and 50 miles east of First Mesa. The government distributed livestock to released Navajos who moved to the reservation:

It was estimated that 8,000 sheep, and 1,025 goats were placed on the reservation at that time [1868]. Amsden states ([1934]: 198-199) that 30,000 sheep and 2,000 goats were distributed to these Indians in 1869, and 3 years later 10,000 more were brought in. Although these figures are low in comparison to the 48,000 Navajos . . . and 800,000 to more than 1 million sheep and goats reported on the reservation in recent years [i.e., the 1930's], it is evident that the period following 1868 marked a great increase in grazing and was the beginning of a critical time in the erosion history of the area (Thorntwaite et al., 1942: 69).

The 1868 Reservation could not accommodate growing Navajo population and pasture for livestock, however. Impelled by political-economic forces (see below), some Navajos began moving west and south with their flocks almost immediately. In April 1870, the first Hopi Agent, A.D. Palmer (4-

23-1870) recommended that firearms be distributed to the Hopi to defend against Navajo encroachment. The plan was put into effect the following year: "During the month of May, 1871 the [Hopi] villagers killed six Navajos for stealing or attempting to steal livestock from their pueblos" (Stephens, 1961: 62). By the 1880's, there was direct competition over water sources with all the Hopi villages, including Orayvi. As Scott noted in 1893, "The springs about the Moqui pueblos are the value, as water commands the lands" (Donaldson, 1893: 47).

During the 1870's, Mormon settlers from Utah Territory also began to intrude upon Orayvi's domain, establishing communities at Mũnqapi, Tuba City, and along the Little Colorado River. Indian Agents started to recommend establishment of a reservation to protect Hopi resources:

The Navajo Indians, immediately on the east, have for some time manifested a disposition to encroach upon their best grazing lands, and have only been restrained from doing so by the presence and influence of their agent. On the west and southwest, within the last twelve months, about 400 emigrants [i.e., Mormons] have settled not far from the lands claimed by this tribe, and I understand several hundred more are expected in less than a year. This being the state of the case, I would most respectfully and earnestly recommend that a reservation, of sufficient extent (say thirty miles square [i.e., 900 square miles]), so as to include all their villages and grazing lands) to meet their wants, be at once set apart by the Government for them, before any further encroachments be made upon the domain which they have so long occupied (ARCIA, 1876: 5-6).

That in 1876 an Indian Agent (W.B. Truax) resident at Keam's Canyon for more than a year should describe Navajo residences as "on the east" of the Hopi is an important indication of contemporary Navajo extent vis-à-vis Orayvi. Truax's successor, W.R. Mateer, continued to report Navajo encroachment on Hopi farms and pastures in the late 1870's (Stephens, 1961: 65).

Western additions to the Navajo Reservation in 1878 and 1880 (as far as what would become in 1882 the eastern boundary of the Hopi Reservation) recognized some of these de facto movements. The by now primarily pastoral Navajo economy faced increasing effects of political-economic trends emerging from the dominant society, mediated by a "flood of traders":

The individual Navajo household was . . . under almost constant pressure both to increase and to diversify its production, particularly during the early railroad era, after wool prices fell. . . .

The pressure to pay their trading-post debts . . . induced families to raise more stock. If that was not enough, they also produced rugs and jewelry for trade.

The pressure on families to increase market production also allowed them to survive on marginal range and to colonize more of it, because they no longer needed to farm. Grazing, however, altered the natural environment. As both human and animal populations grew, people colonized more and more land until finally the range was filled. But population growth did not stop, and families continued to depend on livestock or even expand it, because neither the merchants nor the government offered a non-land-based alternative (wage work), and the demand for handicrafts was too low to support most families. The land consequently became overgrazed and erosion set in.

The pressure on households to produce for the market may have even quickened population growth. . . .

The market orientation of individual households, together with its corollary, the decay of the self-sufficient community, also almost eliminated communal land tenure, the pre-Fort Sumner form. The dominant form of land tenure became that of households, singly or in small groups, through original claim or inheritance. A vestige of communal tenure survived, however, in the outfit, as land competition, drought, and range erosion, forced many households to seek new land . . . (Kelley, 1986b: 30-32).

Kelley's account encapsulates the causes of Navajo movement onto Hopi lands in the 1880's and thereafter, including north, south, and west of Orayvi. While Hopis experienced some aspects of the same market forces, their subsistence economy remained largely autonomous, and Hopi population was stable overall, growing at a very gradual rate (see below).

On December 4, 1882, Hopi Agent J.H. Fleming proposed boundaries that on December 16 became the Executive Order Moqui (Hopi) Reservation (2,499,558 acres):

In addition to the difficulties that have arisen from want of a reservation with which you are familiar, I may add that the Moquis are constantly annoyed by the encroachment of the Navajos, who frequently take possession of their springs, and even drive their flocks over the growing crops of the Moquis. Indeed their situation has been rendered most trying from this cause, and I have been able to limit the evils only by appealing to the Navajos through their chiefs, maintaining the rights of the Moquis. With a reservation I can protect them in civilization. Being by nature a quiet and peaceable tribe, they have been too easily

imposed upon, and have suffered many losses (Fleming, 12-4-1882).

Several attempts to remove Navajos from the Hopi Reservation occurred over the next few years, with little success. In 1888, Herbert Welsh, head of the Indian Rights Association, undertook a month-long inspection of conditions on the Hopi Reservation:

At each of the [Hopi] communities mentioned the complaint of the people was the same,—the injuries which were inflicted upon them by the continual intrusions and depredations of the Navajos who steal their corn, their melons, their horses, and who in many instances have settled upon their reservation, and treat the Moqui lands as though they belonged to them, making use of the Moqui water, springs and driving the lawful owner from them. . . . For years they have received assurances from the government that the Navajos shall be restrained but without result (Welsh, 9-26-1888).

In response, on October 10, 1888, troops were sent. In the field, Col. E.A. Carr was persuaded against removing Navajos from the Hopi Reservation, however, by Chee Dodge, the influential Navajo leader (Stephens, 1961: 84, citing Carr, 11-15-1888). This military decision favored white settlers, whom, it was thought, would be more vulnerable to Navajo incursion, if Navajos were forcibly excluded from the Hopi Reservation. Hopis protested by withholding compliance from government programs they had in some instances petitioned for. In 1889, the Boarding School at Keam's Canyon opened (following a petition in its favor from First and Second Mesa leaders):

From the very beginning the Hopis attempted to use this school as a political weapon. Their philosophy was simply this: "If the government will protect the Hopis against the encroachments of the Navajos, we will send our children to school; if not, we won't" (Stephens, 1961: 85, quoting Keam, 1-15-1890).

In June 1890, principal Hopi leaders, including Loololma from Orayvi, journeyed to Washington, where they met with Commissioner of Indian Affairs, T.J. Morgan. Again, they complained of Navajo encroachment, especially on their meager water sources (Moquis Chiefs conference minutes, 6-27-1890). Shortly thereafter, in October 1890, Morgan visited the reservation with the Commander of the Department of Arizona, Brigadier General A.D. McCook. They met with Hopi leaders at Keam's Canyon:

La-lo-la-my [Loololma] said that the Navajos trespassed so much upon their watering places that it was difficult for them to find sufficient water for their own herds; that the Navajos were stronger, and took advantage of them by not only appropriating the water of their springs but often stealing their corn, melons, and other fruit, their sheep, goats, and even horses; that the Navajo agent, Vandever, had repeatedly promised to drive the Navajos back upon their own reservation, but his promises were always forgotten, at least never fulfilled (Donaldson, 1893: 56).

Shortly after the Commissioner's departure, encroachment resumed:

I wish to state concerning the Navajoes that notwithstanding your orders, they have been moving their herds out among the [Hopis] ever since you left. Until now they have eaten the last vestige of the [Hopis'] corn stalks and the most of their winter grass. They are a standing insult to the Government and robbers of the weak and the complaints of the [Hopis] are not only just but call for most decisive action on the part of the Government.

I certainly think that troops should be sent at once to drive the Navajo herds from among the [Hopi] even though the department should not be ready to deal with the whole Navajo tribe (Collins 11-28-1890).

The invasion by Navajo livestock clearly had an adverse effect on ground cover and associated patterns of soil erosion.

Establishment of the Hopi Reservation did nothing to settle disputes between Orayvi and the Mormons. Since Mũnqapi was not included in the reservation boundaries, even officially, Hopis there were still operating largely on their own recognizance, without even the formality of Indian Agency purview. Despite good relations early on, Orayvi farmers conflicted with Mormons over water and land use throughout the period from 1879–1902, when the latter left Tuba City. Tuuvi's complaint in 1879 about Mormon appropriation of Hopi fields and water to Agent Mateer has been cited above. In 1882, Talti, Tuuvi's brother-in-law, reported to F.H. Cushing that the Mormons "took our cotton fields away" (Cushing, 1922: 263). In 1885, Tuuvi was beaten up by Mormons in the Mũnqapi area in a conflict over fields (Christensen, 1885).⁷ In 1892, Mayhugh allotted nine Hopis at Mũnqapi (Mayhugh, 2-19-1894), but soon after, he learned of ongoing land disputes with Mormon settlers:

⁷ Tuuvi died ca. 1887 (from natural causes, according to older Hopis I have asked about this).

The Oraibis claim that their families once owned all of the land at Tuba City and used all of the water and the Mormons came there about 20 years ago and commenced driving them gradually from the best land and have taken the water until they have little or none—they further state that one Lot Smith a leading Mormon plowed up this spring the planted crop of corn, beans, and melons of one family⁸. . . . Supt. Collins [of the Hopi Sub-Agency] believes a great injustice has been perpetrated upon the Oraibi village of the Moqui tribe in this particular by the Mormon settlers, in which opinion I concur (Mayhugh 6-22-1892).

Mayhugh's nine Hopi allotments comprised 601 acres along Moenkopi Wash, and he allotted 167 acres to three Navajos downstream (Godfrey, 1988a: 34). Mormon settlers forcibly appropriated Hopi fields in the allotments, however. In 1896, Acting Navajo Agent Constant Williams came from Fort Defiance to investigate:

[Williams] confirmed that several Mormons had taken from the Hopi the dam and ditches around Moenkopi, and had falsely obtained a decree from local courts awarding them, as prior and original appropriators, all the waters of Moenkopi Wash (Godfrey, 1988a: 36).

In response to Williams' recommendations, Indian Service Inspector James L. McLaughlin reallocated the lands (to eleven Hopis and five Navajos) in 1899, and on January 8, 1900, these were included in the newly established Western Navajo Reservation (Nagata, 1970: 34). Farming and grazing rights in the Mũnqapi area have been contested between Hopis and Navajos ever since. In 1995, the U.S. District Court awarded an exclusive Hopi use area around Mũnqapi of 83,000 acres, but did not join this to the main Hopi Reservation.

Within the 1882 Hopi Reservation, Navajos progressively encircled the Hopi villages. Charles Burton, the new Superintendent at the revived Hopi Agency, reported in 1899:

Many Navajos from the Navajo Reservation have settled along the water courses and at the watering places on Moqui land. Why this has been allowed I cannot understand, as the Navajo Reservation is the largest in the United States and the Moqui Reservation is comparatively small. These places taken by the Navajo are the very best ones on the reservation and control most of the water supply. The two tribes

⁸ At the time Mayhugh wrote this, Lot Smith had in fact just been killed by a Navajo man in a dispute over pasturage.

are bitter enemies, and there is constant friction, stealing of horses, destroying of each other's crops, fighting, and murder going on among them.

. . . I earnestly recommend that . . . the Navajo be returned to his own reservation or placed under the control of the superintendent (ARCIA, 1899: 382-384.)

Burton may have had in mind a specific murder of a Hopi man that he reported in September 1899 (Burton, 9-11-1899). The previous year (in December 1897/January 1898), Tuveyesva, a prominent member of Orayvi's Bear clan ("Real Bear", according to Tawakwaptiwa), was killed and had his jewelry stolen by two Navajo men (Titiev, n.d.a: Households I 200-204, S 543-545, and X 595'-596'; H.R. Voth diary for January 1898—see Part II, chap. 19). Tuveyesva was the incumbent Soyalmongwi (Titiev, n.d.a: Household S 543-45), chief of the Winter Solstice ceremony, at Tawa'ovi kiva, the Friendly kiva to which Loololma and Sakwhongiwma had removed ca. 1896. As such, Tuveyesva held an office closest in line to succeed Loololma as Kikmongwi; after his death, his brother, Talahoyiwma, was trained for that role (see above), but he too died between 1900 and 1904, so Tawakwaptiwa was chosen.

During Murphy's allotment efforts in 1908-1911, he reported:

. . . it will be necessary to remove certain Navajos from the vicinity of the Moqui villages, if not from the Moqui reservation; I find practically all the springs in the possession of Navajos, and I find Navajos living within three miles of some of the Moqui villages (Murphy, 7-10-1908).

Murphy received no authorization for removal, however, and was subsequently instructed to allot Navajos on the Hopi Reservation (Valentine, 2-25-1909).

It has been estimated that in 1882, there were 300 Navajos living within the boundaries of the Hopi Reservation (Healing v. Jones [210F Supp 125, 1962]: 137). In 1902 and 1903, that population had increased to an estimated 1,837, and in 1905, to 1,865 (ARCIA, 1902: 686; 1903: 63; 1905: 594)—thus representing a major increase in two decades. By 1907, Superintendent Miller (10-18-1907) estimated 2,000 Navajos on the Hopi reservation, "scattered over all of the reservation except the central part which is occupied by the Hopi." Since the mid-19th

century, Navajo population had been growing continuously at a higher rate than for any other Native North American society. As Bent reported in 1846:

Their numbers are variously estimated at from 1000 to 2000 families or from 7000 to 14,000 souls.

The Navajoes, so far as I am informed, are the only Indians on the continent, having intercourse with white men, that are increasing in numbers (Bent, 1846, in Schoolcraft, 1851-1857, I: 243-44).

Johnston's study of long-term Navajo demographic patterns inferred a population total in 1870 of 11,000, which, by 1910, had risen to 26,624 (Johnston, 1966: 86). Johnston (1966: 139) concluded that annual growth rate of the Navajo population from 1870-1957 was 2.33 percent, "a truly remarkable rate to have been sustained over so long a period" (cf. Phelps-Stokes Fund, 1939: 3). Navajo population has continued to grow at high rate: current estimates report a total population of ca. 300,000. In contrast, growth of the Hopi population has been much more gradual: the current estimate, of both on- and off-reservation residents, is ca. 12,000.

Since the ca. 1,800 Navajos on the Hopi Reservation in 1900 owned ca. 70,000 sheep and goats (see above), the sixfold increase of human population since 1882, would suggest an equally steep rate for livestock over this period, directly resulting in the crowding out of Hopi pastures and springs, and the depletion of vegetation cover. Thornthwaite et al. concluded similarly:

At least until the time of the Civil War, the concentration of human and domestic animal population of the Navajo and other tribes of this area of northeastern Arizona was relatively low, and their use of the land could have changed it but little from the natural condition. . . .

[After the Civil War] It appears to have taken 15 to 25 years for the increased grazing on this land to reduce the vegetal cover to such an extent that changes in erosion became recognizable to the human inhabitants. . . . (Thornthwaite et al., 1942: 68-69, 127).

In sum, the recency and manner of Navajo entry into Orayvi's domain had a highly restrictive impact on Orayvi's resources, and must have affected pasture along the Hopi Washes significantly. H.F. Robinson (see above regarding his report on Murphy's dam) was sent again to inspect conditions on the

Hopi Reservation in 1914. His report emphasized Navajo encroachment on grazing lands, springs and water holes "that belong rightfully to the Hopis":

. . . the thrifty and pushing Navajos have preempted their land and water and by gradual but continued encroachments has hemmed them in, and their area is now so restricted that they are only able to work out a very short distance before they encounter the flocks of the Navajos with their aggressive disposition, who drive the Hopis back toward the mesas and prevent them by force, from grazing their flocks on their own lands which have been preempted and are now occupied by their neighbors and enemies (Robinson 5-26-1914).

The broader compass of American settlement in northern Arizona had further effects on both Hopi and Navajo livelihoods. In 1882, completion of the railroad brought a new wave of American settlers into Orayvi's broad domain, including the towns of Flagstaff, Winslow, and Holbrook (e.g., Cline, 1976). Competition for cattle range especially near the Little Colorado River sometimes affected Orayvi's herds directly. In 1960, giving testimony for Hopi land claims, two older Hopis independently reported most of Orayvi's cattle were rustled by Navajos and white cowboys in 1890. The first witness was Tuwaletstiwa (aka K.T. Johnson, Bow clan, born ca. 1876, son of Sakwmasa, Coyote):

My father's cattle used to graze along the river bank and watered down there. They ran all the way from Dinnebito down. They went down as far as ten miles below Leupp. His [i.e., my] father had thirty-six head of cattle. There were nineteen Oraibi people who had their herds in that area. He can remember their names and name them.

There were a few Navahos around below the Gray Mountain turn beyond the river canyon. This is over west of Cameron. There were no Navahos at all in the area of Leupp or on down the Little Colorado from Leupp.

When K.T. Johnson was about fifteen years old the Hopi in Old Oraibi did not want their children to go to school. The government in order to compel them to go to school had the army round all of the Hopi up and return them to their villages. This happened to the nineteen men with cattle. They were returned to the villages and held there. The only one who brought in his cattle was Roger Quotchatawa's [Qötshaytiwa's] father. The Navahos over beyond Gray Mountain heard that the Hopi had been brought in to the villages by the army and were being held there and they came down and drove off the Hopi cattle. Roger's father was the only one who ended up with any cattle. His [my] father lost his cattle too (Johnson, n.d.).

Tuwaletstiwa's account of Navajo absence from areas down the Oraibi Wash is corroborated by my interviews with older Hopis from Orayvi in the 1990's, who reported that Navajos who had entered the 1882 Hopi Reservation by ca. 1900 were located principally to the northeast, and were known indeed as "Hoopaqtasavam" ("northeast Navajos"). Following Tuwaletstiwa's testimony, Roger Qötshaytiwa (Greasewood, born ca. 1896, son of Tuwamöyniwa, Rabbit) confirmed his account:

Father ran area around Leupp and below with cattle. He confirms Johnson about the nineteen people down in the area around Leupp. He tells a story about white cowboys rounding up some of the cattle when the Navahos came in and taking some about the same time. His father brought his cattle back to the village and it was from this herd my father saved I got my start (Quochetewa, n.d.).

The army's appearance to force Orayvi children (including Tuwaletstiwa) to school in Keam's Canyon occurred in November 1890, when Commissioner Morgan arrived with General McCook (e.g., Scott, 1893: 57). Tuwaletstiwa's remark about the absence at that time of Navajos from the Leupp area suggests Navajos began to move into Orayvi's domain to the southwest only in the 1890's. Citing a report by S.M. Brosius of 10-17-1898 (enclosing an affidavit by a Navajo man, Husteen Be-Jah), Godfrey inferred:

Some time in the 1880's, a few Navajo families moved to Shonto Springs in Oraibi Wash [i.e., Masliipa—see above]. . . . In the winter of 1896-97, sixteen Navajo families drifted into the lower Dinnebito Wash part of Hopi country. . . . White cattlemen had forced these Navajo families to graze on the north side of the Little Colorado River. . . . Eventually they found grass and water for their sheep in the lower Dinnebito Wash at present-day Sand Springs (Godfrey, 1988b: 108).

Navajo territorial expansion to the south and southwest was restricted by the burgeoning presence of settler towns and ranches along the railroad, which were subject to civic, and, if necessary, military protection. The effect was to encourage Navajos who needed new pastures to occupy Hopi lands.

The larger changes Euro-American settlers brought accompanied a formal imposition of hegemonic institutions, which sharply confronted Orayvi's autonomy and exacerbated

ideological conflict (by sending dissenters to Alcatraz, for example). The effects of Euro-American colonization on Orayvi's sphere (cf. Whiteley, 1988a, and see Part II) may be summarized as: (1) settlement (at the outer limits); (2) imposition of institutions including schools (whose intent was compulsory acculturation, notably at Keam's Canyon in 1887 and Orayvi in 1892) and land allotment (particularly from 1891-1894); (3) missionization (beginning especially with H.R. Voth's arrival in 1893, and intensified with the construction of a church on the mesa top in 1902); (4) trading posts (notably at Keam's Canyon and Tuba City in the 1870's, and at Kiqötsmovi in the 1890's); (5) tourism (focusing on the Snake Dance), that particularly reached Orayvi in the 1890's. These forces directly impacted pre-split Orayvi's total environment—social, material, and ideological. But the transformations they introduced were mostly superstructural, and conflict over their import was in the first instance ideological rather than driven by internal competition over the productive land base. As noted at the beginning of this chapter, Hopi metaphysics emphasizes the inseparability of superstructure and base, and ideological conflicts would clearly have implicated the effects of moral conduct on environmental conditions. Social conflict was, however, significantly exacerbated by circumscription ensuing from Navajo and Mormon encroachment on Orayvi and Múnqapi resources, which in turn derived ultimately from the larger political-economic changes introduced to the region by the dominant society since 1850.

ORAYVI'S LANDS AND RESOURCES: CONCLUSIONS

This chapter's concern with Orayvi's human ecology, social organization of production, and existing materialist explanations of the split, has drawn attention to a series of factors. First, Orayvi's economy involved an array of productive strategies: subsistence agriculture was the main arm, but wide-ranging foraging, pastoralism, and trade were major components in overall production. The total productive base occupied a much larger geographic area than the Oraibi Valley.

Second, the arrangement of use rights to fields, while often conceptualized via the generic Hopi sense of clans as collective groups, in practice entailed variant forms; Hopi discourse has been misconstrued by anthropological arguments favoring corporatist descent-group models of joint rights and practices. Most notably, land tenure involved chiefly fields of the ritual sodalities associated with the clanhouses governing those rituals. These hierarchically determined *wimvaavasa* have been mistakenly interpreted as clan lands under the descent-theory model. Other so-called "clan lands" were more generic areal aggregations of fields farmed by particular households. And many other fields, particularly those not dependent on flood-irrigation along the mainstream of the Oraibi Wash, are more aptly thought of as household fields; they exhibit different patterns of inheritance, not only matrilineal. As Nagata and G.B. Page (quoted above) pointed out, the model of clan lands developed by Forde for First and Second Mesas (adopted by Tietiev and Bradfield, and modified by Levy, for Third Mesa) does not correspond with reliable ethnographic reports of Orayvi land use before the split. Orayvi's much larger population and number of clans appears to have been the setting for a more hierarchical social formation than at First and Second Mesas. Authority over field use in the floodplain (cf. H.R. Voth's diary in part II, chap. 19) appears to have been much more the province of the Kikmongwi, Qaletaqmongwi, and the other clanhouse/sodality chiefs, than it was collective clan property (and in this regard, I agree with Levy's hierarchical approach to Orayvi land rights).

Third, the question of population pressure on carrying capacity of Orayvi's productive base—the primary plank of Bradfield's and Levy's explanations of the split—has been shown to be more historically complex than allowed by these two theorists. It appears that intermittent gullying and backfilling of the Oraibi Wash was present by the early 1890's, and probably much earlier. Exacerbation of arroyo-cutting must be explained in significant part by the increased presence of livestock on the Hopi Washes, especially as a result of late 19th-century Navajo immigration and competition for resources.

There is no clear evidence for downcutting through the prime floodplain cornfields until after Orayvi split; moreover, continuous gullying occurred in the upper Oraibi Valley before, not after, the lower valley floodplain. The most serious impact of erosion patterns did not commence until after both the split itself and earlier migrations to Mūnqapi had already redistributed a major portion of the Orayvi population. Moreover, the fact that the Hostiles invited about 50 people from Second Mesa to move into Orayvi in March, 1906, and evidently assigned them areas in which to plant, would suggest that, even though subject to contestation, there were usable field areas beyond those required for the pre-existing population.

Fourth, survey, allotment, and other documentary records contribute significant information to our understanding of land conditions, social aspects of Orayvi land use, and resource availability. Two government attempts to redistribute Hopi lands via allotment were ecologically incompetent and socially counterproductive, and each phase caused a good deal of disruption over land rights, including influencing the second Orayvi split in November 1909. But the allotment programs provide an important historical lens, inter alia, upon land conditions in the Oraibi Valley. Although he eventually opposed allotment, Loololma's (earlier) instructions to chosen clans to reclaim Mūnqapi, and his own selection of a house site at Mumurva in 1890, mark threads of the agential response to historical forces that helped shape the Orayvi split. The government sought to break up Hopi political autonomy, in part by persuading people to move out from the redoubt mesa-top villages into the valleys, in accordance with the Dawes Act, especially after the leaders' visit to Washington in 1890. Indeed, Loololma's move to Mumurva was in conformity with this, but was also part of a strategy to secure Orayvi's domain against settler and Navajo encroachment. If land pressure *tout court* was the driving force Bradfield argues, such actions, together with government programs to get people to move down off the mesas (that persisted after the suspension of the allotment program in 1894), provided potential economic alternatives. The Hopi Agency, the

Menonite mission, and traders (including Thomas Keam at Keam's Canyon, Frederick Volz, and Lorenzo Hubbell at Kiqötsmovi [Whiteley, 1988a: 101–103]), in addition to introducing some other economic alternatives (including a little wage work and marketing of products), provided supplementary resources in drought years, notably 1902–1903, when the mission shipped two train carloads of corn from Kansas (Whiteley, 1988a: 98).

Fifth, some demographic and economic changes in Orayvi's total domain in the late 19th century have received little attention in the anthropological record. These include: (a) Navajo encroachment, especially in the two decades prior to the split, following pressure from the U.S. army and subsequently from the U.S. political economy; (b) Mormon settlements, first at Mūnqapi and then at Tuba City (and along the Little Colorado River), which directly competed with Orayvi farms along the Moenkopi Wash until 1902; (c) American settlement in towns established along the railroad, notably Flagstaff and Winslow, which impacted Native American migration geography, in part forcing Navajo pastoralists into Orayvi's domain. Establishment of the Hopi Agency in 1869 and the Hopi Reservation in 1882 had mixed results on Hopi life-chances: in some respects, Indian Agencies did offer protections for Hopi resources, at least intermittently when official agreements were enforced. But the downgrading of the Hopi Indian Agency into a peripatetically manned subagency from 1883–1899, and the government's failure, even when the military was called in for the purpose, to enforce Hopi rights, permitted the more aggressive Navajo to appropriate waters and pastures closer and closer to the Hopi villages. Navajo movement onto Orayvi lands and springs was a direct result of U.S. policy and the effects of American settlement from the 1850's forward.

The total pattern of Orayvi's human ecol-

ogy, economic resources, organization and social relations of production, arrangement of land rights, and recent historical experience of circumscription, shows significant discrepancies with accounts presented by the principal material-determinist hypotheses of the Orayvi split. Material and demographic pressures were profoundly important factors, and, in general, a hypothesis that foregrounds material conditions receives considerable corroboration from the documentary record. But it must be far more nuanced, both culturally and historically, to account for the totality of material causes and effects evident in that record, than a simple reduction to unrelieved, internally generated population pressure on (inaccurately inferred) ecological conditions in the Oraibi Valley. Ecological and economic pressures did not emerge from a historical vacuum, were not caused by sudden land loss from arroyo-cutting through the prime floodplain cornfields before 1906, and did not interact with a social organization of production by nested descent groups. There was competition for land and resources at Orayvi, especially but not only between factions, but this does not appear to have been the result of specific ecological conditions rather than endemic patterns of internal Puebloan conflict, that were clearly evident at the other Hopi Mesas too, where no comparable split occurred. Attempts to alleviate conflict with Agency intervention called for wholesale redistribution of lands by factions both before and after the split (casting further doubt on the clan model of land tenure).

Orayvi's social hierarchy refracted primarily through the house, clan, and sodality system, especially represented by *wimvaavasa*, ritual or chiefly fields. Like the social system itself, as described in chapter 3, land tenure is more parsimoniously explained via the house model, with its incorporation of affines and other cognatic relatives, than by an orderly hierarchy of lineages. It is to Orayvi's actual houses, ordinary dwellings as well as *maisons*, that my inquiry turns next.