5

The Impact of Sociocultural Differences on Health

Previous chapters have emphasized the powerful impact that national and subnational levels of government have had on the health of the indigenous peoples of Northern America, Polynesia, and Australia. In this and the next chapter we return to the comparative method. Our focus shifts, however, to the importance of indigenous cultures for the health of their members. Our examples are the Hopi and Navajo Indians in the Southwest of the United States, chosen because they live in the same environment; have been coerced by the same government in similar ways (e.g., in regard to forced education and stock reduction in the 1930s); have been forced to acquiesce in the extraction of their natural resources in the interests of the same large corporation (e.g., the Peabody Coal Company, which operates a large strip mine on land claimed by both tribes); and are beneficiaries of the same health, education, and welfare systems.[1] Yet they have very different cultures and patterns of social organization. They thus present yet another opportunity for comparison, this time holding constant the political, economic, and physical environment and considering differences in culture.

Hopis have traditionally been sedentary agriculturalists living in villages on or near three mesas in north central Arizona. Navajos have been semisedentary pastoralists occupying a vast area in northwestern New Mexico, northern Arizona, and southern Utah. Their present reservation completely surrounds the Hopi Reservation (see Figure 5-1). We will consider first the histories of how these two peoples came to settle where they are now, their different cultures, and their different patterns of ecological adaptation and social organization and then look at some of the health-related consequences of those differences.

THE HOPI

Hopi is a Shoshonean language that in turn is part of the large family of Uto-Aztecan languages. According to historical linguists, the ancestors of the Hopi entered the Southwest and acquired maize agriculture probably no later than A.D. 500.[2] From the time of their entry into the Southwest until contact with the Spaniards, they have been known from the archaeological record and identified by archaeologists as the Western Anasazi who occupied an area in what is now

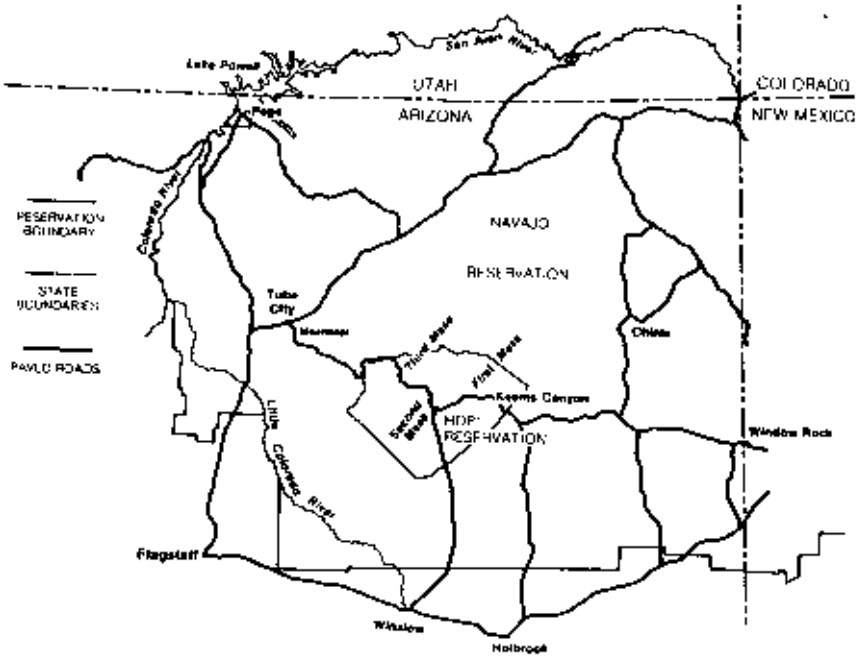

Figure 5-1 Hopi and Navajo Indian reservations, Arizona and Utah, 1970s

northern Arizona and southern Utah that stretched from Chinle Wash in the east to southern Nevada in the west, and from southern Utah as far south as the Little Colorado River. The Western Anasazi remained relatively isolated from other southwestern groups and, before A.D. 1000, were still living in pit-house villages while the Eastern Anasazi of Mesa Verde and the Chaco in northwestern New Mexico already inhabited surface pueblos.[3]

A period of expansion with an increase in population lasted from about 1000 to 1150. There were many small sites, averaging 2.9 rooms and occupied by single extended families. This was a time of improved environmental conditions; Rainfall increased appreciably, and water tables were rising. After 1150, however, the environment began to deteriorate. The people relied more and more on agriculture; their population ceased expanding; and they withdrew from peripheral areas. Some areas were virtually abandoned, and people congregated along lowland drainages and in locations where alluvial farmland and water were available. There developed a discontinuous distribution of sites in which centers of dense population were separated by nearly empty areas. Water tables continued to fall, and erosion increased between 1250 and 1300, when the Western Anasazi relied to an unprecedented degree on agriculture. Gathering diminished in importance as adverse conditions combined to reduce the productivity of natural plant communities. Hunting also contributed less than it had in the preceding period. There was a heightened concern for water. Large sites, con-

centrated in a few restricted localities, continued trends begun in the previous period. There were, however, few of these, and the majority of settlements continued to be small, located next to arable alluvial bottom land. In some areas there is also evidence of conflict among settlements, presumably because of competition for scarce farmlands.[4]

Beginning about 1300, there was a precipitous drop in the water table, the onset of severe gully cutting, and a significant decrease in rainfall. The entire northern area of the Western Anasazi became unfit for human habitation and people moved to the southern end of Black Mesa, where the Hopi villages are located today, and to a few sites along the Little Colorado River where surface water was still available. By 1450, flooding of the Little Colorado destroyed some villages and irrigation systems, forcing people to join the villages along the southern edge of Black Mesa until only the area occupied by the present-day Hopis was still habitable. These villages were larger and depended on water from springs and seeps at the base of the mesa and from alluvial flooding of the major washes.

Erosion continued until the easternmost Hopi sites, with exception of Awat'ovi, were completely abandoned by the time of the Spanish *entradas*. Spanish estimates of the Hopi population are often unreliable. In 1583, for example, Espejo reported 50,000 Hopis, whereas Luxan said there were 12,000.[5] But estimates of 3,000 in 1614 and 2,966 in 1664 appear more reasonable, if only because they agree with each other and are compatible with the number and size of Hopi sites occupied at the time.

Archaeological evidence has been found of the abandonment of villages due to the erosion of the Jeddito Wash watering the easternmost sites by Antelope Mesa, even after the first Spanish contacts. The archaeological evidence also points to the sporadic occupation of Canyon de Chelly to the east by small groups of Hopis from 1300 to the 19th century but especially before 1700.[6] Ethnographic and historical accounts describe how varying numbers of Hopis were forced to leave their villages during periods of drought and agricultural failure. Spanish sources mention as havens of refuge the Havasupai villages as well as other Pueblos. During the 19th century, Hopis were received at Zuni to the east, and Zunis were hosted at Hopi when their economy was under stress.

In recent years, the view that the 15th- and 16th-century Hopi population was small, that most of the Spanish estimates were exaggerated, and that early ethnographic descriptions reflect the immediate precontact Hopi culture has been contested by those who argue that 14th-century Anasazi society was organized in a complex regional system that collapsed because of organizational failure.[7] This implies a large population, which in turn means that the Spanish estimates of large Hopi populations in the 16th century may well have been more accurate than has generally been supposed. And this means that ethnographic accounts are not a good guide to the social organization of the Pueblos in the precontact period. It also requires an explanation of the much smaller populations estimated in the 18th and 19th centuries. Upham invokes epidemics as the deus ex machina, citing evidence from elsewhere in the New World of depopulation ratios of 20 to 1 or more. Unfortunately there is no evidence of any epidemic in this area

at the time, much less a series of epidemics that would selectively eliminate children and young people. Not to worry. Assume a depopulation ratio of 20 to 1 ("an admittedly conservative estimator"[8]); assume not one but two undocumented smallpox epidemics between 1521 and 1581; and presto, a possible scenario becomes a "probable scenario." It should be clear that this revisionist pre- and early contact history is of a piece with the revisionist history of the central place of epidemics in New World depopulation. It is as clear an example as one can find of the assumption of a natural history of population decline among indigenous peoples as a result of European contact.

One of the implications of the revisionist version of western Pueblo prehistory is that despite the absence of large sites before 1400, precontact Hopi society was highly stratified and controlled by an elite.[9] Upham argues that the usual ethnographic view is quite different: that Hopis and other western Pueblos were egalitarian and democratic. This is in fact a highly selective reading of the ethnographic literature, for as Bennett showed almost 50 years ago, there is a deep division between ethnographers who view Hopi society as harmonious, egalitarian, and gemeinschaftlike and those who view it as hierarchical, coercive, and repressive.[10]

Our view is that Hopi society after 1400 was indeed stratified and that it was a system designed to manage scarcity rather than economic surplus.

> The picture that emerges is of a society that maintained stability and integration through the promotion of homogeneity both psychological and structural. Survival depended on unending fieldwork and intense cooperation. To achieve this the ideology had to be egalitarian while all manifestations of individualism—competition, innovation, ambition—were severely discountenanced. At the same time, however, economic reality did not permit equality. The agricultural resources were localized and marginal. During periods of drought, the land could not support the population which had grown during the preceding wet years. A core population had to maintain itself in such a manner that excess population could be sloughed off without creating serious internal conflict. This was achieved by a hierarchical system which concentrated wealth, ceremonial position and status in the hands of a relatively small proportion of families.[11]

Throughout the prehistoric period we see two major developments shaping the evolution of Hopi society: the adoption of agriculture, which most probably led to a transition from bilateral to matrilineal descent, and the effects of the deteriorating environment, which led to population decline and the concentration of a few large villages located by permanent water sources. With the period of abandonment and site aggregation, however, we find the development of the Hopi system as we know it from the ethnographic literature.[12]

Before the adoption of agriculture, Hopi society was very much like that of their linguistic congeners, the Shoshonean speakers of the Great Basin, who occupied an area very similar to that of the Western Anasazi. Subsistence centered around the gathering of wild seeds, roots, and piñon nuts. Extended families came together only occasionally for ceremonies and the piñon harvest. On these occasions, headmen had only temporary authority, there being neither "tribe" nor "band." Women did most of the gathering, and their importance is

attested to by matrilocal postnuptial residence, women's control of the seed harvests, and the frequent occurrence of fraternal polyandry in many areas.[13]

Agricultural land in the Southwest is limited so that a rule of inheritance favoring some children at the expense of others evolved in order to avoid dividing fields among heirs to the point that a family could no longer survive. From matrilocal residence and women's control of gathering sites or seed harvests, it is but a step to women's control of farmlands and the inheritance of these lands through the female line.

Early Apachean social organization was very much like that of the Great Basin Shoshoneans except for the agricultural Western Apaches, who developed matrilineal descent. Their settlement pattern was much like that of the Western Anasazi around 1100, that is, many small settlements near farm sites for most of the year. The local group was the largest unit, with a definite leader and important functions. Generally, two or three named clans were represented in each local group, which contained anywhere from two to 10 matrifocal extended families, some containing 10 to 30 households.[14]

In each group, one clan predominated, and the group was known by that clan whether or not it contained others of equal size. The farmlands of a group were spoken of as belonging to its dominant clan, although use rights were not confined to that clan. The head of the local group was also spoken of as the chief of its predominant clan. Marriage to someone of one's own or a related clan was prohibited, but marriage into one's father's clan was preferred, as was the marriage of two people whose fathers were of the same clan (shared father's clan).

If, as we believe is most probable, similar developments took place among the Western Anasazi, a tendency toward local group endogamy would have developed as the reliance on agriculture and group size increased. Successive marriage alliances among two or, at most, three clans sharing localized farm sites decreased internal competition for land. At the same time, however, cultural homogeneity prevailed over fairly large areas, owing to the expanding population and the living off of local groups. Relatedness among people of the same clans and phratries (groups of related clans) provided the basis for intersettlement cooperation.

By 1300, when the Hopis abandoned large areas of heretofore habitable land and settled fewer but larger settlements, control of the shrinking agricultural resources led to competition in many locales. The tendency toward local endogamy increased, but the larger village populations contained a greater number of clans, which in turn required the development of mechanisms to integrate the previously autonomous local groups. Marriage prohibitions were developed to preclude the formation of "cliques" resulting from father's clan marriage in successive generations.

With the contraction of the Western Anasazi into the southern Black Mesa area, the social system of the Hopi as we know it today was probably complete. Villages with populations in the hundreds, each containing a large number of clans and phratries, also needed to develop integrative mechanisms beyond that of marriage regulation in order to maintain village harmony, especially during hard times. Presumably, the katsina cult was adopted by the Hopi about this time

and was one of the integrating mechanisms. In addition, the power of religious specialists and the emphasis on fertility and rainmaking probably reached their most intense development at this time.

The point to be made by this review of Hopi social history is that there was never a time during which an economic surplus was sufficient to lead to the creation of a managerial class of the sort that, through intervillage marriage alliances, could integrate the numerous villages of both the Western and Eastern Anasazi societies. To the contrary, environmental stress was persistent throughout the entire prehistoric period and not a more recent phenomenon resulting from postcontact conditions. Despite the technological advance represented by agriculture, the health status of the Anasazi Pueblo populations seems to have deteriorated over a long period of time. According to Martin:

> *There were major and persistent nutritional deficiencies resulting from a corn diet; crowded and unsanitary living conditions enhanced the chances of picking up communicable diseases such as gastroenteritis; dental problems including caries and periodontal disease were a major concern; most adults had arthritis and spinal degeneration from carrying heavy loads; parasites such as lice and helminths were common; and infant and childhood mortality were high. With respect to trends over time, a continuum of health problems suggests that there were changes in the patterns with an increase in diseases associated with large and aggregated populations.*[15]

Among the Hopi, wealth and religious/political power have varied together. Both land and ceremonies are controlled by clans, and the clans with the best lands control the most important ceremonies. Moreover, because ceremonies as well as lands are owned by clans, priestly roles are inherited as a matter of clan membership. Which is to say, Hopi ceremonies are learned by the officiants; they are not a gift that any individual might be born with or acquire as a result of some unusual experience. Finally, as Ruth Underhill observed, because they are agriculturalists, the Hopis direct their ceremonies at bringing rain for the benefit of the entire community rather than for the well-being of a particular individual, as is the case with many of the ceremonies in hunting-gathering societies.[16]

In addition to bringing rain for the benefit of all, public ceremonies may be used as a means of enforcing conformity to community norms. In these densely settled, hierarchically organized villages, mechanisms of social control have been highly developed. Gossip is a powerful, if informal, means. If gossip does not have the desired effect, mocking by clowns at public ceremonies may follow. If all else fails, the leadership of the village may expel deviants. The same institutions that control the religious life of the people also control their behavior, the two spheres often being indistinguishable.

We have said that there is disagreement about the size of the Hopi population before and at contact. There is more general agreement on the size of the population later in the historic period. Mid-19th-century estimates tend to be in the range of 2,500 to 3,000, reaching a nadir after severe drought and the smallpox epidemic of 1866 which reduced the population from around 3,000 to about 1,600 by 1875. Since the turn of the century the population has increased steadily to 2,500 to 3,000 in the 1930s. There was virtually no emigration off the

reservation before World War II.[17] After the war, however, emigration increased. In 1980 the U.S. Census enumerated 6,601 Indians on the Hopi Reservation of a total Hopi population of 8,930 (i.e., about 74 percent of the population lived on the reservation).[18] In 1990 the census counted 7,061 Indians on the Hopi Reservation.[19] Despite the difficulties of enumeration and definition, the pattern of population growth over the past 150 years is reasonably clear: stagnation and even decline through the second half of the 19th century followed by a fivefold increase from about 1900 to 1990. As we shall see, the Navajo pattern has been very different.

THE NAVAJOS

Unlike the Hopis, the Navajos appear to be relative newcomers to the Southwest. They are Athabaskan speakers, like other Apacheans, and must have arrived in the Southwest no more than 500 to 700 years ago. They moved into the area at the time the Pueblos had been severely constricted and retrenched. "The Apacheans, including the Eastern Apaches, Western Apaches, and Navajos, located in areas entirely surrounding the Pueblos, and retained intelligibility among the dialects."[20] By 1626, a Spanish report mentioned the Apache Indians of Nabaho, and in 1630, these special Apaches were distinguished from those who never planted but lived by the chase, "whereas the Apaches of Navajo 'are very great farmers.'"[21]

It is generally believed that the Navajos learned farming from the Pueblos and probably developed matrilineal descent at this time. Unlike the clans of the Pueblos, which take their names from animals and natural phenomena, Navajo clan names refer to features of the landscape, much like the band names of the Eastern Apaches. This and the fact that Navajo kinship terminology is not the same as that of any of the Pueblos suggests that matrilineality evolved as an adaptation to their changed subsistence rather than having been borrowed wholesale from the Pueblos.[22] The Navajos also seem to have established fairly sizable villages containing as many as 50 hogans grouped together.[23]

Intensive interaction with the Pueblos began after the Pueblo revolt of 1680 when, in 1690, the Spaniards reconquered the area. From then until about 1770, Tewa, Jemez, Keresan, and Zuni refugees lived among the Navajos. The Navajo population may have doubled at this time, although there is no way of ascertaining its size.[24] The intermixture of populations was such that Hrdlicka observed that contemporary Navajos "are much more closely related both physically and ethnically to the Pueblos" than to the Apaches.[25] The area of Navajo occupation at this time is studded with ruins, called *pueblitos*, containing Pueblo houses intermingled with Navajo hogans. These sites are generally located in defensive locations with walls and lookout towers.[26] It seems likely that this was the period during which the Navajos adopted Pueblo marriage restrictions. Marriage into one's own clan or phratry, one's father's clan and/or phratry, one's shared father's clan and phratry, and one's mother's father's clan and phratry was forbidden, with the result that in a village containing eight or nine exogamous phratries,

only about half of the marriageable-age individuals were potential marriage partners.[27] These rules served to integrate the ethnically disparate population by forcing intermarriage. To this fusion the Pueblos brought their knowledge of livestock and religious beliefs, all of which had a profound impact on what was to become "traditional" Navajo culture.

After 1770, drought, intensified Ute raiding, and a resumption of warfare with the Spaniards led to a migration of the Navajos to the south and west of their center of settlement in the upper San Juan River drainage. The relatively large pueblito settlements were abandoned, and the population became more dispersed. Presumably farming diminished somewhat in importance at this time as well, and Pueblo elements of social organization became increasingly more diluted. By the early 1800s, stockraising had become as important as agriculture and, during the early years of the 19th century, became the dominant subsistence pursuit.

Pastoralism led to a dispersed and mobile population. Much of the year was spent in relative isolation in residence groups composed of one extended family from which nuclear families might separate for a variety of reasons and for varying lengths of time. Pastoralism is also, the world over, a male-managed subsistence pursuit associated with patrilocal or virilocal residence and patrilineal descent. Moreover, according to Lowie, the status of women in these societies is "almost uniformly one of decided and absolute inferiority."[28] Yet Navajo society remained matrilineal and has remained so to this day.[29] Low population density and transhumance precluded the development of communitywide ceremonials that marked the Pueblos' agricultural cycle and curing societies. In consequence, Navajo ceremonies are almost exclusively healing rituals performed for individuals. In most other respects, however, the Navajos patterned their religion after that of the Pueblos.

The years from about 1800 to 1863 have been termed the herding and raiding period.[30] The Southwest was ceded by Mexico to the United States in 1848, after which time the federal government sought to control Navajo depredations. In 1864 after an all-out campaign, most of the Navajos were captured and imprisoned at the Bosque Redondo in eastern New Mexico. In 1868 they were allowed to return to a treaty reservation straddling what is now the Arizona–New Mexico border.

After their return from captivity, the Navajos were supplied with livestock and began rebuilding their flocks and herds and spilling over the boundaries of the original Treaty Reservation to return to areas where they had lived previously. Their livestock provided not only subsistence but also wool and meat for sale. The result was increasing integration into the cash economy.

Livestock was not evenly distributed among Navajo family units. As in the period before captivity, so in the later period there were stockmen with large holdings and many dependents to help with the herding, and other families with virtually no stock at all. A survey of the Southern Navajo Reservation in 1915 showed that about a quarter of all families owned no livestock.[31] Even for those with some livestock, pastoralism alone was insufficient to provide complete subsistence, and by the 1920s all but the wealthiest engaged in part-time wage work.[32]

The stock reduction program of the 1930s destroyed the stratification system based on livestock that had evolved before the reservation period and during the first six or seven decades of the reservation period.[33] The result was that virtually no one was able to depend on livestock for subsistence any longer, and the reservation economy shifted to one based on welfare and wage work.

Despite great variations in wealth before stock reduction, Navajo society was never as hierarchical as Hopi society. Navajo positions of leadership were achieved, not inherited. Dependence on a local leader was voluntary. And although various forms of deviant behavior could be sanctioned by the community—including expulsion and death—scattered settlements and the value of personal autonomy meant that there was a great deal of freedom of behavior as well.

Even during the 17th and 18th centuries the Navajo population seems to have been substantial: perhaps 3,000 to 4,000 people, according to various estimates. Over 8,000 were imprisoned in the 1860s, and it is estimated that perhaps another 2,000 remained free, making a total of about 10,000.[34] By 1900, 30 years after their return to their homeland, the population was estimated to be about 20,000. It had doubled by 1930, by which time the reservation had been enlarged to its present size of about 24,000 square miles. By 1960 the population was over 90,000.[35] In 1980 the total Navajo population was said to be 158,633, 104,968 of whom lived on the reservation.[36] According to the 1990 Census, the reservation population was over 143,000. If 66 percent of the total population lived on the reservation, as in 1980, then the total population of Navajos was more than 215,000 in 1990.[37]

There have been major problems counting Indians, including Navajos. Nonetheless, the evidence is persuasive that demographically Navajos have been enormously successful, much more so than any other tribe. Indeed, there is no evidence that they ever suffered the kind of population declines that affected so many other Indian peoples. There are, according to Johnston, "four factors which account for the relative stability of Navaho death rates."

> First, their food supplies were sufficiently stable to permit survival, albeit with much periodic hardship. Secondly, the early cessation of hostilities against the Americans and the effective prohibition of predatory activities both by and against Navahos after 1864 combined to eliminate the heavy male mortality which commonly occurred among Plains Indian tribes. Thirdly, the geographic dispersion of the Navaho effectively insulated them from the worst effects of epidemics which decimated the populations of many densely settled Indian villages and communities. Finally, the profound isolation of most Navahos from outside contacts permitted them to maintain a relatively stable social existence from the time of their return to their homelands in 1869 well into the 20th century.[38]

COMPARATIVE SOCIOECONOMIC PATTERNS

Despite major differences in culture, social organization, settlement patterns, and population history, many of the measures typically associated with health status are strikingly similar among these two tribes. In 1936, as part of the stock

reduction program, a major survey of Navajos and Hopis was carried out by the Soil Conservation Service of the Department of Agriculture. Table 5-1 displays some of the summary measures.

Several points stand out. Though the Hopi population was much smaller than the Navajo, their population density was much greater. Consumption groups[39] were larger among Navajos than Hopis. Per capita income was about $10 higher for Hopis than Navajos. The Navajos were, however, more involved in the cash economy than the Hopis were. More of their income was from commercial sources—primarily livestock—and more of their consumption items were pur-

Table 5–1 Population characteristics, Navajo and Hopi Indian reservations, 1936

	Hopi Reservation	Navajo Reservation[a]
Population	2,779	38,360
Population per square mile	3.6	1.5
Average consumption group	5.6	6.8
Income per capita	$149.21	$139.75
Commercial	$ 81.94	$ 97.30
Noncommercial	$ 67.27	$ 42.45
Sources of income	$ 59.53	$ 49.10
Wages	$ 18.19	$ 41.20
Livestock	$ 65.00	$ 32.06
Agriculture	$ 2.22	$ 8.46
Rugs	$ 4.27	$ 8.93
Miscellaneous		
Total stock per capita (sheep units)[b]	11.3	21.0
Total consumption per capita	$108.93	$109.39
Commercial	$ 41.66	$ 66.94
Noncommercial	$ 67.27	$ 42.45
Commercial consumption by kind (in %)		
Food	65	62
Clothing	23	26
Household equipment	7	5
Productive equipment	5	7
Food consumption		
Percent purchased	29	49
Percent home produced	71	51

[a] Figures for the Navajo Reservation also include the Hopi Reservation population, but because there are relatively so few Hopis, the distortion is insignificant.

[b] Sheep units are a unit of measurement for reducing all forms of livestock to a common denominator based on the amount of land required to support one sheep. "A sheep unit is the equivalent of one sheep grazing yearlong. One sheep or goat equals one sheep unit, one head of cattle equals four sheep units, one horse equals five sheep units." The figures are based on the assumption that cattle eat four times as much as sheep do, and horses five times as much. D. F. Aberle, *The Peyote Religion Among the Navajo* (Chicago: Aldine, 1966), p. 67.

Source: Section of Conservation Economics, *Statistical Summary, Human Dependency Survey, Navajo and Hopi Reservations*, Navajo Area, Report 8, Soil Conservation Service (Washington, DC: U.S. Department of Agriculture, 1939).

chased rather than produced by the consumption group. These patterns of income and consumption reflect important differences between the two tribes. Equally important, however, was the fact that their incomes were not dramatically different.

Life changed greatly for both groups within a few years of the Human Dependency Survey. The government-ordered stock reduction had a huge impact on the Navajos,[40] but less on the Hopis, who were not as involved with stock raising. For both tribes World War II and its aftermath brought increasing involvement in wage work, a decline in subsistence agriculture, and a diminution in ceremonial involvement.[41] These changes resulted in rather similar aggregate socioeconomic measures, as Table 5-2 indicates.

There is some evidence that the Hopis have participated more fully in the educational system, a point to which we shall return later. Apart from that, measures of poverty, labor force participation, and unemployment are remarkably similar. Moreover, both reservations occupy similar peripheral positions in the national economy. In each case, whatever natural resources exist are extracted by non-Indian interests, with relatively few benefits flowing to reservation residents in the form of jobs. Indeed, most wage employment is in the health, education, and welfare bureaucracies of government agencies. In regard to socioeconomic measures, therefore, the two populations have been remarkably similar for at least 50 years.

Regarding access to health care, too, the Navajos and Hopis are similar. Since

Table 5–2 Socioeconomic measures, Navajo and Hopi reservations, 1970 and 1980

	Hopi Reservation		Navajo Reservation	
	1970	1980	1970	1980
Proportion of housing with >1 person/room	65.8	58.0	75.8	64.9
Proportion of units <10 years old	9.2	33.1	54.0	47.1
Proportion of people ≥25 years old who are high school graduates	27.5	40.3	17.4	34.6
Proportion of people >16 years old in the labor force	36.4	54.7	32.9	58.3
Unemployment rate	13.7	20.5	12.0	23.7
Proportion of traditional occupations	—	6.3	—	4.5
Median family income	56,839	8,197	6,106	8,397
Proportion of families below poverty	61.8	50.9	62.1	50.5
Proportion who have always lived on the reservation	-	91.2	---	89.7

Source: C. M. Scipp, *American Indians: The First of this Land* (New York, Russell Sage Foundation, 1989), various pages. Data from 1970 and 1980 are not comparable, owing to boundary changes.

1955 Indian residents of each reservation have been beneficiaries of the Indian Health Service and have received free medical care as well as a variety of community health services. Before 1955 these services were provided by the Bureau of Indian Affairs. Similarly, access to social services from the Bureau of Indian Affairs and from state and county governments are essentially the same. Thus both reservations are strikingly similar to the MIRAB economies described in Chapter 3. Possibilities for economic growth have not been realized; wage work is found primarily off the reservation or in government agencies on the reservation; and those who cannot find adequate employment are dependent on welfare and a variety of subsistence activities.

DIFFERENCES IN HEALTH

Population Change

We have shown that the Navajo population has grown to a much greater size than has the Hopi population. Over the past century the number of Hopis has increased perhaps fivefold (from 1,900 to 9,000), whereas the number of Navajos has increased more than 10-fold (from 20,000 to >200,000). There also is evidence of more rapid Navajo than Hopi growth in the 19th century: from 1800 to the 1860s perhaps threefold for the former, as contrasted with no growth for the latter.

Observers during the early years of this century commented on the differences in the health of the Navajos and Hopis. The Hopis were said to live in less sanitary conditions than the Navajos and to experience worse health and higher infant death rates.[42] Several epidemics of smallpox afflicted the Hopis in the second half of the 19th century (1853, 1866, and 1899), whereas there is no record of such events among the Navajos.[43] As noted in Chapter 1, a sequence of epidemics such as this is especially likely to cause the population to fall, as the youngest generation is afflicted preferentially after the first epidemic.

Less impressionistically, an analysis of the 1900 census showed that among Hopi women aged 18 to 52, the average number of children ever born was 5.7, with an average of 2.9 still alive. In contrast, among Navajos the corresponding figures were 4.4 ever born and 3.6 still alive.[44] Thus in the late 19th century, Hopi fertility was higher and child survival was lower than they were among the Navajos, thus indicating that infertility and subfertility have not always been implicated in population decline, as some writers have suggested.[45]

There were also measurable differences in the fertility and population profiles of the villages of First and Second Mesas, which suffered more from the epidemics than did Orayve on Third Mesa. Thirty-eight percent of the Navajos in the area and 34 percent of the Orayves were between 0 and 9 years of age, compared to 21 percent for the villages of First and Second Mesa.[46] In general, Orayve's population was much younger than the populations of First and Second Mesas (see Table 5-3). In addition, there were significant differences in the number of childless women over 33 years of age, their fertility rates, and the proportion

Table 5–3 Intermesa comparisons of age cohorts

A. Adults and children

	Mesa						
	First		Second		Third		
Age	Obs	(Exp)	Obs	(Exp)	Obs	(Exp)	Total
≥20	301	(286.57)	319	(286.57)	411	(457.87)	1,031
≤19	236	(250.43)	218	(250.43)	447	(400.13)	901
	537		537		858		1,932

Note: $X^2 = 39.75$; $df = 2$; $p = .0001$.

B. Adults 20 + years of age

	Mesa						
	First		Second		Third		
Age	Obs	(Exp)	Obs	(Exp)	Obs	(Exp)	Total
40+	137	(128.46)	177	(136.14)	126	(175.4)	440
30–39	91	(84.08)	68	(89.11)	129	(114.81)	288
20–29	73	(88.46)	74	(93.75)	156	(120.79)	303
	301		319		411		1,031

Note: $X^2 = 51.19$; $df = 4$; $p = < .0001$

Source: J. E. Levy, *Orayvi Revisited: Social Stratification in an "Egalitarian" Society* (Santa Fe: School of American Research, 1992).

of surviving children (see Table 5-4).[47] According to Bradfield, the epidemic of 1853 hit the First Mesa villages the hardest, and that of 1866/67 was worst for the villages of the Second Mesa.[48] The government successfully quarantined Orayvi during the epidemic of 1899, with the result that the village was spared and its population in 1900 looked more like that of the Navajos than did those of the other mesas.

Anthropologists working in Hopi villages starting in the 1930s also commented on the differences between the Navajos and Hopis. Colton noted that the Navajos moved seasonally, that their water supplies were uncontaminated because they were far from dwellings, and that the excreta deposited "not far" from their dwellings "do not present a menace to health because of the sparsity of the population and the semiarid climate."[49] He continued: "The Hopi family, on the other hand, lives in crowded quarters. Families live close together, and the excreta are often deposited in the narrow plazas, streets, middens, and passages near the houses. Were it not for the arid climate, living conditions would be impossible."[50]

Writing in the 1950s about his early fieldwork at the Third Mesa village of Orayvi, Titiev observed:

> Toilet habits have changed markedly. In the 1930s young boys, in particular, did not hesitate to urinate on the terraces before their houses. They were warned only not to wet and thus weaken the walls. At present they go to the edge of the mesa to relieve

many Navajo women did when herding sheep—might be less fecund than women in agricultural communities. Research elsewhere suggests that sedentism is associated with greater fecundity than is hunting-gathering. The same may be true of pastoralism. Without knowing more about the daily activities of women at the time, however, we can do no more than speculate. The reasons for the low Navajo fertility in the late 19th century therefore still eludes us. We can say, however, that before medical treatment and public health had much to offer American Indians, patterns of child mortality and fertility varied in ways that were associated with the ecological adaptations that each had made. The fertility differences do not accord with the high levels of sterility suggested as being among the major determinants of population decline, for the population that was declining had a higher fertility rate than the one that was increasing.

Cultural factors also appear to have had an effect on both the children's survival and the fertility of women in Orayve, the one village not affected by the epidemic of 1899. Although there were no significant differences in the average number of children born to women between the ages of 18 and 32, after age 33 women of the senior lineages in high-ranking clans had significantly *more* children per bearing woman than did all other women. These women of the highest possible status not only bore more children (10 per woman over 33 years as compared with 7.5 for all other women in the same age cohort), but their children also had the poorest survival rates (28.6 versus 47.3 percent). It would appear that rather than controlling birthrates, the high-status women were trying to produce heirs and so tended to shorten birth spacing, thus displacing the older sibling from the breast and inadvertently exposing it to a variety of infectious diseases. In an effort to preserve their positions, the senior lineages of the leading clans, it seems, were engaging in a self-defeating practice.[54]

Fertility in the Postwar Era

By the early 1970s there had been a striking reversal in the fertility rates of Navajos and Hopis. The former had an average annual crude rate in 1971/72 of between 28 and 34 per 1,000, depending on the population estimate. The latter had a rate of between 18.9 and 20.8 per 1,000 population (on the reservation).[55] Moreover, it was clear that the reason the Hopi birthrate was lower than the Navajos' was that the Hopis had significantly lower numbers of births at ages 30 and above. Hopis in their 30s and above had higher rates of induced abortions, hysterectomies, and bilateral tubal ligations than did Navajos of the same age.[56] Vasectomies were equally uncommon in each population.

There are no data available on the use of oral contraceptives and IUDs among Hopis. Data from the Navajo population indicate that IUD use was as effective as in most populations but that oral contraceptives were used less effectively than in any other populations studied at the time.[57] Ineffectiveness was due to "personal" rather than "medical" reasons, usually the objections of husbands, boyfriends, and family members.[58]

Interviews with Navajo women indicated that those who were likely to use contraception were older, had more than three children, had less than an eighth-grade education, and lived in arrangements in which they were relatively less

dependent on kin than were the nonusers. The interviews suggested that most of the women with many children were interested in knowing how to control their fertility but that pressure from their mothers and husbands discouraged it. Those who lived relatively independent of kin thus avoided many of those pressures. On the other hand, young women were not particularly likely to be contraceptive users.[59] These data suggest part of the reason that Navajo fertility rates remained high into the 30s and 40s. They do not indicate why the Hopi rates did not. To explain that we must turn to other sources.

One of the variables often observed to be associated with declining fertility is female education. In 1970, 52 percent of Hopi women 25 to 34 years of age had graduated from high school, compared with 28.8 percent of Navajo women of that age.[60] For men the figures were 58.3 and 35.5 percent. Thus, although the educational differences between the two tribes were not enormous when all people 25 and above were included (see Table 5-2), among young adults the differences were substantial, suggesting that the postwar changes had had a greater impact on the Hopis than on the Navajos.

Much of the difference can be explained by differences in settlement patterns. Hopis live in compact villages; Navajos live in more or less isolated camps. The construction of a paved road in the late 1950s linking all the Hopi villages to one another and to off-reservation towns had profound consequences because the Hopis now had easy access to the high school built on the reservation in the 1930s as well as to sources of entertainment, shopping, and employment in non-Indian communities.[61] Titiev wrote of the changes brought about in the village of Orayve by the new road network:

> The inhabitants no longer feel isolated, and no longer are they impelled to direct their energies inward toward the village and to develop internal strength through self-reliance, pueblo-wide ceremonies, local amusements, and communal enterprises. Instead, people now turn their attention outward and away from the pueblo, especially in such matters as jobs, shopping, and entertainment.[62]

Because we do not have interview data, we may infer only tentatively that it was changes such as those described by Titiev that were involved in the dramatic decline of fertility among women aged 30 and above.

Increasing educational levels and diminished isolation of the villages were also implicated in a decline in the ceremonial cycle, in a shift from a primarily subsistence to a primarily cash economy, in the use of modern construction techniques and materials that enabled the building of new and larger homes, and in the tendency for nuclear families to reside independently.[63] A scattered population and larger numbers meant that many of these same changes have taken much longer to be felt in Navajo society. Indeed, only in the last decade has urbanization become the dominant mode for most Navajos.

Morbidity and Mortality

The postwar years saw an impressive decline in the death rates in each population, so much so that by the 1960s noninfectious and man-made conditions had

come to dominate the epidemiologic regimes of each population. Infant mortality had dropped dramatically in each tribe: For the Hopis in 1968/69 the rate was 11.4 per 1,000 live births, and the Navajos in 1970 had a rate of 31.5, a substantial decline since the prewar years.[64] Accidents of all sorts were the leading cause of death in each population. Motor vehicle accidents accounted for about half of all accidents in each, and in the mid-1970s the Hopi rate was at least half the Navajo rate.

Comparisons of mortality pattern using officially reported statistics are made difficult, however, by the way they are aggregated. Navajo deaths are reported for the "Navajo Area," which comprises not only the reservation itself but also the nearby towns of Flagstaff, Winslow, and Holbrook, Arizona, and Gallup and Farmington, New Mexico, and some more sparsely settled regions. Any Indian who dies in these places is counted as a Navajo, even though Indians of other tribes also live there. For the Hopis, on the other hand, deaths are reported for the Indian Health Service catchment area (service unit) which comprises the Hopi reservation.

Because the number of Navajos in the region is so large compared with other Indian populations, this reporting convention does not distort their mortality patterns to an intolerable degree. But it can have a substantial impact on the patterns reported for much smaller tribes if, as is assuredly the case, there is selection at work. For instance, if Hopis who migrate to border towns are more likely than Hopis who remain on reservation to have drinking problems, then when they die of alcohol-related conditions, their deaths will be counted with the Navajo figures and not with the Hopis'. To circumvent this problem, we describe only conditions on which actual field studies have been carried out. We shall discuss the comparative epidemiology of two chronic conditions in order to make the point that even after major cultural and socioeconomic changes are well under way and even when access to health care is free and essentially available on demand, there still are major differences in behavior in the two tribes that are reflected in differences in patterns of disease.

Alcoholic Cirrhosis

Alcohol has widely been regarded as the most destructive of the trade items that Europeans provided to the indigenous peoples of the New World and Oceania. Most commonly the effects of excessive consumption have been judged by the public behavior that is readily observable: public intoxication, group drinking, brawling, motor vehicle accidents, and so on. Another way to measure the effects is to use the incidence of death due to, or the prevalence of, alcoholic cirrhosis. This condition is the result of heavy, prolonged drinking that may or may not also involve the more public behaviors just cited.

Because Navajos have commonly used alcohol in public and usually in groups, it has been the conventional wisdom for decades that alcohol is their "number one health problem," to quote a commonly used phrase. On the other hand, because the Hopis have presented themselves, and have been perceived by many others, as the peaceful people living in harmonious and well-integrated communities, alcohol abuse has not been widely remarked on until relatively recently.

As a result, it came as a surprise when we observed in the 1960s that the Hopi death rate from alcoholic cirrhosis was over 40 per 100,000, more than twice the Navajo rate, which was no more than 17.3 per 100,000. So surprising was it, indeed, that one senior clinician in the Indian Health Service (IHS) accused us of falsifying the data, despite the fact that all the cases were diagnosed in IHS hospitals, some on the very service for which he was responsible. Because the Hopi population is not numerous—in those years numbering between 5,000 and 6,000—one or two deaths a year would not strike most observers as unusual. It was only by calculating the rate of death that we became aware that alcohol abuse was a problem. Moreover, of the eight Hopis who died of cirrhosis in the years 1965–67, only one had been living on the reservation at the time of death. The others lived off the reservation in border towns and would have been counted as Navajo deaths in the official statistics.

Originally we assumed that the reason that most of these deaths had occurred off the reservation was that people had been unable to resist the temptations of easy access to alcohol in the towns and that town life itself had been so stressful and disruptive that they had turned to alcohol for relief. The picture was more complex, however, for the survivors of the people who had died, as well as families of other cirrhotics we interviewed, often said that the drinking had begun on the reservation and that the family had been pressured to leave the community when social sanctions had been unable to change the drinker's behavior. Not every community was able to exert pressure on the deviants to leave, however. For as we and others have observed, in some villages where the existing ceremonial cycle and theocratic structure had ceased to operate, such mechanisms of social control could no longer be invoked.[65]

The most salient distinction between villages at the time of our study was whether or not they had accepted the legitimacy of the federally instituted tribal council. The anticouncil villages were those where the theocracy still exercised influence and thus where traditional mechanisms of social control could still be enforced. Such mechanisms included as a last resort the expulsion of deviants from the community. In the procouncil villages such mechanisms were no longer intact, and deviants could not be expelled. Thus when we compared all cirrhotics —not simply those who had died—by current residence, we found significantly more living off than on the reservation and more in procouncil than in anticouncil villages. But when we compared them by village of origin, there was no difference between anticouncil and procouncil villages.[66]

The next question was how to explain the origin of deviant behavior within the villages. In this instance there were not enough cases of alcoholic cirrhosis to analyze, and we therefore analyzed together several extreme deviant acts, including homicide, suicide, and all forms of alcohol-related pathology.

We have already said that Hopi villages were endogamous and that a variety of marriage rules precluded the formation of political cliques through marriage alliances. We observed in the procouncil villages that the social deviants were more likely than the controls were to be the products of disapproved intermesa marriages or marriages with non-Hopis. This, however, was not the case in the anticouncil villages where all marriages in the parent generation adhered to the

rule of village or mesa endogamy. On the other hand, the social deviants in the anticouncil villages were more likely than the controls were to be the offspring of marriages of people from clans of very different statuses.[67]

Thus it appears that deviant behavior of several types, including alcohol abuse, has been more likely in the children of disapproved marriages and that such disapproved marriages could and did occur within the traditional system as well as the nontraditional system. Indeed, in the traditional system, marriage between members of clans of different status was common, considering both the small size of Hopi villages in past times and the further limitation placed by the numerous marriage proscriptions on the number of suitable partners available. In the nontraditional system in the anticouncil villages in the mid-1960s, clan status was not significant, as control of land and ceremonies had diminished in importance. On the other hand, the parents' village of origin still seemed to be important. It is unlikely that clan, village, or mesa remains as salient to the present generation of young adult Hopis as they were even a generation ago.

The Navajo situation was different. There are reports from at least the late 19th century that the use of alcohol was common among Navajos, particularly men. Men would drink with others of the same age, often at ceremonies and generally with relatives and friends. Alcohol was expensive and an item of high prestige, and thus another common form of consumption was for a wealthy stockman to give it to the dependent members of his outfit. In such situations it was not uncommon for the women also to have a drink.[68] In all these instances, alcohol use was a social activity. Indeed, the person who drank alone and did not share his alcohol was considered to be deviant. Moreover, the Navajos have not cherished the value of self-restraint to quite the same degree as have the Hopis and other Western Pueblos. Thus flamboyant drinking behavior among groups of young men particularly has not been discountenanced as it has among Hopis.

In this context, heavy drinking among groups of men was not considered deviant, and most men who lived in remote areas and who drank in this way went for weeks or months without drinking at all. Moreover, because such behavior was so widely accepted and promoted group solidarity, family members were unable or unwilling to intervene even if excessive drinking had untoward consequences, as it often did, for accidents, fights, arrests, and the expenditure of needed cash were not uncommon. Alcoholic cirrhosis was not high on the list of consequences, however, because the style of drinking coupled with the isolation of so many Navajo families made steady drinking unlikely.[69] In the next chapter we shall consider some of the differences between people who died of cirrhosis and other consequences of alcohol abuse and those who used alcohol a lot but did not die of the consequences. Suffice it to say here that most men substantially reduced their alcohol consumption as they entered their 40s. Those who did not were a minority.

Not only was the mortality rate from cirrhosis higher among Hopis than Navajos, but the evidence also suggested that the case-fatality rate (the proportion of people with the disease who died of it) was higher as well. That is, once someone had developed cirrhosis, death occurred in a higher proportion of cases, indicating that the disease had a different natural history in each population. It is

clear, therefore, that the incidence and trajectory of cirrhosis were different in these two neighboring Indian populations; which is to say, the natural history of the condition differed in ways related to the social organization and culture of each tribe.

Epilepsy

Epilepsy is a chronic condition caused by a number of different phenomena, including infection, trauma, and alcohol abuse. Much of the time the cause is unknown (idiopathic epilepsy). It is somewhat more prevalent among Indian than Anglo-American populations but less prevalent than in poverty-stricken areas, especially inner cities. In a study of epilepsy among Navajos and several Pueblo tribes, Levy and colleagues found that in comparison with the prevalence among whites in Rochester, Minnesota (5.7 per 1,000), the age-adjusted rates among Indians were as follows: Tewas, 7.5; Navajos, 8.2; Hopis, 8.0; and Zunis, 9.1.

Seventy-five percent of the Anglo-American cases were idiopathic, whereas 47 percent of the Indian cases were. The higher prevalence of epilepsy among Indians, and the relatively lower proportion of idiopathic cases, was explained by the greater exposure of Indians to infection, trauma, and excessive alcohol consumption.[71] For our purposes, what is important is the trajectory of epilepsy among Navajos and Pueblos (including Hopis). Navajo epileptics were significantly more likely than Pueblos were to have developed emotional and social problems. Among epileptics with such problems, Navajos developed them earlier. And among people with problems, female, but not male, Navajo epileptics developed far more severe problems than did Pueblo epileptics.

> Only Navajos (two males and one female) were diagnosed as psychotic. Only Navajos were involved in homicide or homicide attempts: two females were murdered, one male was murdered by his brother, and another was seriously stabbed by his brother. Only Navajos (two males and one female) made serious suicide attempts. Seven Navajo women were diagnosed as having persistent hysterical reactions and another had a few isolated episodes. One Pueblo male also had a few episodes.[72]

Levy and associates attribute the earlier onset and greater severity of emotional and social problems among Navajo epileptics to differences in the ways in which parents respond to children with a seizure disorder. "The characteristic reaction of Navajo parents to the epileptic child was withdrawal," even to the extent of fleeing when a child had a seizure. "By contrast, Pueblo parents tried to treat the epileptic child as normally as possible. They took special pains to talk with their own and their neighbors' children, so that they would act calmly when witnessing a convulsion and would not tease." However, "the outward placidity of Pueblo parents masked a tendency to deny the serious and chronic nature of the disease. . . . By treating the child as normal, Pueblo parents avoided dealing with the medical and social problems posed by the disease." The result was that when Pueblo children with epilepsy entered adolescence, they tended to develop

emotional problems, just as the Navajo children did, though not of the same severity.[73]

Why do Navajos and Pueblos deal with epileptics so differently? Levy and colleagues argue that Navajos view epilepsy as the result of incest, whereas Hopis and other Pueblos do not. Why, then, is incest of so much greater concern to Navajos than to Hopis and other Pueblo Indians?

The admittedly speculative explanation is that when the Athabaskans moved into the Southwest some time before the Spanish *entrada*, they had bilateral descent and practiced cross-cousin marriage, which was later to become a preference for marriage into the father's clan after the development of matrilineal descent. We have seen that as a result of hosting many Pueblos for almost a century after the Spanish reconquest in the 1690s, the Navajos adopted Pueblo marriage proscriptions so as to integrate polities composed of different cultures (Pueblos and Athabaskans). Later, when pastoralism became the dominant pursuit and the population dispersed, families lived in relative isolation for much of the year. A taboo that once had threatened punishment for not marrying into different ethnic groups changed and came to refer only to marriage within one's own clan. Violation of the prohibition was believed to cause epilepsy.[74] Where social controls were largely lacking, supernatural sanctions were more likely to be invoked.

That is to say, clan incest became a major preoccupation for the Navajos because they resided in isolated family units where incest was a real risk. Among Pueblos residing in densely settled villages where public scrutiny was continuous, incest was less likely. Thus the meaning of epilepsy was especially charged for the Navajos, whereas it was not for the Pueblos, and thus the familial and societal reaction to epilepsy was different as well, with different consequences for the epileptic.

DISCUSSION

The Navajos and the Hopis have been in contact for about 500 years and have profoundly influenced each other. Nonetheless they remain quite distinct. That this continues to be the case is attributable to the fact that for Indians it was land that the encroaching European-Americans wanted, and it was acquired by means of both warfare and treaties. The treaties recognized Indian tribes as domestic sovereign nations with legitimate claims to certain territories and certain rights. The situation was different from that of, for example, African Americans, from whom labor rather than land was the desired commodity. For Africans, tribal distinctions were vaporized in the crucible of slavery and its aftermath. The result was the establishment of an African-American identity that long antedates the creation, however incomplete, of a supratribal, American Indian identity. It was indeed the establishment of reservations recognized by treaty that has made possible the continual reaffirmation of tribal, as distinguished from a more generalized Indian, identity.[75]

Even before the reservation period, the histories of population change were different in each tribe. In the early reservation years before medical interventions were very effective, they continued to be different. The reasons for these different population trajectories have nothing to do with widespread infertility among Hopis, a cause of population decline that has been invoked in Polynesia and that has been suggested as a model for the American Indian decline. Whatever the causes elsewhere, among the Hopis there is no evidence of infertility, suggesting that it is possible to reach the same point by several paths. Moreover, among the Navajos, population growth in the late 19th century was associated with comparatively low fertility, but with even lower mortality.

Among the Indians north of Mexico the Navajos are unique, for there is no evidence that they ever suffered the declines experienced by so many other native Americans, even in the 16th century when, it is postulated, a smallpox pandemic decimated the Indians even before they saw their first European.[76] We have already suggested some of the reasons: a scattered settlement pattern, relative isolation, a reservation that was expanded by executive order several times until the 1930s, and encouragement to be independent by agents of the federal government, who in the early reservation period provided livestock so that herds and flocks could be rebuilt. Like the several Polynesian populations described in Chapter 3, the Navajos are important because they exemplify the fact that disease did not afflict all populations in the same fashion or to the same degree and that to invoke disease as the cause of the universal decline of New World populations in the absence of other factors is to oversimplify. Indeed, it seems implausible that Navajos alone should have escaped unscathed while every other population declined by 90 percent or so. More plausible is a whole spectrum of responses, from the Navajos at one end to total extinction at the other.[77]

In the contemporary era, too, we have shown that diversity continues to characterize fertility, mortality and the consequences of chronic disease. As in the case of epidemics of acute infectious diseases, so in the case of noninfectious chronic conditions, diseases do not simply happen to a society; they are as well an expression of that society. The comparisons between Navajo and Hopi cirrhotics and epileptics illustrate an alternative way of conceiving of disease trajectories: as careers of people with a particular condition in contrast with the natural history of the condition itself. In an essay on longitudinal studies of alcohol abuse, Griffith Edwards called attention to these two different models used by investigators to explain the patterns they observed. He defined natural history as "the sequential development of designated biological processes within the individual" and career "as an individual's sequential behaviour within a designated role."[78]

There is an important epistemological difference between the conceptions of natural history and career. We have already said that the former assumes a natural world free of adventitious human influences. It is essentialist in its view of disease. Which is to say, it is assumed that diseases may be treated as species with an existence and course largely independent of the characteristics of the individuals or populations who suffer from them. Those who write about patient

(or deviant) careers tend to take a more nominalist view. They do not necessarily deny the reality of harmful biological processes but argue that they do not exist as diseases until they have been defined as diseases. And what is crucial, the very process of defining or labeling a condition as a disease rather than, say, a sin has profound implications for the person experiencing the condition and for the outcome of the condition.[79]

Writers who use the idea of career to describe the experiences of patients are concerned with how the patient's sense of self is shaped by the institutions and individuals with which his condition brings him in contact. According to Erving Goffman,

> One value of the concept of career is its two-sidedness. One side is linked to internal matters held dearly and closely, such as image of self and felt identity; the other side concerns official positions, jural relations, and style of life, and is part of a publicly accessible institutional complex. The concept of career, then, allows one to move back and forth between the personal and the public, between the self and its significant society.[80]

A number of studies of patients with particular conditions have been based on this notion of career, among them Goffman's work with mental patients, Julius Roth's[81] with tuberculosis patients, Fred Davis's[82] with polio patients, and Robert Scott's[83] with blind people. The study of the blind suggests that people with the same level of disability may be taught to be independent or dependent, according to the treatment philosophy of the program providing services. Likewise, the differences between Hopi and Navajo epileptics and cirrhotics may best be viewed as differences in the typical careers of people with these conditions in each culture, rather than as differences in the natural history of the two conditions.

All these examples are based on chronic conditions that are slowly, or not inevitably, fatal and in which what people are taught to believe about themselves makes a difference in regard to their outcome. These contrast with conditions such as lung cancer, which are equally fatal regardless of therapy or socioeconomic status.[84] In such conditions it makes more sense to talk about the natural history of the disease than the career of the patient, at least in regard to outcome. The career conception is thus particularly useful in explaining the course of conditions in which the patient's own behavior may have a determining influence on outcome, because it speaks to the way in which social institutions shape how people conceive of themselves and how conceptions of the self shape the course of the condition.[85]

The contrasting historical and contemporary experiences of these two neighboring peoples therefore indicate that in regard to both acute infectious diseases and chronic diseases, the conception of "natural history of disease" may be misleading. The epidemiology of acute infectious diseases, whether epidemic or endemic, and chronic diseases, whether infectious (tuberculosis) or noninfectious (epilepsy) all are shaped in important but different ways by the social

context in which they occur. It is only by understanding this context that one can understand morbidity and mortality in their full complexity.

NOTES

1. S. Nagata, *Modern Transformations of Moenkopi Pueblo* (Urbana: University of Illinois Press, 1970); S. Nagata, "The reservation community and the urban community," in J. O. Waddell and O. M. Watson, eds., *The American Indian in Urban Society* (Boston: Little, Brown, 1971), pp. 114–59; R. O. Clemmer, *Continuities of Hopi Culture Change* (Ramona, CA: Acoma Books, 1978); D. F. Aberle, "A plan for Navajo economic development," in *Toward Economic Development for Native American Communities*, a compendium of papers submitted to the Sub-Committee on Economy in Government of the Joint Economic Committee of the Congress of the United States (Washington, DC: U.S. Government Printing Office, 1969); J. E. Levy, "Who benefits from energy resource development: The special case of the Navajo Indians," *Social Science Journal* 17(1980): 1–19.

2. J. G. Jorgensen, *Western Indians: Comparative Environments, Languages, and Cultures of 172 Western American Indian Tribes* (San Francisco: Freeman, 1980), p. 68.

3. G. G. Gumerman and J. S. Dean, "Prehistoric cooperation and competition in the Western Anasazi area," in L. S. Cordell and G. G. Gumerman, eds., *Dynamics of Southwest Prehistory* (Washington, DC: Smithsonian Institution Press (a School of American Research Advanced Seminar Book), 1989), pp. 99–148, 111.

4. J. Haas and W. Creamer, "Warfare and tribalization in the prehistoric Southwest: Report on the first season's work, 1984" (Santa Fe: School of American Research Press, 1985).

5. E. G. McIntire, "Hopi Indian population change," paper presented at the 14th annual meeting of the Arizona Academy of Science, Phoenix, April 18, 1970; E. H. Spicer, *Cycles of Conquest: The Impact of Spain, Mexico, and the United States on the Indians of the Southwest, 1533–1960* (Tucson: University of Arizona Press, 1962), p. 190.

6. C. R. Steen, *Tse Ta'a: Excavations at Tse Ta'a, Canyon de Chelly National Monument, Arizona*, Research Series no. 9 (Washington, DC: National Park Service, 1966), pp. 55–57.

7. S. Upham, *Politics and Power: An Economic and Political History of the Western Pueblo* (New York: Academic Press, 1982).

8. S. Upham, "Smallpox and climate in the American Southwest," *American Anthropologist* 88(1986):126.

9. It may be more accurate to put the sequence the other way around. Size and complexity are assumed, and a mechanism must be discovered or invented to account for the fact that what Europeans described was smaller and, in some instances, simpler.

10. J. Bennett, "The interpretation of Pueblo culture: A question of values," *Southwestern Journal of Anthropology* 2(1946):361–74. See also R. Redfield, *The Little Community: Viewpoints for a Study of a Human Whole* (Chicago: University of Chicago Press, 1955).

11. J. E. Levy, S. J. Kunitz, and E. B. Henderson, "Hopi deviance in historical and epidemiological perspective," in L. Donald, ed., *Themes in Ethnology and Culture History: Essays in Honor of David F. Aberle* (Berkeley, CA: Folklore Institute, 1987), p. 385.

12. For a more detailed discussion of Hopi society and population, see J. E. Levy,

Oraibi Revisited: Social Stratification in an "Egalitarian" Society (Santa Fe: School of American Research Press, 1992).

13. F. Eggan, "Shoshone Kinship Structures and Their Significance for Anthropological Theory," *Journal of the Steward Anthropological Society* 11(1980):65–93.

14. R. N. Bellah, *Apache Kinship Systems* (Cambridge, MA: Harvard University Press, 1952); G. Goodwin, *The Social Organization of the Western Apache* (1st ed. 1942) (Tucson: University of Arizona Press, 1969).

15. D. L. Martin, "Patterns of health and disease: Stress profiles for the prehistoric Southwest," paper prepared for The Organization and Evolution of Prehistoric Southwestern Society, advanced seminar, School of American Research, Santa Fe, September 25–29, 1989.

16. R. Underhill, *Ceremonial Patterns in the Greater Southwest*, American Ethnological Society, Monograph no. 13 (Seattle: University of Washington Press, 1948), p. viii.

17. E. G. McIntire, "Hopi Indian population change," paper presented at the 14th annual meeting of the Arizona Academy of Science, Phoenix, April 18, 1970, on file in the library of the Museum of Northern Arizona, Flagstaff.

18. C. M. Snipp, *American Indians: The First of this Land* (New York: Russell Sage Foundation 1989), pp. 87, 328ff.

19. E. Palsano, J. Greendeer-Lee, J. Cowles, and D. Carroll, *American Indian and Alaska Native Areas, 1990* (Washington, DC: Racial Statistics Branch, Population Division, Bureau of the Census, 1991).

20. Jorgensen, *Western Indians*, pp. 71–72.

21. R. M. Underhill, *The Navajos* (Norman: University of Oklahoma Press, 1956), pp. 35–36.

22. Although the prevailing opinion is that the Navajos and Western Apaches developed matrilineal descent after their arrival in the Southwest, Dyen and Aberle attempted to demonstrate that the Apacheans were matrilineal before they left their northern homeland in what is now Alaska and western Canada and that the Eastern Apaches became bilateral after their arrival. See I. Dyen and D. F. Aberle, *Lexical Reconstruction: The Case of the Proto-Athabascan Kinship System* (Cambridge, Cambridge University Press, 1975).

23. E. T. Hall, Jr., "Recent clues to Athapascan prehistory in the Southwest," *American Anthropologist* 46(1944):98–105.

24. Underhill, *The Navajos*, p. 42.

25. A. Hrdlicka, *Physiological and Medical Observations Among the Indians of the Southwestern United States and Northern Mexico*, Bulletin no. 34, Bureau of American Ethnology, Smithsonian Institution (Washington, DC: U.S. Government Printing Office, 1908), p. 8.

26. D. Keur, "A chapter in Navajo–Pueblo relations," *American Antiquity* 10(1944): 75–86.

27. D. F. Aberle, "Navajo exogamic rules and preferred marriages," in L. S. Cordell and S. Beckerman, eds., *The Versatility of Kinship: Essays Presented to Harry W. Basehart* (New York: Academic Press, 1980).

28. R. H. Lowie, *Primitive Society* (New York: Harper Bros., 1961), p. 193.

29. Evidence for the development of conflict between the sexes is discussed in J. E. Levy, R. Neutra, and D. Parker, *Hand Trembling, Frenzy Witchcraft, and Moth Madness: A Study of Navajo Seizure Disorders* (Tucson: University of Arizona Press, 1987).

30. G. Bailey and R. G. Bailey, *A History of the Navajos: The Reservation Years* (Santa Fe: School of American Research Press, 1986), p. 17.

31. R. S. McPherson, "Ricos and Pobres: Wealth distribution on the Navajo Reservation in 1915," *New Mexico Historical Review* 60(1986):415–34; E. Henderson, "Navajo

livestock wealth and the effects of the stock reduction program of the 1930s," *Journal of Anthropological Research* 45(1989):380.

32. Bailey and Bailey, *A History of the Navajos*, p. 180.

33. D. F. Aberle, *The Peyote Religion Among the Navajo* (Chicago: Aldine, 1966).

34. Bailey and Bailey, *A History of the Navajos*, pp. 19–20.

35. D. Johnston, *An Analysis of Sources of Information on the Population of the Navaho*, Bulletin no. 197, Bureau of American Ethnology, Smithsonian Institution (Washington, DC: U.S. Government Printing Office, 1966), pp. 136–38.

36. Snipp, *American Indians*, pp. 87, 328.

37. Palsano et al., *American Indian and Alaska Native Areas*.

38. Johnston, *An Analysis of Sources of Information*, p. 150.

39. "The consumption group is defined as one that constantly and habitually funds and shares all forms of income, including agricultural products, livestock and livestock products, and goods purchased from the traders. The consumption group is, in the majority of instances, identical with the biological family, but it consists frequently of two or more related biological families and occasionally of unrelated biological families or individuals. See Section of Conservation Economics, Statistical Summary, Human Dependency Survey, Navajo and Hopi reservations, Navajo area, Region 8, Soil Conservation Service (Washington, DC: U.S. Department of Agriculture, 1939), on file in the library of the Museum of Northern Arizona, Flagstaff.

40. For example, Aberle, *The Peyote Religion*.

41. Levy et al., "Hopi deviance," p. 387; E. B. Henderson, "Kaibeto Plateau ceremonialists: 1860–1980," in D. M. Brugge and C. J. Frisbie, eds., *Navajo Religion and Culture: Selected Views. Papers in Honor of L. C. Wyman* (Santa Fe: Museum of New Mexico Press, 1982), pp. 164–75.

42. S. J. Kunitz, *Disease Change and the Role of Medicine: The Navajo Experience* (Berkeley and Los Angeles: University of California Press, 1983), p. 32.

43. S. J. Kunitz, "Factors influencing recent Navajo and Hopi population change," *Human Organization* 33(1974):7–16.

44. S. R. Johansson and S. H. Preston, "Tribal demography: The Hopi and Navajo populations as seen through manuscripts from the 1900 U.S. Census," *Social Science History* 3(1978):1–33.

45. D. E. Stannard, "Disease and infertility. A new look at the demographic collapse of native populations in the wake of Western contact," *Journal of American Studies* 24(1990):325–50.

46. Levy, *Orayve Revisited*.

47. The Navajos had far fewer childless women than expected, and the First and Second Mesas had far more: chi square = 11.15, $df = 3$; $p = .01$

48. M. Bradfield, "The changing pattern of Hopi agriculture," Royal Anthropological Institute of Great Britain and Ireland occasional paper no. 30, 1971, p. 62.

49. H. S. Colton, *Black Sand* (Albuquerque: University of New Mexico Press, 1960), pp. 112–13.

50. Ibid., p. 115.

51. M. Titiev, *The Hopi Indians of Old Oraibi: Change and Continuity* (Ann Arbor: University of Michigan Press, 1972), p. 335

52. M. Titiev, "Old Oraibi, a study of the Hopi Indians of Third Mesa," papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University, vol. 22, no. 1, Cambridge, MA, 1944, p. 31; E. L. Bailey, "Some sex beliefs and practices in a Navaho community," papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University, vol. 40, no. 2, Cambridge, MA, 1950.

53. Quoted in Johnston, *An Analysis of Sources of Information*, p. 74.

54. Levy, *Orayvi Revisited*.

55. S. J. Kunitz, "Navajo and Hopi fertility, 1971–1972," *Human Biology* 46(1974): 435–51.

56. S. J. Kunitz and J. C. Slocumb, "The use of surgery to avoid childbearing among Navajo and Hopi Indians," *Human Biology* 48(1976):9–21.

57. J. C. Slocumb, C. L. Odoroff, and S. J. Kunitz, "The use-effectiveness of two contraceptive methods in a Navajo population: The problem of program dropouts," *American Journal of Obstetrics and Gynecology* 122(1975):717–26.

58. J. C. Slocumb, S. J. Kunitz, and C. L. Odoroff, "Complications with use of IUD and oral contraceptives among Navajo women," *Public Health Reports* 92(1979):243–47.

59. S. J. Kunitz and M. Tsianco, "Kinship dependence and contraceptive use in a sample of Navajo women," *Human Biology* 53(1981):439–52. This was a sample of reservation residents. It is likely that women living off the reservation would have had a different pattern of contraceptive use.

60. U.S. Bureau of the Census, Census of Population: 1970, Subject Reports, Final Report PC(2)-1F, *American Indians* (Washington, DC: U.S. Government Printing Office, 1973), p. 152

61. E. A. Kennard, "Post-war economic changes among the Hopi," in J. Helm, ed., *Essays in Economic Anthropology*, proceedings of the 1965 annual spring meeting of the American Ethnological Society (Seattle: University of Washington Press, 1965), p. 27.

62. Titiev, *The Hopi Indians of Old Oraibi*, p. 337.

63. Ibid.; Kennard, "Post-war economic changes"; Nagata, *Modern Transformations of Moenkopi Pueblo*.

64. Kunitz, *Disease Change*, pp. 17, 83. In 1978 the Hopis were reported to have had a rate of 22.3/1,000 live births. In such a small population with a small number of births, such fluctuations are not unexpected. See B. R. Burkhalter, C. K. Ritenbaugh, and G. G. Harrison, *Trends in Infant Feeding Among Southwest American Indians, 1900–1980* (Tucson: Department of Family and Community Medicine, University of Arizona School of Medicine, 1981), p. 169.

65. S. J. Kunitz, J. E. Levy, C. L. Odoroff, and J. Bollinger, "The epidemiology of alcoholic cirrhosis in two southwestern Indian tribes," *Quarterly Journal of Studies on Alcohol* 32(1971):706–20; Levy et al., "Hopi deviance."

66. Levy et al., "Hopi deviance."

67. Ibid., pp. 380–82.

68. J. E. Levy and S. J. Kunitz, *Indian Drinking: Navajo Practices and Anglo-American Theories* (New York: Wiley, 1974). See also M. Topper, "Navajo 'alcoholism': Drinking, alcohol abuse, and treatment in a changing cultural environment," in L. Bennett and G. Ames, eds., *The American Experience with Alcohol: Contrasting Cultural Perspectives* (New York: Plenum Press, 1985), pp. 227–51.

69. The rate of death due to cirrhosis was higher in areas close to border towns where alcohol was relatively more accessible than it was in remote parts of the reservation. See S. J. Kunitz, J. E. Levy, and M. Everett, *Alcoholic cirrhosis among the Navaho*," *Quarterly Journal of Studies on Alcohol* 30(1969):672–85.

70. Levy et al., *Hand Trembling*, p. 72.

71. Ibid., p. 74.

72. Ibid., p. 81.

73. Ibid., p. 85.

74. The myth accounting for the taboo tells of the Butterfly People (Navajos) who commit incest in an attempt to avoid marrying the Swallow People (Pueblos). They mated with the closest available relative, that is, a sibling. Today, sibling incest is emphasized, although some Navajos say that marriage into father's clan also causes epilepsy. See Levy

et al., *Hand Trembling*, pp. 46–49, 55–59; also B. Haile, *Love Magic and Butterfly People: The Slim Curley Version of the Ajilee and Mothway Myths*, ed. C. Luckert (Flagstaff: Museum of Northern Arizona Press, 1978).

75. S. Cornell, "Land, labour and group formation: Blacks and Indians in the United States," *Ethnic and Racial Studies* 13(1990):368–88.

76. The influenza pandemic of 1918 is said to have killed a higher proportion of Navajos than of Hopis who lived in the village of Moenkopi, a daughter village of Oraibi about 50 miles to the west. This is attributed to the fact that the Navajos, who lived in dispersed family groups, did not receive nursing care and food when they fell ill, whereas the Hopis, being near an agency town, did. It appears that the influenza among the Navajos was a common-source epidemic that spread from a major ceremonial that many victims had attended. Under ordinary circumstances, the influenza would not have been expected to take as high a toll as it did. See S. Russell, "The Navajo and the 1918 influenza pandemic," in C. F. Merbs and R. J. Miller, eds., *Health and Disease in the Prehistoric Southwest*, Anthropological Research Papers no. 34, Department of Anthropology, Arizona State University, Tempe, 1985.

77. D. H. Ubelaker, "Patterns of demographic change in the Americas," *Human Biology* 64(1992):361–79.

78. G. Edwards, "Drinking in longitudinal perspective: Career and natural history," *British Journal of Addiction* 79(1984):175.

79. These distinctions are not new. In 1926 F. G. Crookshank wrote:

> The whole history of Occidental Medicine may indeed be almost indifferently pictured as a swaying struggle between Nominalism and Realism, or between Aristotelianism and Platonism, or between the natural followers of Hippocrates and those of Galen; but most faithfully, perhaps, as between Hippocratic Cos and antagonistic Cnidus. At Cos men studied the organism, or *whole individual*, in health and in diseases: At Cnidus, the *part* or organ: the disease: and the type, if not the *name* (italics in original).

F. G. Crookshank, "The relation of history and philosophy to medicine," in C. G. Cumston, *An Introduction to the History of Medicine* (London: Kegan Paul, Trench, Trubner, 1926), p. xxx.

80. E. Goffman, "The moral career of the mental patient," in E. Goffman, *Asylums: Essays on the Social Situation of Mental Patients and Other Inmates* (Garden City, NY: Anchor Books, 1969), p. 127.

81. J. A. Roth, *Timetables: Structuring the Passage of Time in Hospital Treatment and Other Careers* (Indianapolis: Bobbs-Merrill, 1963).

82. F. Davis, *Passage Through Crisis: Polio Victims and Their Families* (Indianapolis, Bobbs-Merrill, 1963).

83. R. A. Scott, *The Making of Blind Men: A Study of Adult Socialization* (New York: Russell Sage Foundation, 1969).

84. E. R. Greenberg, C. G. Chute, T. Stukel, J. A. Baron, D. H. Freeman, J. Yates, and R. Korson, "Social and economic factors in the choice of lung cancer treatment," *New England Journal of Medicine* 318(1988):612–17, B. R. Cassileth, E. J. Lusk, D. Guerry, A. D. Blake, W. P. Walsh, L. Kascius, and D. J. Shultz, "Survival and quality of life among patients receiving unproven as compared with conventional cancer therapy," *New England Journal of Medicine* 324(1991):1180–85.

85. For a somewhat different view of the way people with chronic illnesses learn to conceive of themselves, see R. F. Murphy, *The Body Silent* (New York: Norton, 1990). See also R. F. Murphy, J. Scheer, Y. Murphy, and R. Mack, "Physical disability and social liminality: A study in the rituals of adversity," *Social Science and Medicine* 26(1988):235–42.

Table 5–4 Fertility and survival of children on three mesas (women 33+ years of age)

A. Fertility (as # children born/fertile woman) and survival rates of children

Mesa[a]	Barren	Bearing	Total	Fertility	% Surviving
First Mesa	9	71	80	6.51	40.7
Second Mesa	8	82	90	7.34	35.2
Third Mesa	3	80	83	8.09	47.5
Navajo[b]	2	129	131	5.3	79.4

B. Survival of children

	Died		Survived		
Mesa	Obs	Exp	Obs	Exp	Total
First	274	(271.1)	188	(190.9)	462
Second	390	(353.2)	212	(248.75)	602
Third	340	(379.7)	307	(267.3)	647
	1004		707		1711

Note: $X^2 = 19.4$; $df = 2$, $p = <.0001$

[a] *Source:* J. E. Levy, *Orayvi Revisited: Social Stratification in an "Egalitarian" Society* (Santa Fe: School of American Research, 1992).

[b] *Source:* S. R. Johansson and S. H. Preston, "Tribal demography: The Hopi and Navajo populations as seen through manuscripts from the 1900 U.S. Census," *Social Science History*, 3 (1978):1–33.

themselves, and house terraces no longer reek of stale urine. As for defecation, members of both sexes used to resort to the outskirts of the pueblo and trusted to cultural blindness to preserve their modesty. These conditions no longer prevail.[51]

Different living conditions accounted for the differences in mortality from both epidemic and endemic infectious diseases. The fertility differences documented from the 1900 census cannot be accounted for as readily. It has generally been said that contraception was not widely used by either group.[52] On the other hand, an army surgeon at the Bosque Redondo in the 1860s is quoted in reference to the Navajos:

> On this reservation I cannot say I have seen a single case of constitutional syphilis. But what does and will decrease the number of the tribe and finally wipe them out of existence is the extensive system of abortion carried on by the young women. You may remark how seldom it is a young woman has a child; in fact, none of the women, except they are thirty or forty, ever think of having one, if they can help it, so that two or three children are considered a large family.[53]

Admittedly this was an especially traumatic period of Navajo history, and women may have been especially likely to have wanted to avoid having children in such a setting. Nonetheless, it is also possible that such voluntary restriction continued to be practiced, particularly among women who were over 30 at the time of the 1900 census and who were of the generation born at the Bosque Redondo or in the years preceding captivity.

It is also possible that the pastoralists walking long distances each day–as