

Chapter 4. HORTICULTURAL SOCIETIES

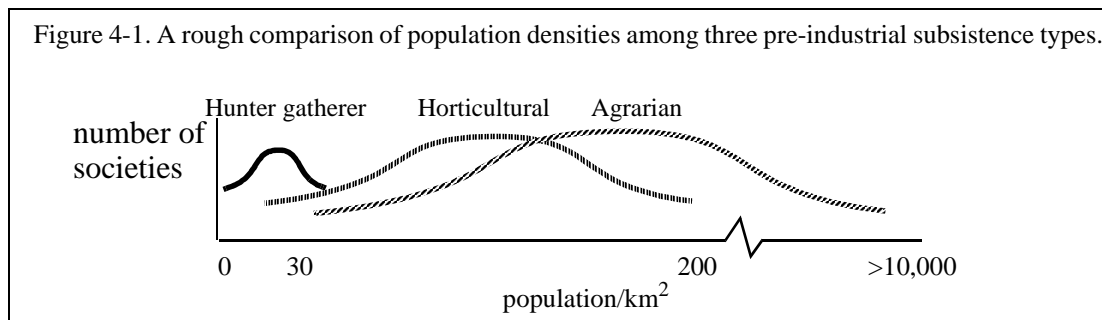
I. Introduction

A. Basic Concepts

Horticultural societies are differentiated from hunting and gathering societies by the use of domesticated plants as the major basis for subsistence. Horticultural societies are technically differentiated from agrarian societies by their lack of plows and animal traction, and from pastoral societies because they do not make domesticated herd animals the main basis of subsistence.

Many more people can be supported per km² by investing effort in replacing relatively rare wild plant species that produce relatively few parts that humans can eat with masses of domesticated species that produce relatively great quantities of edible parts. People tend to have to work hard to plant, weed, harvest, and process food in horticultural systems. There is no assistance from animal or mechanical powered tools.

Horticultural societies have agricultural systems that are relatively unproductive per unit of human labor compared to plow agriculture, and more productive per unit land area than hunting and gathering., As figure 4-1 illustrates, this is a generalization about means; it does not tell us anything about the variance. Hunters and gatherers in the very best environments (e.g., the Northwest Coast) had local population densities that far exceed the very low densities of some horticulturalists of the tropical forests. Likewise, the best that horticulturalists can do in a favorable environment in this regard undoubtedly beats what the plowman can do in an unfavorable environment. When livestock becomes important enough that their herders become mobile, substantially different pastoral societies arise, although many horticulturalists keep some animals, and many pastoralists engage in some farming.



Keep these two efficiencies, productivity per unit land and per unit labor, in mind. They have somewhat different effects on culture core variables.

B. History

Horticulture first developed in the Middle East beginning about 9,500 years ago and by about 5,000 years ago this technology had spread far eastward and to the Atlantic in the West (Times Historical Atlas¹, 1979: 42). Cattle and sheep herding developed very early, in association with the plant domesticates, chiefly wheat and barley, plus a substantial number of minor crops. Hence, with the availability of draft animals, agrarian societies arose relatively early from horticultural ones in W. Asia and Europe. North China, Mexico, and Peru were also earlier centers of horticulture. The tropical lowlands of East Asia, Africa, and South America appear to have developed horticulture based on tropical crops rather later than the four semiarid city centers. We will discuss the evolution of horticulture in more detail in Chapter 26.

C. Ethnographic Sample

Unlike the case with hunting and gathering societies, we have a rather large sample of contemporary horticultural societies. However, our sample is still rather biased relative to the historical record. A special type of horticulture, swidden cultivation, has turned out to be a quite durable adaptation to the wet tropics. Elsewhere, plow agriculture has tended to replace horticulture. For example, the Spanish brought cattle to the New World, and ox-drawn plows replaced horticulture in most of the drier and more temperate parts of “Latin” America fairly soon after the Conquest. Chroniclers with the conquistadors give us some picture of these societies. We know something more of the horticulture of the Native American of the Eastern half of the US, most of whom were forest horticulturalists, and of the peoples of the Southwestern US and N. Mexico, who were horticulturalists in semi-arid country. These societies persisted in fairly unmodified state into the 19th Century.

Many people still depend upon horticulture in the wet tropics. You may have heard the somewhat old pejorative term “slash and burn” applied to swidden horticulture. After WWII views on swidden cultivation have changed substantially (Conklin, 1954). In many areas of the hot, wet tropics, high rainfall has developed soils that are very poor in nutrient holding capacity. An effective way to farm these poor soils is to burn off the forest and grow crops for a few years in the ash fertilized plot. As nutrients are depleted and weeds invade the field, it is allowed to return to forest. The period of forest fallow varies greatly, but 15-50 years. is perhaps the typical range. No more elaborate form of cultivation has yet proved practical on the worst of these soils, and many examples of quite simple horticulture are common in S.E. Asia, S. America, and Africa. In some tropical areas, especially Africa, there are also societies practicing more advanced forms of horticulture in the seasonally dry

1. This is a very interesting reference work for leisurely perusal.

regions north and south of the Congo Basin. In Oceania, Melanesian and Polynesian societies still practice horticulture. A few hundred million people in the tropical parts of the world practice horticulture today.

II. Technology

A. Simplest Horticulture

The simplest toolkit of all is very simple indeed. The toolkit of horticulturalists varies immensely in complexity. Lenski and Lenski (1982) recognize this fact by subdividing the continuum into “simple” and “advanced” subtypes. The Amazonian Basin horticulturalists like the Yanomamo, Xavante, and Waorani made do with a simple stone axe to cut the forest, a means of making fire by friction to burn it, and simple wooden digging sticks and spades to plant their cuttings of manioc, sugar cane, maize seeds, etc. (Steel axes and machetes are much preferred to stone these days; steel is roughly 3 times as efficient in results per unit effort as stone.) South American simple horticulturalists typically keep no domesticated animals, and the men hunt and fish for protein. In Oceania, by contrast, pigs are a near-universal element of simple horticulture. In Sub-Sahara Africa, cattle are frequently kept whenever tsetse flies, which transmit devastating diseases from native game to the relatively recent cattle, are absent. Residence is semi-permanent, so houses of modest sophistication are constructed. Villages may last on the same spot for a decade or longer, until it is convenient to move to find more game or to be closer to swidden plots.

Despite the relative simplicity of the technology, something like a 100 or more domesticated crops are kept, and plots are botanically complex. Conklin (1954) reported that an “ideal” Philippine Hunanoo swidden plot would contain 48 species of cultivars, including some 250 named varieties of the basic crops. A sharp division between domesticated and wild plants probably gives a misleading impression of tropical forest cultivation. Many wild plants are encouraged or planted. The complexity of swidden plots sometimes seems to mimic the forest, as plants with different stature and maturity schedules are interplanted. Forest succession seems to be managed to encourage species that will return the plot to cultivatable condition as rapidly and in as good a condition as possible. Altogether, tropical horticulturalists might be styled vegetation managers rather than farmers after the agrarian model (e.g., Conklin, 1961; Manner, 1981). Thus, as in the case of mobile hunters and gatherers, the simplicity of the toolkit belies the sophistication of its application.

B. Complex Horticulture

Many ancient horticultural societies had much more than the minimum tool kit. To get an impression of the range of technical sophistication of horticulture, we can compare

the extremely simple Amazonian basin technology to much more sophisticated toolkit of the Andean Highlands. Andean peoples were a fair example of an advanced horticultural society in 1500. Cultivation implements included a “foot-plow”, a sort of spade. Fields were permanent, often terraced and irrigated, and normally manured or cultivated with a short fallow. Inca and pre-Incan water control and irrigation works were quite impressive. Much of the system is still used today in the Highlands and Coastal Valleys of Peru, and ruined hydraulic structures are common as well. Domestic animals were kept, llamas, alpacas, and guinea pigs. Bronze was used for some utilitarian items and for weapons and ornaments (gold and silver for the last, too). Houses made of mud brick were designed to last a generation or two. Monumental architecture and fortifications of dressed stone are the visually most arresting accomplishments of the Andean peoples. You have all seen pictures of Cuzco and Machu Picchu. Textiles and pottery were in common use. Only a few societies we would call horticultural have a more sophisticated toolkit, although African horticultural societies have iron tools. This last is important. Bronze is a good metal for many purposes, but it is expensive because good copper and tin ores are hard to come by. Hence, bronze is an elite metal, not much used for common agricultural tools. Iron is a democratic metal, harder to manufacture, but relatively cheap once the technique is known because its ores are much more abundant. Perhaps significantly, Sub-Saharan Africa has little monumental architecture, which is a product of highly stratified societies. Iron and agriculture came together. Is it possible that the democratic metal (a good, sharp spear for Everyman) prevented the extremes of stratification in Africa?

III. Demographic Consequences

In the poor soil regions of the very wet tropics human densities under horticulture are often very low. In Amazonia and lowland New Guinea, densities are well within the range for hunters and gatherers, a fraction of a person per km². These people keep perhaps a hectare² of garden under cultivation per family, and do not return to the same plot for up to 100 years. Also unsuitable soils and areas too distant from rivers may not be worthwhile to cultivate at all. Even so, much seemingly suitable land seems to be lightly populated, and much suitable land left uncultivated. Students of Amazonia have debated several possible reasons for this, including depopulation by introduced diseases, the existence of intense warfare, and limited abundance of sources of protein (see papers in Hames and Vickers, 1983). In New Guinea, very high mortality rates from malaria may be a sufficient explanation for low population densities.

2. A hectare is roughly the length of a football field on each side—100m X 100m.

Under more favorable circumstances, horticulture can support quite high human densities. On good soils, densities of up to 100 people per km² are possible, as in some parts of the highlands of New Guinea and tropical America, in Polynesia, in Africa, and in S.E. Asia. These densities are perhaps partly a function of recent developments like new crops during the last few hundred years, but in general horticulture is capable of supporting as many or more people per unit land as under the plow, just with more human labor per unit of yield. The maps and tables from Steward and Faron (1959) in figure 4-3 give an impression of the variation in South America during both pre-Columbian and contemporary times.

Settlements are of course much more likely to be permanent or semi-permanent than was the case with hunters and gatherers. Shifting cultivation in poorer tropical areas is the norm, and villages are moved every 5-25 years in some cases, but among advanced horticulturalists, permanent villages are the rule. In the least dense tropical systems, settlements may be no larger than hunters and gatherers' camps. The Gebusi of lowland New Guinea referred to in the last Chapter average 26.5 people per settlement. At the other extreme, fair-sized cities were maintained by the highly developed horticultural societies of Africa, Peru and Mexico. Cuzco, the Inca capital, must have several tens of thousands of inhabitants, for example. Common people lived in substantial permanent adobe houses, and huge monumental edifices were constructed of intricately dressed stone. But such large settlements are an indirect outgrowth of horticultural technology itself and make sense only in the context of the political situation we will consider in a moment.

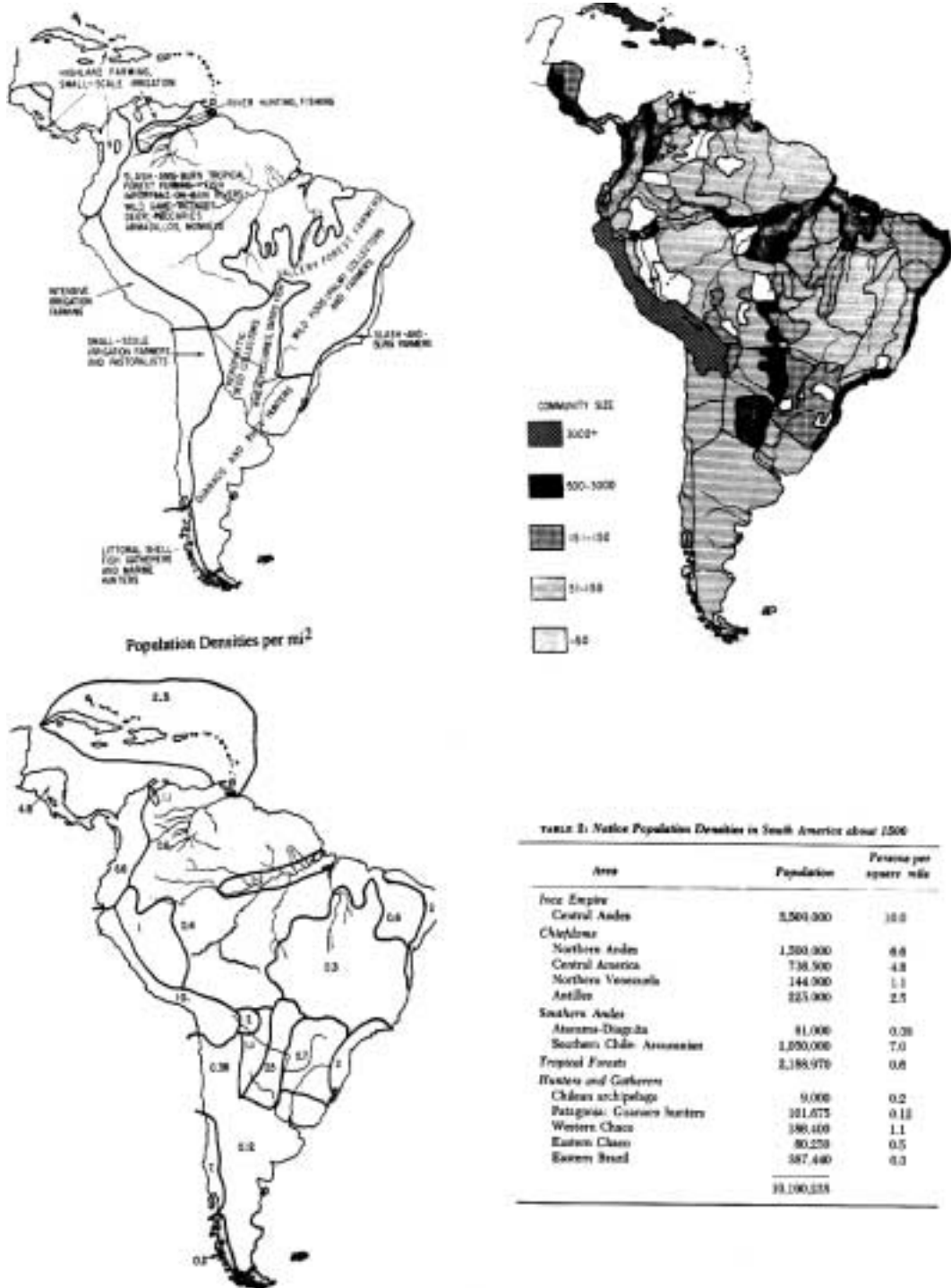
IV. Social and Political Organization

A. The Range of Sophistication is Large

The range of variation in political institutions is large under horticultural subsistence. Note in Steward and Faron's (1959) maps and tables that there is a pretty close correlation between ecology, population density, and political and social complexity. We looked briefly at the Gebusi in the last Chapter, who are as simple politically as the simplest hunting and gathering groups (Knauff, 1985). They lack any sort of formalized political roles. Kin relations and personal ties are all that order Gebusi society. The weak headman is also found among the simpler horticultural societies, such as those of the Amazon Basin, while full-fledged imperial states are found in the most advanced societies, such as the Inca Empire of Peru. More typically, horticultural societies are either organized around "Big-men" or Tribal Chiefs.

In the simpler horticultural societies, differences compared to hunters and gatherers are, to repeat, modest. Kinship remains the most important means of organizing social in-

Figure 4-3. Comparison of environment, subsistence type, community size and population density among contemporary native South American peoples. Compare with data for the same areas ca. 1500bp. Maps and table taken from Steward and Faron (1959:45, 52, 53, 57).



teractions, and plays almost the same role as described for these societies. Interestingly enough, kinship emphasizes ties through the female line rather frequently in horticultural societies. Such societies are said to be matrilineal. In many horticultural societies, women contribute disproportionately to subsistence activities because they are responsible for most of the gardening work, and it seems to be useful to keep related sets of women together after marriage, rather than men as in the typically patrilineal hunter-gatherer case. However, many horticulturalists are patrilineal, so there is no strongly deterministic effect of subsistence type and environment on this variable. Polygyny³ is also common in horticultural societies for the same reason. When women are the principle wealth producers, a man may get rich by having several wives. Men seem rather parasitical in horticultural societies, because they often do relatively little subsistence work but arrogate to themselves important political and military roles.

The norm for horticultural societies shifts radically in the direction already glimpsed among the richest of hunter-gatherer societies, toward the addition of new forms of social organization. Permanent villages of a few hundred people and much denser populations on the ground make interactions with non-kin commonplace. Coordination of non-kin often leads to political specialists, tradesmen, craftsmen, priests, soldiers, slaves and other occupational specialists, if population densities are high enough to permit sufficient people to be freed of the tasks of cultivation. Note that merely an increase in population density, even without any per capita increases in productivity, can allow some social complexity. If there are many people nearby, a small contribution from each will be sufficient to support a few leaders or craftsmen as full-time specialists. Simple markets may facilitate such specialization, but the role of political institutions in exchange is often large.

Political systems organized by political entrepreneurs are common. These “Bigman” systems are characterized by a free competition for the main political role; these are “democratic” societies in which men rise to leadership through their merits and with the support of a body of followers. These systems have been well studied in New Guinea. Similar systems were probably the norm in much of horticultural America, for example in the biggish villages along the main stem of the Amazon. An aspiring bigman tries to talk his relatives into providing him with a share of their produce which he uses to create patterns of obligation among non-kinsmen. If he is successful he may come to be recognized as the main bigman in his village, responsible for the coordination of its affairs and redistributing food and

3. *Polygyny* is the state or practice of having more than one wife or female mate at a time. *Polyandry* refers to having more than one husband or male mate. *Polygamy* refers to a marriage in which a spouse of either sex may have more than one mate at the same time

other necessities between kin groups through the webs obligations that surround him. Typically there remain lesser competing bigmen, who may displace or succeed the current main one. The big-man is a sort of cross between a businessman and a politician. Some of these societies look as if they had been designed by conservative economists, like Milton Friedman, who so emphasize free-market competition (Pospisil, 1978).

There seems to be a strict limit to the number of people that can be organized politically under the bigman system, only up to a few hundred people. Typically, a bigman is merely respected for his personal qualities, and perhaps feared because of his ability to mold a public consensus. His formal powers are generally weak. In this, the bigman system somewhat resembles modern democracies in the extent to which the political elite must respond to public opinion. We are not aware of any known cases of a formal electoral democracy developing directly out of such a system and permitting a state level of political organization to arise. It is interesting that formal democracy is so rare among human societies, and that open political systems based on free competition for popular support occur in relatively simple societies and then again in the industrial democracies. Other kinds of social institutions can operate to link people on a wide scale even with relatively weak leadership. Wiessner and Tumu (1998) reconstruct the way Enga collaborating bigmen in Highland New Guinea used systems ceremonial warfare and ceremonial gift exchange to bring many thousands of Enga across a considerable distance into a rather complex economic system.

Political systems based on hereditary politicians (Chiefs) organize fairly large-scale political units. Chieftainships have a hereditary principle of political power, and, as they are elaborated, evolve into the ascriptively stratified societies so common historically. Often, the senior males of a lineage have some authority over lineage members in hunting and gathering and simple horticultural groups. Chieftainship arises by extension of this principle to the ranking of lineages themselves as senior and junior, so that the senior male of the purportedly senior lineage (the man who can trace his ancestry back to a founding male through *eldest* sons) claims political authority over a large group. Genealogies may in fact be jiggered fairly substantially to fit political reality, but the ideology of inherited political power over a large “family” is important. The ranking of lineages can be quite deep in the more complex cases. There may be a level or two of sub-chiefs with the head of the most exalted senior lineage of all acting as the overall “paramount” tribal chieftain. Conquered or allied people may be incorporated under some paternalistic principle or simply by “re-writing” history to correspond to the ranked lineage principle.

Sometimes the number of people coordinated by such a system gets very large in-

deed, up to a few tens of thousands, rather than the few hundreds for the big-man system. However, the typical chief still has to mobilize kin obligations to make his will felt. The subchiefs and other members of the high-ranked lineages do his bidding because he is a kinsman, or because he and his kinsmen are strong enough to compel obedience. The chief typically has to be on site to make his will felt. For example, in war he calls out the warriors and leads them into battle. All of this is true despite the fact that the chief is usually also endowed with supernatural respect, as a chief priest of a local cult as well as a political leader. The supernatural powers (the *mana* of the Polynesian chiefs for example) is often so effective in preventing revolts by average citizens. However, in most cases, there are enough genealogical complexities so that chiefs always have to watch out for ambitious half-brothers, uncles, and neighboring chiefs. Members of lesser lineages may not often revolt on their own, but they can often easily rationalize a shift of loyalty if the existing chief is too overbearing. Thus the will of lesser folk plays a role, if a diminished one compared to big-man systems, in constraining leaders.

In a few cases, state-level political systems are based on horticultural subsistence. At some point, the size of a chiefdom becomes too large to be managed by the paramount chief without a cadre of clerks, judges, policemen and soldiers directly answerable to the chief, and we judge that a state has arisen. However nepotistic the recruitment of this body of retainers may be, a new principle of social organization, bureaucracy, is said to have arisen when the chief's subordinates are no longer sublineage leaders in their own right, but functional specialists of one sort or another who exercise authority only as agents of the state leader. Then the chief is called a king. As the state emerges, it is also typical for the senior lineages to be separated from lesser folk qualitatively as an aristocracy, rather than being only quantitatively higher-ranked. If you are familiar with medieval European history, there is no simple point at which this boundary was crossed. (Were Shakespeare's MacBeth and Lear kings or chiefs?) States are usually, but not always, underpinned by agrarian technology, whereas horticulturalists more commonly get only as far as chiefdoms. Nevertheless, there are many examples of small states under horticultural technology in the New World, Africa, and S.E. Asia. The Inca's very late, large, multiethnic conquest empire was a unique achievement under horticultural technology however. (See Patrick Kirch (1984) for a good example of the political evolution of chiefdoms from the simplest exemplars to borderline states in Polynesia.)

B. The Redistribution Function

The political organization of horticulturalists is important because of the redistributive aspect of political institutions. Crop production is not a particularly secure mode of

life in many environments. Any given family can easily suffer from insufficient production in a given year. Political institutions often function to redistribute food to the unlucky, either as a loan or “gift” that creates obligation to the bigman or chief. Chiefs and bigmen are celebrated for their generosity and condemned for selfishness. A failure of generosity will result in substantial loss of popular support, and more or less severe risk or loss of power. Furthermore, given a modicum of political leadership with an interest in economic prosperity and efficiency, a considerably more complex economy can develop. This is because, similarly, craft specialists such as long-distance traders and blacksmiths require some guarantee of subsistence before they will abandon horticulture for a trade. Of course, the costs of maintaining a full blown chief in the rich style to which he easily becomes accustomed is not a negligible cost. We will return to consider the functional versus exploitative aspects of political institutions in Chapter 27.

C. Management of Violence

Warfare is typically much more important under horticultural than hunter-gatherer technology. This is true even among the groups like the Amazonian horticulturalists that do not otherwise depart from hunter-gatherer social and political organization much.

Terroristic practices such as headhunting, headshrinking, scalping, and cannibalism are commonly practiced by horticulturalists, and are vivid testimony to the high levels of intercommunity violence they commonly exhibit. Probably, the main impulse for such warlike behavior is that fixed property is much more available as booty, cultivated land is more worth seizing (or defending), slaves can be put to productive work in the fields, etc. Just the fact of higher densities mean that unrelated people are closer at hand to cause trouble (or offer opportunities to raid).

The very simplest societies seem to exhibit a lot of violence at the level of individual homicides, as we saw in the last chapter. As population density goes up, and political sophistication increases, organized authority gradually suppresses internal violence at a larger and larger scale. Politically organized communities forbid murder, as Thomas Hobbes hypothesized long ago suggested. Bigmen and chiefs in simpler chiefdoms do not monopolize legitimate violence (the right to punish transgressors) to anything like the degree of states. Rather they act as mediators, mobilizers of public opinion, and occasionally co-enforcers of customary rules. Often in such societies a kin group remains responsible for its own policing, say avenging a murder or demanding blood payment for one. The big-man or chief advises, and uses his good offices and prestige to ensure in-group peace, but does not wield a big stick. Still, this is sufficient to make a marked reduction in within-group violence.

However, politically organized and independent communities feud and war. With the

problem of in-group violence substantially solved, people are freer to turn to their more distant neighbors. Horticultural societies are typically as highly and exuberantly aggressive as groups as typical hunters and gatherers are overtly peaceable but murderous as individuals. Clan vendetta, raids led by “fight chiefs” (actually a type of bigman), and chiefly wars of conquest are typical of horticultural societies.

Much of this warfare is highly ritualized, including on the one hand chivalrous arranged battles, and on the other the conspicuous exhibition of warrior virtues and the preparation of grisly trophies. We will consider why warfare might have such elaborate symbolic attributes in Chapter 19.

V. Other Features of Culture

Elite “high” culture emerges in chiefdoms and states. Lenski and Lenski note several interesting correlates of the development and elaboration of horticulture for the symbolic elements of culture. One is the development of “high” art, art for the elite made by specialists. Hunter-gatherer “folk” art was something people did for their own enjoyment and use in exchange. At the horticultural stage, art begins to be used also as a symbol of prestige, especially ascribed prestige of noble birth. Regalia like crowns, and ceremonies like coronation develop that mark elites as qualitatively distinct from commoners. Similarly, supernatural beliefs are elaborated. Witchcraft, for example seems to be correlated with sedentary life. Horticulturalists may not like their neighbors and kin, but they cannot move away the way hunter-gatherers usually can. Maybe this is the reason why witchcraft beliefs become particular developed among horticulturalists (Edgerton, 1971).

In chiefdoms, we begin to see another phenomenon, the development of a close relationship between religion and political organization. Chiefs frequently claim supernatural powers or support, and supervise the construction of monumental buildings to celebrate the connection. The well known henge monuments⁴ of the Atlantic coast of Europe are examples, as are the totemic mounds of the US Mid-West, and the statuary of Polynesia—that on Easter Island being the most spectacular.

VI. Environmental Gradients and Core Response

The ecological and humidity gradient from the Pacific across the Andes into the Amazon Basin is one of the most spectacular in the world. It provides an excellent example of how the same basic subsistence system can lead to very different outcomes in different en-

4. Stonehenge, near Salisbury in England, is an example of this type of monument.

vironments by the Stewardian culture core mechanism. The Coastal Valleys are narrow oasis ribbons in an extremely dry desert, flowing from 6,000m peaks to the sea. On the east, the Andes plunge very sharply from a similar range of tall peaks to nearly sea level in perhaps 50 km, carving spectacular gorges in the eastern flanks of the mountains. The Eastern Lowlands are hot, wet tropical forest, with mostly poor, heavily leached soils. In the mountains are a series of high (3,000-4,000 m), cool, semiarid intermontane valleys covered with fresh alluvium from the eroding Andes.

The human ecological gradient was equally sharp. The wet Eastern lowlands were the home of simple horticulturalists and hunters and gatherers. The intermontane valleys and miniature Niles along the Peruvian Coast were host to sophisticated chiefdoms, city-states, and ultimately the Inca Empire. The Inca Empire developed very late, mostly in the 15th Century, and it was immensely long (ca 2,000 km) but very narrow, following the montane valleys and coastal rivers. The Andean and Amazonian societies were in long, direct and continuous contact along the Eastern side of the Andes at roughly 2,000 m elevation. Machu Picchu, the famous “lost city of the Incas” was a fortified border town on this frontier, only 50 km or so downriver toward Amazonia from the Inca capital at Cuzco. The toolkit of the lowlanders was relatively modest, and the scarcity of good soils kept population densities low, accounting for the relatively simple bigman-led political systems with little division of labor. The Inca Empire and precursor city-states had a much more productive agriculture centered on good alluvial soils. Terracing, irrigation, manuring and other advanced horticultural techniques allowed dense populations and sufficient labor efficiency to permit the emergence of urban centers with considerable craft specialization as well as bureaucracies and professional military forces.

The sharp differences in technology across this frontier cannot have had to do with evolutionary differences due to development in isolation. Trade, raiding, and other forms of contact gave ample opportunity for the lowland people to acquire highland technology, if they could use it. They didn't apparently because they couldn't. Thus, the extremely steep natural-ecological gradient on the East side of the Andes was (and still is) matched by an extremely steep human ecological gradient. As we shall see a broad culture core reflects the gradient as well. For Steward (1959), it must have been gratifying to see how well his culture core concept applied in South America.

Horticultural societies also furnish classic examples of differences determined by history rather than ecology. The most famous is the difference between the bigman systems of Melanesia and the ranked chiefdoms of Polynesia (Sahlins, 1963; see also Orlove cite in first chapter). Here, peoples with similar technology inhabiting similar islands differ sub-

stantially in their political organization because of different histories. It seems likely that the idea of ranked lineages only arose once as the Polynesians evolved from Melanesians three millennia ago. In most environments, this small difference had little impact on social organization, but on large islands Polynesians quickly developed large-scale chiefdoms and even states, while Melanesian societies remained relatively small-scale even on very large islands like New Guinea. We will return to this problem in Chapter 27 when we consider the evolution of states and stratification. For the present, just remember that the Andes/Amazon contrast, where a historical/evolutionary effect can be ruled out because of long, constant contact, is not entirely typical.

VII. Conclusion

The culture core concept works, but evolution is needed as well.

Horticultural societies cover an impressive range of variation within the type. Steward's culture core concept does an excellent job of accounting for much of that variation, but there are some quite puzzling anomalies, exemplified here by the contrast between Melanesia and Polynesia. In cases such as Melanesia and Polynesia, we need to invoke historical or evolutionary processes to explain the anomalies. In the case of political evolution in the Andes, the very late development of the Inca Empire is testimony to ongoing evolution.

VII. Bibliographic Notes

References:

- Conklin, H.C. 1961. The study of shifting cultivation. *Curr. Anthropol.* 2: 27-61.
- Conklin, H.C. 1954. An ethnoecological approach to shifting cultivation. *Trans. NY Acad. Sci.* 17: 133-42.
- Hames, R.B. and W.T. Vickers (eds). 1983. *Adaptive Responses of Native Amazonians*. New York: Academic Press.
- Harlan, J.R. 1971. Agricultural origins: centers and noncenters. *Science* 174: 468-474.
- Kirch, Patrick. 1984. *The Evolution of Polynesian Chiefdoms*. Cambridge: Cambridge Univ. Press.
- Knauft, B.M. 1985. *Good Company and Violence*. Berkeley: Univ. of California Press.
- Manner, H.I. 1981. Ecological succession in new and old swiddens of Montane Papua New Guinea. *Human Ecology* 9: 359-60.
- Meggers, B.J. 1984. In, H. Sioli, ed. *The Amazon*. Hague: Junk.
- Pospisil, L. 1978. *The Kapauku Papuans of West New Guinea*. New York: Holt, Rinehart, and Winston.
- Sahlins, M. 1963. Poor man, rich man, big-man, chief: Political types in Melanesia and

Polynesia. *Comp. Stud. Soc. Hist.* 5: 285-303.

Steward, J.H., and L.C. Faron. 1959. *Native Peoples of South America*. NY: McGraw-Hill.

Times Atlas of World History. 1979. Maplewood NJ: Hammond. (This is a wonderful reference book. If you have any interest in history you'll love it. They have a companion one on archaeology. Only drawbacks: they get dated fast and have no references to follow up.)

Wiessner, P, and A. Tumu. 1998. *Historical Vines: Enga Networks of Exchange, Ritual, and Warfare in Papua New Guinea*. Washington: Smithsonian Institution Press

General:

The journal *Human Ecology* is a good place to start for descriptive articles on modern swidden cultivation. See especially Vol. 11 #1, March 1983.

Regional summaries and collections of papers from regions where horticulture is common are useful, e.g.:

Vayda, A.P. 1968. *Peoples and Cultures of the Pacific*. Garden City NY: The Natural History Press.

General readers in human ecology usually have some of the important classical papers on horticulture. The book-length descriptive works on particular horticultural societies are an important primary reference, as is the growing agronomic literature from the tropics.