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Evolution of Nested Networks in the Prehistoric U.S. Southwest: A Comparative World-Systems Approach*

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Place-centric interaction networks are arguably the best way to bound human systemic processes because approaches that attempt to define regions or areas based on attributes necessarily assume homogenous characteristics, whereas interaction itself often produces differences rather than similarities (Chase-Dunn and Jorgenson 2003). The culture area approach that has become institutionalized in the study of the pre-Columbian Americas is impossible to avoid (as below), but the point needs to be made that important interactions occur across the boundaries of the designated regions and interaction within regions produces differences as well as similarities. Networks are the best way to bound systems, but since all actors interact with their neighbors, a place-centric (or object-centric) approach that estimates the fall-off of interactional significance is also required.

The comparative world-systems approach has adapted the concepts used to study the modern system for the purpose of using world-systems as the unit of analysis in the explanation of human social evolution. Nested networks are used to bound systemic interaction because different kinds of interaction (exchange of bulk goods, fighting and allying, long-distance trade and information flows) have different spatial scales. Core/periphery relations are of great interest but the existence of core/periphery hierarchy is not presumed. Rather the question of exploitation and domination needs to be asked at each of the network levels. Some systems may be based primarily on equal interdependence or equal contests, while others will display hierarchy and power-dependence relations. It should not be assumed that earlier systems are similar to the modern global system in this regard. Rather it should be a question for research on each system.

The comparative world-systems claim that whole systems must be the unit of analysis for explaining much of social change is mainly sustained by

* An earlier version was presented at the workshop on 'Analyzing Complex Macrosystems as Dynamic Networks' at the Santa Fe Institute, April 29–30, 2004.

the hypothesis of ‘semiperipheral development’. Without looking at intersocietal relations it is impossible to see this phenomenon.

Studies of premodern interaction networks have found a pattern of **pulsation** in which networks expand and contract over time, with an occasional vast new expansion that integrates larger and larger territories. Recent waves of globalization in the nineteenth and twentieth centuries are a continuation of this phenomenon. And another observation from comparing systems is that all systems that have hierarchies exhibit a pattern of the **rise and fall** of powerful polities. The modern rise and fall of hegemonic core states is thus analytically similar to the rise and fall of empires and the rise and fall of paramount chiefdoms.

Chase-Dunn and Hall (1997) propose an explanation of human social evolution that combines transformations of systemic logic across rather different modes of accumulation with an underlying ‘iteration model’ that posits causal relations among population growth, intensification, population pressure, migration, circumscription, conflict and hierarchy formation and technological change. It is an interaction model because the outcomes (hierarchy formation and technological development) have a positive effect on population growth, and so the model predicts a spiral of world-system expansions.

A number of important exogenous variables affect the iteration model. Climate change is mainly an exogenous variable, though local climate may have also been impacted by societies in the past, and is quite certainly being impacted in the present. Geographical conditions can facilitate or hinder the emergence of larger polities. Zoological and botanical capital can speed up processes of technological development by providing species that are easily domesticated by humans. And natural capital scarcity can also slow down technological change.

The long-distance diffusion of domesticated crops and animals, and of technological ideas from distant systems can have huge consequences for a local world-system without signifying a systemic integration of the two systems. Systemic integration requires two-way and regularized (frequent) interactions. Very intermittent incursions or pandemic diseases can impact upon a system from without. These possibilities of exogenous impacts on local and regional systems need to be taken into account in order to fairly test the iteration model and transformations of the modes of accumulation as explanations of human social change.

It does not make sense to ask **how many** world-systems there were in prehistoric North America if we accept the group-centric approach to bounding world-systems mentioned above. If every group interacts with neighboring

peoples then there are no major breaks in interaction across space. Thus there were as many 'systemic wholes' as there were groups because each group had a somewhat different set of interactions.

Of course this is not to say that there were not differential densities of interaction. Natural barriers such as deserts, high mountains, and large bodies of water increased the costs of communication and transportation. But ethnographic and archaeological evidence reveals that most of these geographical 'barriers' did not eliminate interaction. In California travel across the High Sierra was closed by deep snow in the winter. But when the snow thawed regularized trade across this high range resumed. Natural barriers do affect interaction densities, but in most cases they do not eliminate systemic interaction.

The suggestion that 'culture areas' – the culturally similar regions designated by anthropologists (*e.g.*, California, the Pacific Northwest, the Southwest, *etc.*¹) – can be equated with world-systems is fallacious from the group-centric point of view because important interactions frequently occurred across the boundaries of these culture areas. Nevertheless it is convenient to follow Stephen Kowalewski's (1996) lead in discussing how the world-systems in these traditional culture areas were similar or different from one another. The literature on trade networks by archaeologists is usually organized into discussions of these culture areas, but there has been more and more study of trade interactions between the different culture areas.² This section discusses the U.S. Southwest and those recent adjacent to it that may have been in systemic interaction with the Southwest. Chase-Dunn and Hall (1998) also examine the other described the world-system aspects of the other 'culture areas' in that part of North America that became the United States.

Humans came across the Aleutian land bridge at least thirteen thousand years ago. An encampment of hunter-gatherers near Monte Verde, Chile, complete with chunks of Mastodon meat, has been firmly dated at 12 500 BP (10 500 BCE). The land route was difficult to pass before about 12 000 years ago because of the large Pleistocene glaciers. But it is possible that maritime-adapted peoples moved along the coasts. Most archaeologists discount the possibility of early voyaging across the open ocean.

In the region that became the United States so-called Paleo-Indian used large distinctively fluted stone spear points known as Clovis points³ over

¹ The culture areas for which there are volumes of the Smithsonian *Handbook of North American Indians* are: Arctic, Subarctic, Northwest Coast, California, Southwest (2 volumes), Great Basin, Plateau, Plains, Southeast, and Northeast.

² Multiscalar and multitemporal spatial analyses have been applied to the Southeast and the Midwest by the studies contained in Nassaney and Sassaman (1995) and this approach has been applied in several of the essays included in Neitzel (1999).

³ The first Clovis points found near Clovis, New Mexico, have been dated as 11 200 BP (9200 BCE).

a wide region of North America. Archaeologists think that the peoples who lived during the epoch they call 'Paleo-Indian' (usually from 10 000 BCE to 8 000 BCE) were small groups of big game hunting nomads who ranged over wide territories. In the case of the Paleo-Indian archaeologists disagree about whether or not there was trade among groups. Many Clovis points have been found that are made of stone that came great distances. But since it is thought that the nomadic Paleo-Indian ranged widely, it is possible that they procured the materials directly from quarries rather than trading for them.

The general model of social evolution that has most often been applied to North America is that groups migrated to fill the land, then population increased, and trade and complexity emerged. This general sequence is implied in the periodizations that archaeologists have developed to characterize the cultures for which they find evidence in North America. In every region the Paleo-Indian period was followed by the Archaic, a period in which groups became more diversified hunter-gatherers, restricted their migrations to smaller regions and developed distinctive regional lithic styles. Sometimes distinctions are made between the Lower and Upper Archaic. The Archaic lasted longer in some regions than in others. After the Archaic, the periodization terms differ from region to region. The general picture is one of increasing population density, the development of more complex societies in each region and increasing trade within and between regions. But this general model becomes more complicated when we look more closely. The trends toward greater population density, complexity and trade were broken by cyclical processes of the rise and fall of hierarchies and complexity, changes in the patterns of interaction within and between regions and important differences in the timing and nature of social change across regions.

The notion of widely nomadic populations becoming gradually more sedentary is related to the problem of cultural differences, social identities and territoriality. Archaeologists note that stylistic differences among groups became more pronounced as nomadic circuits became smaller and sedentism developed. This is interpreted as the formation of local cultural identities by which people distinguished their own communities from those of their neighbors.⁴ The wide circles of year nomadic treks of the Paleo-Indians with their continentally similar Clovis spear-points were replaced by smaller regional and intersecting circles of migration by groups hunting smaller game species and using regionally distinct projectile points. Thus the spatial nature of nomadic 'settle-

⁴ Ericson and Baugh (1993) and Baugh and Ericson (1994) helpfully summarize the archaeological evidence and interpretations of the relationship between changing trade networks and the rise and fall of societal complexity in North America.

ment systems' shrank toward the eventual development of sedentism. A system of moving people to resources was replaced by a system of moving resources to people through trade networks. At first the trade networks were small, but over time they grew larger. It is this latter process of trade network expansion that brought small regional systems into greater interaction with distant peoples. This is analogous to the sequence of network expansions in waves that occurred in Afroeurasia since the emergence of sedentism that began twelve thousand years ago in the Levant.

The Southwest

Most of the research on the Southwest that explicitly uses world-systems concepts has focused on relations among societies within the Southwest (*e.g.*, Upham 1982; Spielmann 1991a, 1991b, 1991c; Baugh 1991; Wilcox 1991; McGuire 1992, 1996), but there has also been an important literature on the relationship between the Southwest and Mesoamerica (discussed below). The term 'Pueblo' is the generic word that Spanish colonizers applied to sedentary horticulturists found in what is now New Mexico and Arizona. These groups had only a few traits in common: they built adobe villages with a central plaza and ceremonial structures, and they grew corn, beans, and squash. In historical times (*i.e.* after the arrival of Spanish colonists) there was no overarching unity among the Pueblo peoples, and warfare occasionally occurred between different Pueblo villages. The people who occupied these villages spoke languages from at least three different major linguistic stocks.

There are several culture areas within the Southwest. The main centers that developed political complexity about 1100 years ago were the Hohokam in Arizona, the Anasazi Chacoan polities and a few centuries later, Paquime (Casas Grandes) in Northern Chihuahua about 200 kilometers south of Chaco Canyon (see Fig. 1). Other important archaeologically known cultures in the region are Mogollon and Mimbres.

The ancestors of the historically known Pueblo Indians were the Anasazi – the 'people of old'. The Anasazi culture emerged from 900 CE to 1150. Several large centers were built in this period. At Chaco Canyon a very large center emerged in the tenth and eleventh centuries with perhaps more than 10 000 people living in the Chaco core (Vivian 1990). The Chaco culture, recognizable by distinctive pottery and architecture, spread widely in New Mexico and Arizona through the establishment of many 'Chaco outliers'.

After 1200 Chaco Canyon was nearly abandoned as the region endured a fifty-year drought. Kintigh (1994: 138) notes that at the turn of the thirteenth century there was a renewed aggregation of living units into large communities and

abandonment of smaller settlements. This suggests the reestablishment of a regional system. This second wave of complexity also collapsed. All this is reminiscent of the cycling, or rise and fall of chiefdoms that Anderson (1994) describes for the prehistoric Southeast.

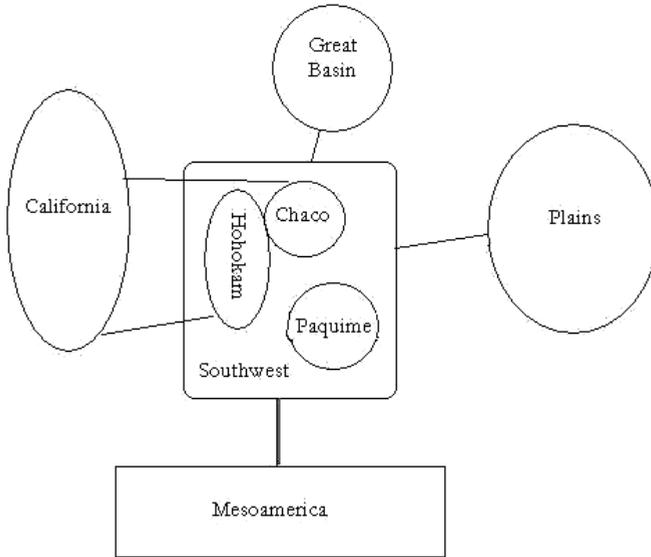


Fig. 1. Southwestern macroregion and adjacent regions

Stephen Lekson (1999) has formulated an explanation for the rise and fall sequence of the Southwest that focuses on the significance of what he calls the 'Chaco Meridian'. Lekson sees immense significance in the geographical aspects of the great straight roads that radiated from the ritual center of Chaco Canyon. He notes that after the decline of Chaco the next large central place to emerge in the region, the so-called Aztec Ruin on the Salmon River, is directly to the north of Chaco and that one of the ritual roads goes north from Chaco in the direction of the Aztec Ruin. And after the decline of Aztec a new, larger central place emerged that we know as Paquime (Casas Grandes) in a region that allowed for the building of an elaborate canal-based irrigation system.

Lekson makes much of the observation that Casas Grandes, though 200 kilometers to the south of Chaco, is also exactly on the Chaco Meridian. Lekson's explanation focuses on a hypothetical religious elite that adapted to successive drought crises by moving its center of operation first directly north, and then directly south of its original cult center.

David Wilcox's (1999) interpretation of the hegemonic rise and falls in the Southwest posits a system of competing polities that succeed one another rather than the adaptation of a single cultural group that moves its center of operation. It is, of course, possible that newly emergent groups tried to appropriate the spiritual power and legitimacy of earlier dynasties. This phenomenon is well known from state-based systems. So it is possible that Wilcox's scenario can also account for the phenomenon of the Chaco Meridian.

The debate over the nature of Southwestern complex polities is reminiscent of similar controversies about Mississippian complex chiefdoms. Wilcox points out that chiefdoms may be organized either around a single sacred chief who symbolizes the apex of a polity or they may take a different form that he calls 'group-oriented' that is organized around a council of chiefs. Few examples of elite burials are found in the Southwest (though this may partly be a consequence of the existence of cremation rituals). Wilcox contends that the polity that emerged at Chaco Canyon started out as a ritual theocracy in which an ethnic group of rainmakers migrated to the canyon, perhaps at the invitation of the horticulturalists who already lived there. This group of ritual specialists constituted a theocratic polity at first and the cult of the Great House was established in the Chaco outliers to organize the collection of food and raw materials. A new center was established at Aztec Ruin, but Wilcox believes that this outlier became an independent and competing polity. He sees the emergence of Chaco as stimulating secondary chiefdom formation in adjacent areas and the emergence of 'peer polities' that constitute a system of competing and allying polities. Wilcox contends that institutionalized coercion eventually became a more important feature of the Chacoan system. He cites evidence of mass burials and cannibalism in the period just before the Chaco collapse. He characterizes the transition from theocracy to institutionalized coercion as the emergence of a tributary state. He thinks that the Chacoan hegemonic state conquered Chuska to the east in order to gain control of timber resources.

But while Wilcox sees the Chacoan phenomenon as involving a core/periphery hierarchy based on tribute-gathering, his characterization of the Hohokam phenomenon in Arizona is quite different. Hohokam settlements emerged in the context of the building of a large system for irrigating maize horticulture in the Phoenix basin and adjacent regions. The big Hohokam capital was a Snaketown. One of the main signatures of the Hohokam religion was the circular ball court used in fertility rituals. The largest of these ball courts was at Snaketown. Wilcox claims the centrality of Snaketown was completely a matter of 'ritual suzerainty' and that there was no coercive element in the relationship between Snaketown and the Hohokam outliers.

Kowalewski's (1996) comparison of the Southwest with other US culture areas describes a radical core/periphery identity separation that emerged between closed corporate Pueblo communities of horticulturalists and the more nomadic foragers and raiders that lived around them. The Pueblo peoples live in defensible towns, often atop mesas (flat-topped mountains), where they were able to protect their stores of corn from nomadic raiders. And the dramatic Anasazi cliff dwellings (*e.g.*, Mesa Verde) have obvious defensive advantages.

But Feinman, Nicholas and Upham (1996), in their explicitly world-systemic comparison of Mesoamerica and the Southwest (which ignores the issue of the interaction between these two macroregions), characterize the Southwest as a region in which networks were open and permeable, without strong boundaries between societies. The contrast with Kowalewski's portrayal is vivid. Perhaps the earlier system was open, while the bounded Pueblo communities emerged after the Spanish invasion or after nomads obtained horses. But the existence of the Anasazi cliff dwellings, built hundreds of years before the arrival of Spaniards and horses, looks functionally quite similar to the mesa communities of historically known Pueblos. It is a lot of trouble to build houses into a cliff and carry water up from below. Defense against raiders would be a likely explanation. Defensive communities and conflictive relations are often associated with strong cultural boundaries between the conflicting groups.

In her discussion of Plains/Pueblo interactions Katherine Spielmann (1991a, 1991b) delineates two ways in which exchange between what had heretofore been relatively autonomous groups might have developed into systemic exchange (core-periphery differentiation in world-system terms).⁵ The first, which she favors, is **mutualism**, in which sedentary horticulturalists engage in systematic exchange with nomadic hunters in such a way that the total caloric intake over the necessary variety of food types mutually benefits both groups. The second, favored by Wilcox (1991) and Baugh (1991), is **buffering** in which sedentary agriculturists use exchange with nomadic hunters to supplement food supplies during periods of scarcity.

The issue of pacific *vs.* conflictive relations between horticulturalists and foragers has been raised in many other contexts. Gregg's (1988) discussion of the expansion of gardening into Europe portrays a symbiotic relationship between farmers and foragers who exchanged complementary goods. Spielmann's (1991b) rendering of this relationship in the Southwest also favors a symbiotic interpretation in which complementary surpluses were exchanged between Pueblos and nomadic foragers. Baugh (1991) uses world-systems concepts to

⁵ Other sources on Plains – Pueblo interaction are Baugh (1984), Habicht-Mauche (1991), Spielmann (1989), Wilcox (1984), Wilcox and Masse (1981).

analyze this same relationship. Both he and Wilcox (1991) see elements of a core/periphery hierarchy in which the sedentary groups (Pueblos) were benefiting more than the nomadic foragers from the interaction.

One hypothesis that stems from the iteration model of world-systems evolution (Chase-Dunn and Hall 1997: ch. 6) is that all systems go through cycles of increase and decrease in the level of conflict among societies. Farmer/forager interactions are more likely to be symbiotic under conditions of low population pressure, but when ecological degradation, climate change or population growth raises the costs of production, conflict among societies is likely to increase. It is during these periods that new institutional solutions are more likely to be invented and implemented. But if new hierarchies or new technologies are not employed, conflict will reduce the population and a period of relative peace will return.

Randall McGuire's (1996) study of core/periphery relations in the Hohokam interaction sphere reveals evidence of the rise of a culturally innovative center near what is now Phoenix, Arizona. Several different surrounding peripheral regions adopted styles from this core. McGuire demonstrates the dangers of applying assumptions based on the modern world-system to stateless systems. He finds that the peripheral Hohokam regions did not culturally converge, but rather they become more different from one another as climate changed and they interacted with other distant core regions. Of course the hypothesis of convergence among peripheral regions is also contradicted for the modern world-system because peripheral areas often experience quite different developmental paths.

Little is known archaeologically about nomad – nomad relations in the Southwest. Some of the nomadic groups may have been recent arrivals (Wilcox 1991). Baugh (1991) and Wilcox (1991) suggest that trade among nomadic foragers was an alternative to centralization in stabilizing volatile food supplies. The arrival of Spaniards (from 1530s on) vastly disrupted intergroup relations (see Hall 1989). The alliances that some of the nomadic groups made with the Spanish (*e.g.*, the Comanches) may have had prehistoric analogues in which nomadic groups allied with particular Pueblo core societies to provide protection against other nomadic groups, and possibly to serve as allies in disputes among Pueblo societies.

The nested network approach to bounding world-systems is helpful for understanding the ways in which precontact North American societies were linked to one another and the relevance of these links for processes of development. As with state-based systems, bulk goods, political-military interactions, prestige goods networks and information networks formed a set of nested nets of increasing spatial scale. Some of the earliest explicit usage of world-systems concepts by archaeologists (Whitcotton and Pales 1986; Weigand *et al.* 1977)

were arguments that the Southwest constituted a periphery of the Mesoamerican world-system.

There has been a huge controversy about the importance or unimportance of links between the US Southwest and Mesoamerica (Mathien and McGuire 1986; Cobb, Maymon, and McGuire 1999). An early advocate of the importance of these linkages was Charles Dipeso (1974) who argued that the great houses at Chaco Canyon were erected as warehouses and dwellings for a small group of Toltec traders, the *pochteca*.⁶ Dipeso contended that it was the withdrawal of the Toltec *pochteca* in the twelfth century that prompted the rapid decline of the Chaco Canyon polity.

That there were at least some connections between the Greater Southwest and Mesoamerica is now widely accepted. However, their importance for local development is still the subject of considerable dispute. Weigand and Harbottle (1993) continue to argue that the Southwest was a periphery of Mesoamerica based on the proven fact that turquoise from the Cerrillos Hills just south of Santa Fe was mined and exported to the states in the Valley of Mexico (where Mexico City now is). They claim that turquoise played an important role in the overall structure of trade between these two regions and that the demand for turquoise was an important factor in the rise of complex societies in the Southwest. Other features of societies in the Southwest, such ball-courts, ceremonial mounds and scarlet macaws kept as pets, also suggest influences from Mesoamerica. Striking similarities in Southwestern and Mayan mythology (spider woman, warrior twins, *etc.*) are downplayed by Cobb, Maymon and McGuire (1999). They suggest that the feather-serpent motif associated with Quetzecoatl may have been part of an ancestral mythology common to all the Native Americans. Cobb, Maymon and McGuire also contend that important large settlements in Western Mexico linked to the states of the Valley of Mexico are relatively recent phenomenon, and that before that the huge region of northern Mexico was inhabited only by nomadic foragers.

Late Mississippian chiefdoms such as that at Etowah in Georgia have been found to have produced iconography that employs design elements and symbolic content that is strikingly similar to the icons of Mesoamerican states (*e.g.*, Anderson 1994: 83). Archaeologists refer to the cultural complex that produced this iconography as the 'Southern Cult' (Galloway 1989). Most archaeologists

⁶ In the Aztec empire *pochteca* were important agents of the king who were sent on distant missions to trade and to obtain political and military intelligence. It is thought that earlier Mesoamerican states such as the Toltecs also had long-distance specialists of this kind. The most plausible explanation for Kaminaljuyu, a city in Guatemala built in the style of Teotihuacan (in the valley of Mexico), is that trader priests converted the local Mayans to the Mexican religion.

contend that influences from Mesoamerica were unimportant to the processes of development that occurred in the Southwest and other areas of what is now the United States. Some argue that these cultural resemblances are due to parallel evolution, not interaction (*e.g.*, Fagan 1991).

The evidence of turquoise sourcing shows that there was definitely trade between highland Mesoamerica and the Southwest. Certainly there was down-the-line trade, but there could have also been at least a few long-distance trade expeditions undertaken by *pochteca* from the Mexican highlands or from Western Mexico. It is hard to imagine how down-the-line trade could have transmitted the ideologies behind the iconographs of the Southern Cult, though the predominant consensus among both Southwestern and Southeastern archaeologists (*e.g.*, Cobb, Maymon and McGuire 1999) is that direct influence was slight. The predominant opinion among archaeologists after a several decades of dispute is that local and regional processes were much more important determinants of development in the Southwest and the Southeast than were the long-distance connections with Mesoamerica.

The Plains

The Plains Indians are best known in the ethnographic literature for large bands of horsemen who hunted buffalo and made war. But horses were introduced by Spaniards in the sixteenth century and rapidly adopted by nomadic groups on the Plains. The coming of the horse had a revolutionary effect on the societies of the Plains because of increased mobility and increased efficiency of the hunt. Groups that formerly needed to disperse to find food could now come together to form larger polities and alliances. These developments had important affects on adjacent regions where peoples both adopted plains features and organized to defend against the military power of the Plains peoples.

But an earlier story is less well known. Contemporaneous with the emergence of the Mississippian interaction sphere was the florescence on the southern Plains of a mound-building culture that had important trade and cultural links with both the Mississippian heartland, especially Spiro, and with the Southwest (Vehik and Baugh 1994). This is known as Caddoan culture. The Caddoans built large mounds and villages and planted corn, but they were culturally somewhat different from similarly complex societies to the east and west. This cultural distinction might be interpreted as only marginal differentiation if we did not also know that the Caddoans cut themselves off from trading beyond the Plains and constructed a network centered on the Caddoan heartland (Vehik and Baugh 1994). This was an instance of a semiperipheral region turning itself into a core by means of delinking from other distant cores. Around

1200 CE Caddoan trade with the Mississippian societies collapsed. This caused societies on the eastern Plains (on the border between the Plains and the Mississippian interaction sphere) to decrease in complexity. It also created a Plains trade network centered in the Caddoan heartland that was largely separated from both the Southwest and the Mississippian networks. Later the Caddoan core declined at about the same time as the Cahokian core chiefdoms. And this was contemporaneous with declines in the Southwest. A fascinating instance of synchronous growth/decline phases of cities and empires in East and West Asia from 650 BCE to 1500 CE (Chase-Dunn, Manning and Hall 2000) suggests the possibility of similar synchronies in the growth/decline sequences in the Americas.

The Great Basin

In what are now the states of Utah, Nevada and eastern California is a region of high desert in which water does not flow to the seas, but rather into large land-locked basins. Some rather large rivers run for hundreds of miles and disappear into the sand. It is an ecologically sparse environment that is punctuated by small areas where water, game and plant life are more abundant. In addition to the lack of rainfall in most areas, the distribution of rainfall varies greatly from year to year. This ecologically coarse environment was the home of nomadic foragers, known ethnohistorically as the Paiute, the Western Shoshone and the Ute, who adapted to the desert environment by moving to where food was most available. This region was also the inspiration of the theory of social evolution known as cultural ecology that emphasizes the importance of social adaptations to the local environment. Julian Steward, a major figure in the development of cultural ecology (1938, 1955), did important ethnographic surveys in which he charted population densities across the entire Great Basin region and analyzed why there were important organizational and cultural differences among the ethnohistorically known groups in this large region. The ecological constraints on human societies are dramatic in the basin and range geography studied by Stewart.

As the debate about whether or not the Southwest was a periphery of Mesoamerica has raged, there has been an analogous controversy over whether or not the Great Basin was a periphery to the Southwest. The early peoples who moved into the Great Basin occupied the few locations where there were good supplies of game and food plants. Subsequent population growth and more recent arrivals led groups to occupy more marginal regions. What emerged was a mosaic of social structures that mapped the ecological geography almost perfectly. The desert mosaic was composed of small settled groups near isolated

food resources (*e.g.*, near rivers and lakes) surrounded by more nomadic groups who were following the yearly variation in food availability. This desert mosaic was impinged upon by outside influences from California, the Plains and the Southwest, but despite these factors and changes in climate, the basic mosaic pattern still existed when the Euroamericans came to explore this region in the 1840s.

Southwestern-type village-living horticulturalists and pot-makers, called the Fremont culture, emerged in the southern Great Basin in about 400 CE. Upham (1992) has argued that Great Basin peoples alternated back and forth from settled *versus* nomadic strategies depending on climatic, ecological and interactional shifts. Trade networks that are visible in the potsherd evidence (broken pieces of pots with distinctive designs) indicate that the settled groups used trade networks to insure against local food shortages (McDonald 1994). Between 1250 and 1350 CE the Fremont peoples abandoned the Great Basin, probably because of the droughts of the Little Ice Age. It was this same climatic change that probably caused the abandonment of the Anasazi regions on the Colorado plateau to the south. New groups of people, presumably the ancestors of the Shoshoni, may have moved into the region at this time (Madsen and Rhode 1994).

Julian Steward's (1938) analysis shows that the local sedentary core groups developed religious rituals, collective property rights, and political organization at the village level, whereas their more nomadic neighbors existed primarily with only family-level organization. Steward does not discuss the interactions among these groups. Indeed he claims that there was little trade and little interaction. But the groups occupying prime sites would have needed to protect their resources from intruders. They developed political organization to regulate internal access, but also to protect from external appropriation. Steward argues that warfare was not an important emphasis for any of these groups, except those few who adopted some of the cultural trappings from neighboring societies on the Great Plains. Nevertheless the development of bounded territories and the enforcement of legitimate claims to resources by means of coercion – even if only yelling and stone-throwing – represented an institutional response to a core/periphery differentiation in which some groups needed to protect their ecological resources from other groups.

As for the peripheral peoples, their culture, as Steward (1938) says, was primarily 'gastric' – focused on food. In order to not starve they needed to cache enough food to survive through the winter. The key food for this purpose was the nut from the cone of the Pinion pine. These were available for harvest in the fall. Pinion nut crops varied greatly from location to location and from

year to year, and when they were plentiful in one location there was usually enough for all those who had the ability to harvest and process them. This set of characteristics was not propitious for the development of property rights, and so groups did not try to control particular Pinion stands.

This was a rather elemental form of a local core/periphery structure. There was no core/periphery hierarchy in which core societies exploited the labor or resources of peripheral societies. What the core societies did was to protect their assets from potential peripheral intruders. And for their part the peripheral peoples were disorganized by the ecological circumstances, in which 'optimal foraging strategy' dictated that they remain spread out in very small groups. Thus when hunger gripped them they had not the ability to attack the stores of the core societies. Rather they simply starved.

Contrary to Steward's claim that Great Basin peoples did not trade, there is ample archaeological evidence that they did participate in long distance trade networks.

Bennyhoff and Hughes (1987) show that an olivella shell-based trade network that linked the Western Great Basin to the coast of Northern California expanded from 2000 BCE to 200 BCE and then contracted from 200 BCE to 700 CE and then expanded again from 700 CE to 1500 CE. After 1500 CE there was a major expansion within California based on a different kind of shells (clam disk beads), but this network did not extend into the Great Basin. Hughes (1994) shows that two cave dwellings in the Western Great Basin that are rather close to one another, were parts of very different obsidian exchange networks, but were linked into the same shell network. This cautions us against assuming that all sorts of trade items fit into the same exchange networks.

California

This section considers the whole California culture area in comparative perspective. In California only a few societies had clans and moieties,⁷ and there were no hierarchical kinship systems. In the area of Northern California that was studied by Chase-Dunn and Mann (1998; see also Chase-Dunn and Hall 1997: ch. 7) the largest polity was the tribelet, a very small unit consisting of a few villages. Larger political entities did not exist except in the San Joaquin Valley (Yokuts) and in Santa Barbara (Chumash). Though California has been characterized as a culture area based on social structural and artifactual similarities, there were enormous differences within California as well. Linguistic differences are the most obvious. Linguists contend that six major linguistic stocks were present in indigenous California. Whereas clay pots were not

⁷ Moieties are kinship groups organized as dualities. For example, the people of each village are divided into two kin-based groups.

used by most of the indigenous peoples of California, the Western Mono, Paiute and some of the Yokuts peoples made pottery in southeastern California. The only maize horticulturalists in California lived along the Colorado River on the border between California and Arizona, although nearly all groups in California planted small amounts of tobacco.

We have already mentioned the studies of trade linkages between California and the Great Basin. These show that the expansion and contraction of trade networks is a feature of intersocietal relations even when the constituent societies are very egalitarian. Shell and shell artifacts from the Pacific were traded with the Southwest. Wilcox (1999) emphasizes the notion that the Chumash traded abalone shell and shell fishhooks with the Chacoans.

Interaction Nets over the Long Run

Rather than a simple model of interaction nets getting larger, the sequence found in several North American regions shows a more complicated pattern. The 'settlement systems' of nomads were spatially huge as they ranged over great territories. As population density increased these nomadic ranges became smaller until the transition to sedentism emerged. The first sedentary societies had very small interaction nets, but these got larger and then smaller again, and then once again larger. This is network pulsation.

The early Paleo-Indians were explorers and colonizers of land that was yet uninhabited. They chased herds of big game, and they also tended to concentrate in areas that had greater amounts of game and other foods (Anderson 1994). As has been the case in other colonization sequences (*e.g.*, the Pacific), the first arrivals probably took the best locations and then tried to hang on to them. Population density was so low at first that there were plenty of good new locations, and so interactions among groups were mainly friendly. But as the best locations became utilized and the megafauna became scarce, more competition emerged. Some groups developed seasonal migration rounds in particular territories and tried to defend the best camping sites against new arrivals. The small bands always needed to gather with other bands seasonally to trade and exchange marriage partners. But the sizes of these seasonal gatherings were limited by the availability of food stocks at the meeting place.

A kind of territoriality emerged among nomads, but it was probably not well institutionalized. We do not know whether or not the Paleo-Indian pioneers brought with them a cultural apparatus for claiming and defending collective territory. The Polynesian pioneers of the Pacific brought with them an ancestral culture that included the concepts of *mana* and *tapu*⁸ that were the basis

⁸ *Mana* is the powers of the universe as controlled and directed by the sacred chiefs. *Kapu* refers to the prohibitions (taboos) that protect sacredness. These important elements of ancestral Polynesian

of sacred chiefdoms. The Polynesians temporarily abandoned ceremony and hierarchy and to become egalitarian hunter-gatherers when they landed on islands populated by large and delicious flightless megabirds (*e.g.*, New Zealand). But when the birds were all eaten, the Polynesians reconstructed class societies and territoriality using the linguistic and ideological equipment that was embedded in their ancestral culture.

Very likely the immigrants to North America did not have such a hierarchical cultural heritage because the Asian societies from whence they came had not yet developed ideas and kin relations appropriate to the symbolization of the linkage between place and blood. This means that the original American pioneers had to invent these institutions as they came to need them.

The Paleo-Indian interaction networks were large, especially for exchanging fine and useful objects such as Clovis points and exotic lithic blanks. Cultural styles were widely shared across macroregions. And the territories exploited by human groups were huge, though the numbers of people in each macroband were small. As bands became somewhat less mobile they developed more differentiated tool-kits depending in part on the nature of the territories they inhabited, but also as a way of symbolizing alliances with friends and differences with foes.

The question of systemic *versus* conjunctural or intermittent relations among macro-regions in prehistoric North America remains. The consensus among archaeologists is that the patterns of network development, complexity and hierarchy seen in the Southwest were predominantly endogenously caused, though exogenous impacts from climate change obviously were important. The notion that Toltec *pochtecas* from Mesoamerica were major players in the emergence of large polities in the southwest has been largely dismissed and no direct evidence in support of this idea has been found. The idea that the export of turquoise to the South had an important impact on developments in the Southwest is plausible, but the mechanisms by which this may have worked have not been investigated. Did the mining and trading of turquoise play an important role in the development of the Chacoan polity? The turquoise trade constitutes a prestige good connection with Mesoamerica, but how important was it in terms of volume and what role did it play in Southwestern social change? These questions have not been answered by those who point to the turquoise connection as evidence that the Southwest was a periphery of Mesoamerica.

sian culture can be seen throughout the regions of the Pacific that became inhabited by Polynesians.

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Abstract

This paper uses a nested interaction networks approach to interpret patterns of social evolution in the late prehistoric U.S. Southwest in comparative and world historical perspective.

The Earth-system perspective is deeply entwined with the history of Earth-system sciences, developed in the second half of the twentieth century. It treats the planet as a series of complex adaptive systems that embody evolutionary processes on different spatial and temporal scales. Take the example of the mountain valley. This perspective sees the planet as a process channelled through a shifting landscape of systematic and nested feedback loops interacting in a non-linear manner. World-systems theory (also known as world-systems analysis or the world-systems perspective) is a multidisciplinary approach to world history and social change which emphasizes the world-system (and not nation states) as the primary (but not exclusive) unit of social analysis. "World-system" refers to the inter-regional and transnational division of labor, which divides the world into core countries, semi-periphery countries, and the periphery countries. Core countries focus on higher skill, capital... Lecture Outline World-systems Nested networks Core/periphery relations The evolution of world-systems. Presentation transcript 3 The comparative world-systems perspective n February 2 *C. Chase-Dunn and B. Lerro, Social Change, Chapter 2, The comparative world- systems approach (course web site)C. Chase-Dunn and B. Lerro, Social Change n C. Chase-Dunn and T.D. Hall, Rise and Demise n Thomas R. Shannon, An Introduction to the World-Systems Perspective. 4 Definition of a world-system n A system of societies, an intersocietal system n Often multicultural: people with different cultures are linked together by trade, communications, conflict and alliances n Example: the modern world-system of national societies: the U.S., Mexico, El Salvador, etc. I then compare these patterns to prehistoric social networks, inferred from a dataset of 4.3 million ceramic artifacts from nearly 500 archaeological sites, to examine the relationship between hydroclimate variability, distance, and social interaction over a 250-year span. 2 Methods. 2.1 Archaeological Interaction Networks. I analyzed data from nearly 500 archaeological sites in the Southwest Social Networks (SWSN) database, a compendium of material-culture data from well-dated sites west of the Continental Divide in Arizona and New Mexico (Mills et al., 2013a; Mills et al., 2013b; Peeples and Haas, 2013; Borck et al., 2015; Hill et al., 2015; Mills et al., 2015).