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The Evolution of Human Ecological Systems During the Period of European Colonization and Mercantile Expansion: A Preliminary Assessment

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Introduction

This paper, as the title suggests, deals with a broad-ranging and difficult subject, and one that anthropology, for the most part, has eschewed and left to history and geography. However, anthropology, with its emphasis on holism and its insistence that societies be viewed as a system of interrelated parts, has much to offer in explaining what happens to a particular human ecological system when it becomes incorporated into the larger world system. During the period of European colonization and mercantile expansion, many indigenous societies around the globe evolved into different systems, and in this process their relationships with the environment also changed. This paper is a preliminary assessment of some methodological aspects involved in examining the changes in a society's relationship to the environment that occur when a society becomes incorporated into the world-wide market. I also present some models that explore the dynamics of these changes.

Ecological anthropology of the 60s and 70s took a particularistic approach and generated much good work on the relationship particular groups had with their environments. Much of this work, however, fell into the traps of functionalist explanations and the ethnographic present, treating the societies under observation as relatively isolated entities in which culture served as an adaptive tool to maintain an ecological equilibrium. Ecological anthropology of the past was criticized on these accounts, and, for the most part, abandoned by anthropology.

The legacy of ecological anthropology is mixed. On one hand, these works forced us to

see that humans are part of an ecosystem and that the human relationship to nature was not that much different from other animals. I view this as a major contribution to understanding humans. On the other hand, because these anthropologists did not extricate their works from functionalist explanations and the ethnographic present, their methods and theories leave us very little with which to explain change.

The underlying goal of this project derives from the University of Georgia, Department of Anthropology's goal to revitalize ecological anthropology. I understand this goal to be a long-term project in which new and pertinent questions are formulated covering human/environment interactions. One area of inquiry concerns the evolution of human ecological systems—how these systems evolve and why. The question of social evolution encompasses the broad pattern of human existence: the long-term social organization of hunters and gatherers, the domestication of plants and animals, the rise of the state, the emergence and duration of the modern world system and capitalist economy, the industrial revolution, and the contemporary global ecological system. Each of these transformations in human existence directly affected the ways in which humans conceived of, related to, and used their environment.

Anthropology, with its long-term view of humanity is in a unique position to address questions concerning these major transformations in human existence. But to do so, we must learn from the mistakes of the giants upon whose shoulders we stand. We cannot slip into the comfortable confines of functionalist explanations. Nor can we

afford to ignore the global economic system and its effect on indigenous peoples. As this paper shows, capitalist development can be deleterious, disruptive, and malfunctioning. European colonization and mercantile expansion form the nascence of the modern world system and capitalist economy; this project is but a beginning stage of formulating questions on how and why the modern world system served as a catalyst for the evolution of indigenous societies.

Methodology

In order to examine the changes wrought in a human ecological system by colonialism, mercantile expansion, and incorporation into a capitalist market economy, one should begin by pinpointing those factors that one must consider as well as the relationship between those factors. The first problem is one of definition. What is a human ecological system; what are its primary components, and how do the components of such a system articulate with capitalist development? In its most basic sense, a human ecological system is the system of interactions between humans and their biotic and abiotic environment.

At one level, these interactions are purely biological and include such things as energy flows, nutrient recycling, waste assimilation and so on. In this sense, humans can be treated much like any other animal. However, in human ecological systems, humans are the dominant species; therefore, one must consider also those attributes peculiar to humans such as human conceptualizations of the natural world, the ways in which humans organize themselves, the ways in which humans assimilate and disseminate knowledge and information about the natural world, and so on.

Figure 1 is a methodological model of some primary components of a human ecological system. This model proposes that any human ecological system is composed of cultural features and ecological factors. Modes of production constitute one interface between cultural features and ecological factors. I must emphasize that modes of production are but one type of interface between

humans and their environment, and I have chosen to highlight this interface because my interest here is in explaining the evolution of human ecological systems during colonization and mercantile expansion. As such, modes of production are a major arena for change since incorporation into a capitalist economy directly and profoundly impacts modes of production (Cronon 1983; Merchant 1989; Norgaard 1987, 1988; Pearce and Turner 1990). This is not to say that capitalist development does not interact with other components of a human ecological system; but its initial impact is here, and so examining modes of production should perhaps be the first task in explaining how and why human ecological systems change as they become part of the capitalist economy.

The ecological core includes those biotic and abiotic features of the natural environment. However, as part of the mode of production, limiting factors and potential resources are pieces of the ecological core that deserve concentrated analysis. Potential resources (exhaustible and renewable) are those natural features deemed useful by a human group. Limiting factors are traits of the natural environment that limit resource extraction and use. For example, soil compositions may limit cultivation of certain crops; precious metals may be so impure as to render them unsuitable for manufacturing; terrain and distance may make transportation costs of certain resources so high as to deem a resource economically untenable, and so on. In short, limiting factors and potential resources, as part of the ecological core, have a unidirectional, constraining relationship with the economic system and resource definition and use.

The *longue durée* is taken from Fernand Braudel's work in history, but it is essentially analogous to C. R. Hallpike's "core principles" as set forth in *The Principles of Social Evolution* (1988). Braudel (1980) includes in his *longue durée* those enduring aspects of the ecological core, geography in particular. In my model, the *longue durée* is limited to collective cultural features that persist over time. Hallpike (1988) defines core principles as sets of rules and categories that form part of a society's total worldview and are expressed in

institutions, cosmological principles, values, and knowledge. Both Braudel and Hallpike understand these persisting cultural features as limiting factors in that they act as a framework within which changes take shape.

The knowledge component of this model is simply the system by which a society converts facts into information. In other words, a system of knowledge is an epistemological system that imbues certain facts with saliency. Humans, as well as other animals, are confronted with a confusing array of things in the world. Yet we select, highlight, and categorize only a small portion of these things as manifestations to consider in our lives. It is this process of selection and the system by which we learn and reproduce saliency that comprise the knowledge component in this model.

Resource definition and use are the ways in which people recognize resources, define and choose what constitutes a resource, and how they use those resources. The relationship between resource definition and use and knowledge, information ecology, the *longue durée*, and social organization is much more complex than represented in Figure 1. I have chosen to place resource definition and use as a separate component because it is a key component in modes of production and its relationships with the above mentioned components of human ecological systems are filtered through labor and technology (Norgaard 1988; Peach and Constantin 1972; Pearce and Turner 1990). I also see resource definition and use to be a point of articulation with capitalists development; a potential resource can become a valuable resource through the demands of the world market, and this has little to do with whether or not local peoples are directly utilizing the resource.

Figure 1 represents a steady state model of a system, yet as I have mentioned, certain components have been accented because of their articulation with capitalism and mercantile expansion. During European colonization and mercantile expansion indigenous ecological systems came into direct contact with European ecological systems; the result was that both systems fused to form one system in which environmental factors in one part of the world had direct bearing on things occurring

in other, distant parts of the world (Wallerstein 1976). The natural resources of South America, Central America, Mexico, and North America, for instance, became a part of European consumption and production as resources from these areas flowed to the core areas in the world system. Local human ecological systems were no longer (if indeed they ever were) isolated, balanced ecological systems in which indigenous groups maintained an ecological equilibrium with their environment. Dramatic changes occurred within these indigenous systems as new technologies were introduced, labor moved from subsistence to market-oriented, economic systems began to incorporate capitalist and market principles, and resources were redefined according to distant and alien demands. In short, human ecological systems of the core and periphery areas of the world system intersected, and changes ensued in both.

Evolution is, of course, a biological term, and we have to use it with care and especially avoid the traps of the organic analogy and the concept of adaptation, both of which lead directly to functionalist explanations (Hallpike 1988). Evolution is the process by which fundamental structural changes take place. Over time, species change and become different species. Social evolution can be defined in the same way—over time a society changes so that it becomes a different kind of society.

In social and organic evolution, two types of processes occur—change and persistence (Charles Peters, pers. comm., 1993). For a social system, although the system may become a different kind of system, some cultural features simply persist over time. This is the stuff of the *longue durée*. When the system changes, some persistent cultural features oftentimes influence, direct, or amplify changes, others may be unaffected by change or inconsequential to change. In either case, once the new system emerges, persistent cultural features are set within a new configuration, and the relationship with other aspects of the system may be different, or not.

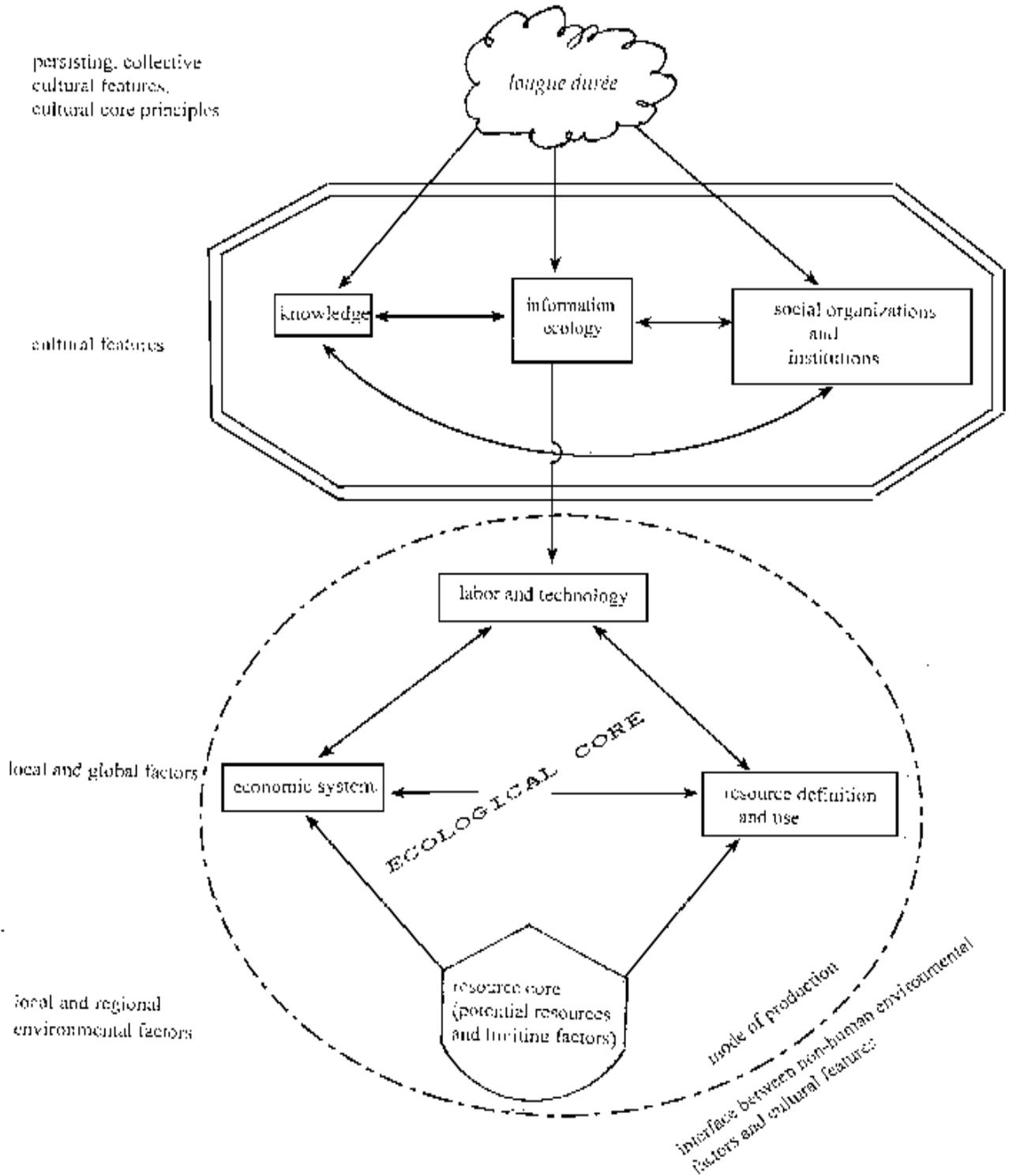


FIGURE 1: A METHODOLOGICAL MODEL OF PRIMARY COMPONENTS OF A HUMAN ECOSYSTEM.

Change can take three basic forms—directional change, non-directional change and transmogrification (Charles Peters, pers. comm., 1993). Directional changes occur in a specific direction, such as from simple to complex (or vice versa). In non-directional change a feature may change over time and become something else, but it is no more complex, no more advanced, than it was before. It is just different. Finally, transmogrifications are changes that result in a feature that is deleterious, absurd, unstable, and may, in fact, carry the seeds of its own destruction or transformation. Transmogrifications are a prominent type of change during European colonization and mercantile expansion.

With social evolution different cultural features may undergo directional change, non-directional change, or transmogrification and others may simply persist. Figure 2 is a schematic representation of the evolution of a social system. Different cultural features such as customs, institutions, or cultural complexes may undergo different types of change. However, it is the whole process of social evolution that concerns us. How are these different processes related? What is the pace of these processes? For example, does directional change occur at a slower pace than transmogrification? Does transmogrification move at a fast pace, thus resulting in absurdities? If these processes unfold at different paces, the social features undergoing these processes would reach a *dénouement*, or structural change, at different times. How do these differing *dénouements* interact with other evolutionary processes? What are the sufficient, necessary, and amplifying agents in the system that propel social evolution, and how are these agents related? What, if any, are the negative and positive

feedback loops between features? What are the inherent contradictions within a system that result from change, and how does this dialectical tension work within the system as the system matures?

As these questions imply, the process of evolution takes place within an interactive framework. Figure 3 represents a scenario of interaction in social evolution. The intention here is to depict some ideas on how a new system results from the interaction of features generated through persistence, non-directional change, directional change and transmogrification. Neutral cultural features are those features without an interactive role in social evolution; they may be either a persisting cultural feature or result from non-directional change. Amplifying features serve to intensify a process of evolution and/or to strengthen other cultural features. Sufficient features are those features that are not necessary for the operation of the new system, but their role is sufficient for its operation. Necessary features are those cultural features that must be present for the new system to operate within its new configuration.

Because the persisting and generated cultural features will be system-specific, any model of social evolution will be system specific. However, if two systems have certain necessary or sufficient persisting features, and/or generate sufficient or necessary features, and if the transmogrifications are not so absurd and deleterious as to undermine these features or the new system itself, then the two systems may undergo similar evolution and result in similar new systems.

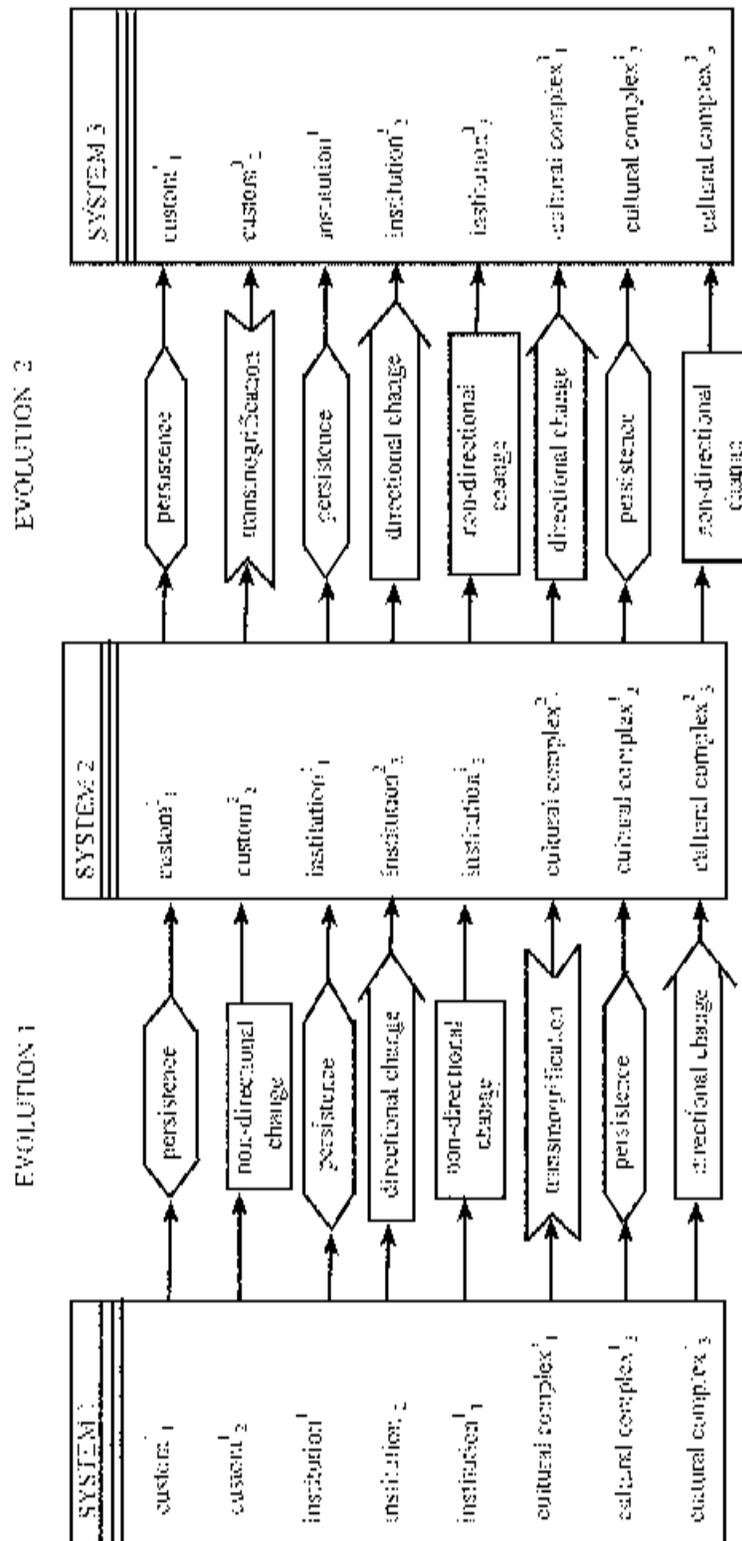


FIGURE 2: POTENTIAL EVOLUTIONARY PROCESSES IN THE EVOLUTION OF A SOCIAL SYSTEM (PARTIAL PERMUTATIONS).

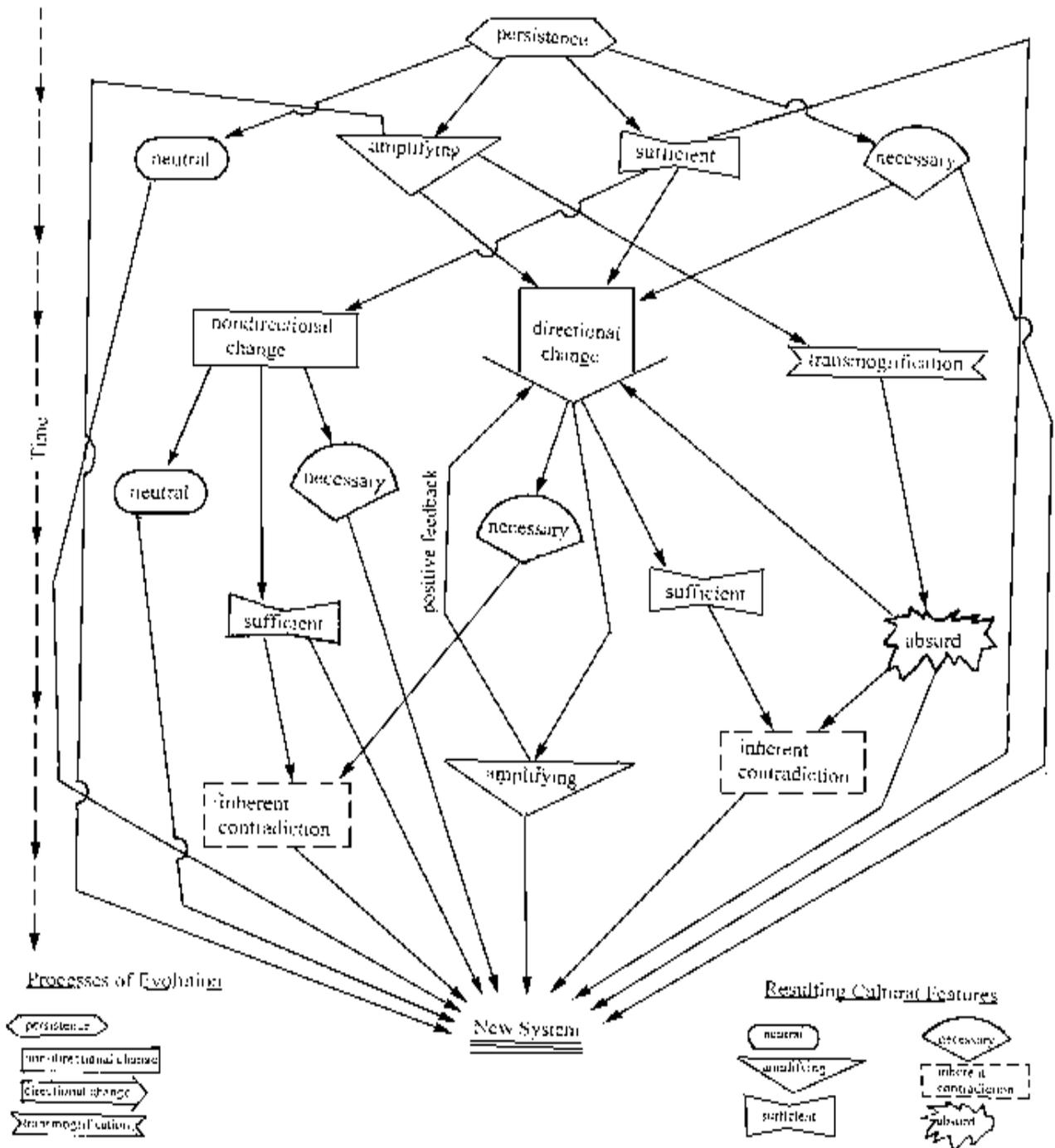


FIGURE 3: INTERACTIONS OF CULTURAL FEATURES IN SOCIAL EVOLUTION.

The Evolution of the Human Ecology of the Southeastern Indians

This discussion of Southeastern Indian society during the period of European colonization and mercantile expansion (ca. 1540 through 1830) is a preliminary contribution to devising a system-specific model of some aspects of the evolution of a human ecological system during this time. I do not give a detailed description of these 300 years of Southeastern Indian history. Rather this is a brief overview of some changes that occurred and those things that I view as important causal factors in these changes.

Table 1 is an historical overview of human ecology in the Southeastern United States during this time period. The table lists certain elements of the human ecological system according to time periods. Under each time period, a vertical reading lists elements of the human ecological system for that particular span of years. Reading left to right gives some indication of how particular elements changed over time. The table makes no attempt at causal linkages; rather it is a listing of consequences and how these consequences constituted a new system.

I should point out that, to date, no historical reconstruction has been done for the Southeast. Some recent works make an excellent start toward this goal (Braund 1993; Merrell 1989; Silver 1990; Usner 1992), but this time period for the South remains relatively unknown. Therefore, much in Table 1 needs a thorough investigation in order to depict the workings of each system. Furthermore, this 300-year period was one of continuous change. Although I have parceled out three human ecological systems, I do not believe that any one system operated as a mature, stable system. Each was in flux, and different parts were undergoing different changes at different times.

Figure 4 depicts some causal linkages in the elements from Table 1. The figure is divided along a time axis and a social axis. The time axis conforms to that in Table 1. The social axis emphasizes the interaction between the European system and that of the southern Indians. The interaction sphere on the social axis constitutes the interactive

components between the European system and the Native American system. As the figure shows, these components comprise most of the causal factors that led to changes in the human ecological system of the Southeastern Indians. The intersection of the core system and the periphery system during European colonization and mercantile expansion was a powerful evolutionary force in both systems (Cronon 1983; Jordan and Kaups 1989; Norgaard 1987; Silver 1990; Wallterstein 1976; White 1983). Although I have chosen to concentrate on change in the Indian system, another flow chart could be drawn with most of the arrows feeding into the European system.

To fully understand the evolution of the Southeastern Indians' ecological system, the relationships between causes and effects would need further detailing, and the processes of evolution would need to be delineated. To illustrate how such an endeavor might be pursued, I have elaborated one small piece of Figure 4 into a schematic model of the dénouement of the economic system and the ecological transmogrification that ensued from the deerskin trade of the eighteenth century.

With their incorporation into the mercantile system, Southeastern Indians engaged in intensive trading with Europeans. By the eighteenth century this trade consisted of Indians trading deerskins for European-manufactured trade goods, especially guns, ammunition, liquor and cloth. Figure 5 depicts the dynamics of this trade system and the relationship between the core and the periphery. In essence, core production and export, plus periphery export, production and consumption were locked into a dependency relationship. The Southern Indians were dependent on Europeans for trade items which by this time had become necessities (Braund 1993; White 1983). The Southeastern Indians simply did not have the resources, capital, labor or economic system to engage in manufacturing themselves. Core production, however, depended on the raw materials, in this case deerskins, from the Southeastern Indians for manufacturing gloves, hats, bookbindings, and so on. However, one important factor here is that for the core, the production of leather goods,

	CONTACT CA. 1540 - 1600	INCIPIENT COLONIZATION CA. 1600 - 1730	INTENSIVE COLONIZATION CA. 1730 - 1830
WHO	Mississippian chiefdoms	Tribes (interior and coastal)	Cherokee, Creek, Choctaw, Chickasaw, Timucuan, Seminoles
	European explorers Spanish missionaries	white traders and backwoodsmen	white traders and backwoodsmen mixed-blood populations
DEMOGRAPHY	introduction of European diseases decline in population warfare	European disease/ slave trade decline in population warfare European coastal settlements black slaves	European disease decline in population warfare Europeans + coastal settlements, movement of whites into backcountry movement of blacks into backcountry
LAND USE AND MODES OF PRODUCTION	intensive corn agriculture hunting, gathering, fishing division of labor by caste and gender	Indian and some backcountry white subsistence corn agriculture hunting, gathering, fishing division of labor by gender European coastal plantation Indian and black slavery slave trade/ beginnings of deerskin trade reciprocity and subsistence oriented economic system/ beginnings of trade and barter	Indian and backcountry white subsistence corn agriculture and herding hunting, gathering, fishing division of labor by caste and gender European coastal plantations and upcountry cotton plantations black slavery deerskin trade/ decline of deerskin trade open-ended barter and trade European and Indian trade alliances; American domination of Indian trade American regulations on land, water rights, backcountry boundaries, etc. conscious acculturation Removal
IDEOLOGY	ideology of conquest	European conceptions of Indians and vice versa	racism

TABLE 1: HISTORICAL OVERVIEW OF THE HUMAN ECOLOGY OF THE SOUTHEASTERN UNITED STATES AT THE TIME OF CAPITALIST DEVELOPMENT AND EXPANSION.

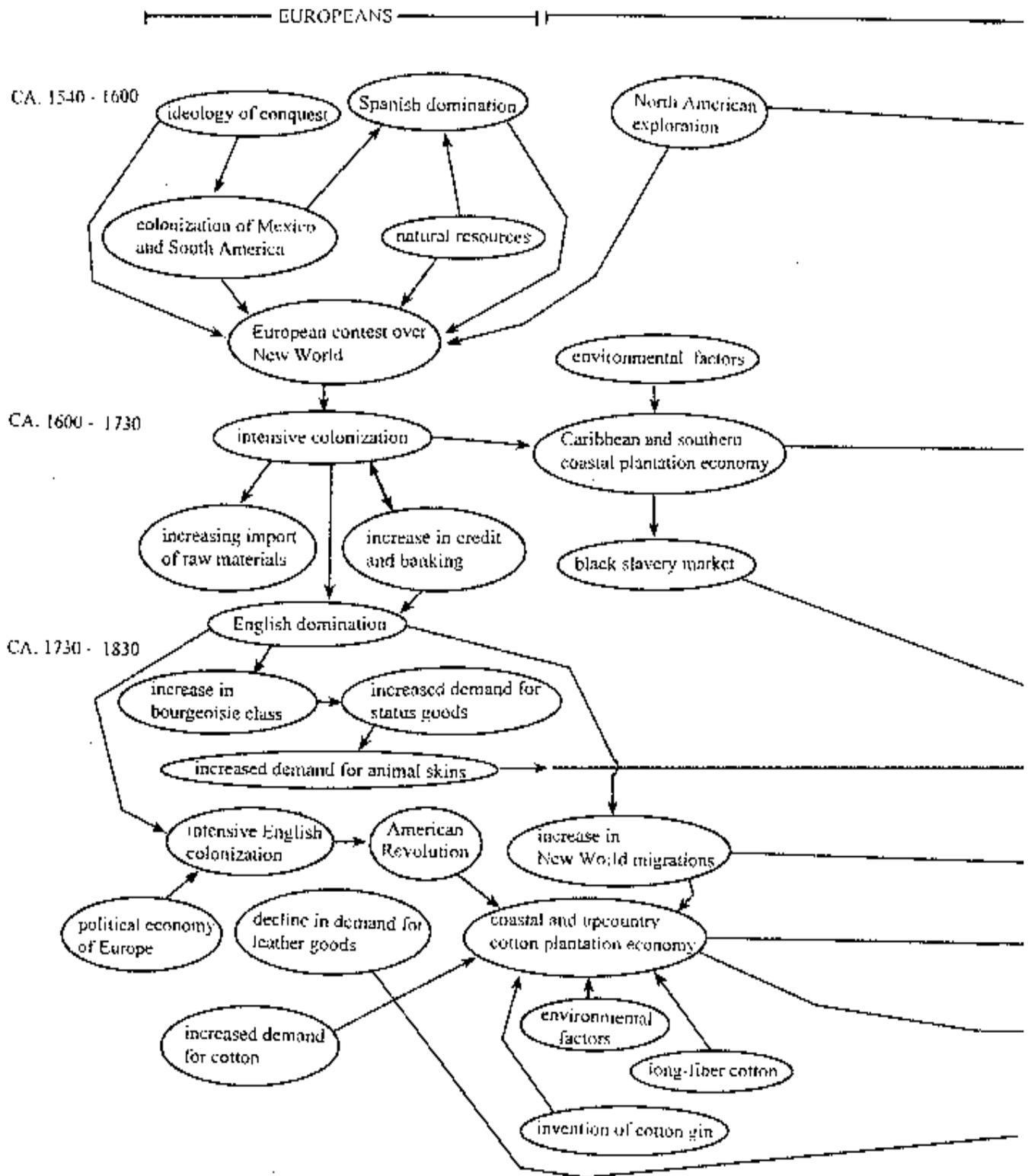
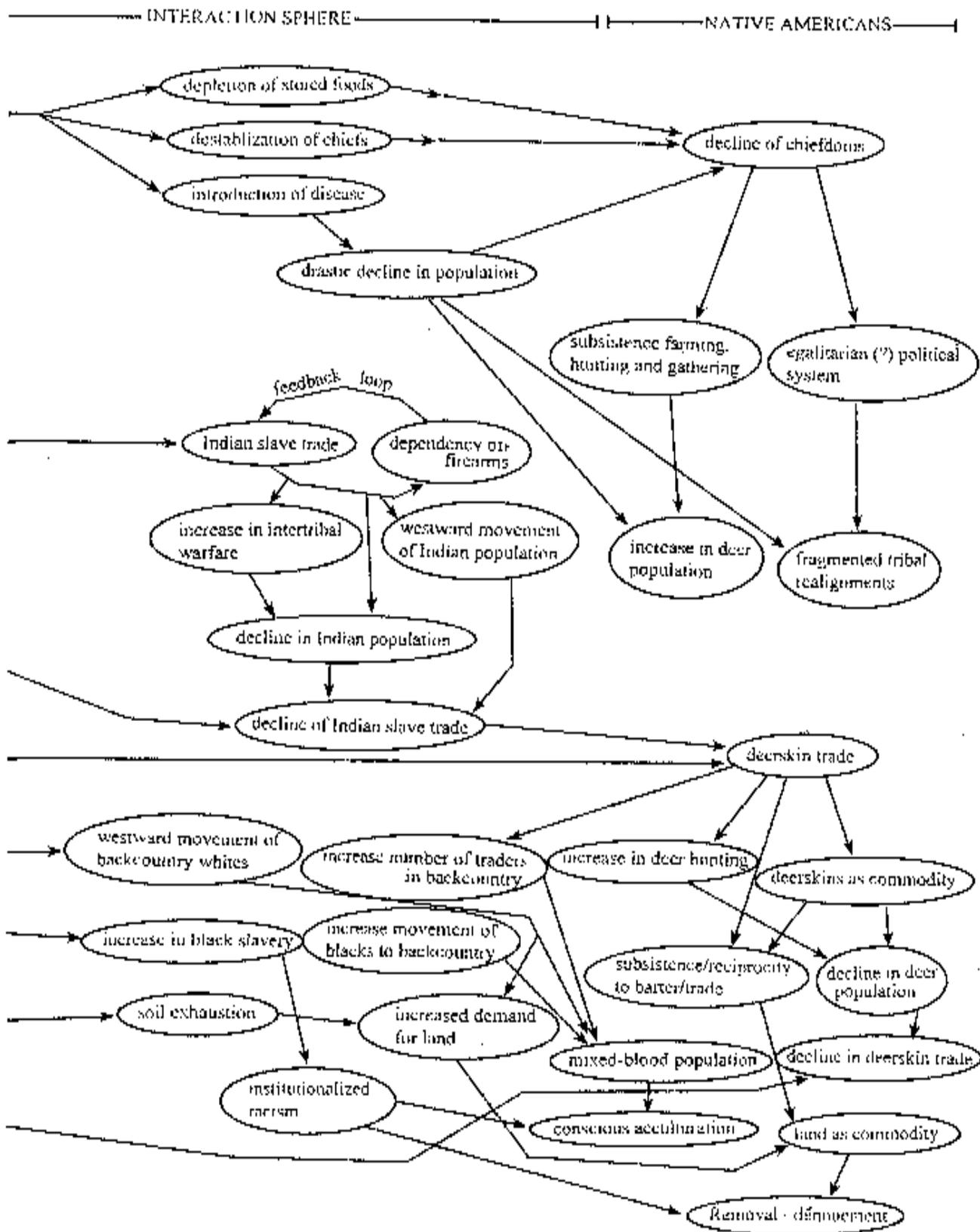


FIGURE 4. THE EVOLUTION OF THE HUMAN ECOLOGICAL SYSTEM OF THE SOUTHEASTERN INDIANS AT THE



TIME OF EUROPEAN COLONIALIZATION AND MERCANTILE EXPANSION.

within a dependency on deerskins, rested on European consumption patterns of these goods and lasted only so long as the demand endured and the supply of deerskins was cheap. Because these goods were not necessities that could not be furnished in other ways, European consumption remained outside of the dependency sphere. Once deerskins supplied by the southern Indians became unprofitable, European manufactures simply turned to other types of production or procured skins elsewhere. In short, within a dependency sphere, the dependency generated in the periphery was more acute than that of the core.

The *dénouement* of the Southeastern Indians' economic system resulted from complex causes generated in the dependency sphere. The system changed from reciprocity and subsistence-oriented to open-ended barter and trade with a market orientation and market principles (Braund 1993; Usner 1982; Wright 1983). A key element here is that the goods being bought by the Indians were elastic. The demand for guns, ammunition, cloth, and liquor were constant because these goods were consumables and did not last, and because they were necessary items.

Periphery consumption, in turn, led to a resource reclassification of deerskins. Before the deerskin trade, the southern Indians used deer at a subsistence level, for food, clothing, bone tools, and so on. Their consumption of deer did not diminish the deer population. With their dependency on manufactured goods, however, the Southeastern Indians joined the world market economy and began using deerskins as trade items with which to purchase manufactured goods. Thus, periphery consumption was a contributing causal factor in the reclassification of deerskins into a commodity. Conjointly, the core production demand for deerskins was a causal condition for this resource reclassification. Because of the dependency relationship between core production and periphery production and export, deerskins became a commodity in the eyes of the Southeastern Indians because deerskins were a commodity in the eyes of European manufacturers. Once deerskins were seen as a commodity, this served as an amplifying

factor in periphery production and export and resulted in an intensification of the trade.

Both the reclassification of deerskins as a commodity and the *dénouement* of the economic system fed a transmogrification of the ecological core. Simply put, the number of deer being killed for their skins exceeded the population threshold for deer reproduction and resulted in a drastic decline in the deer population. This consequence is a transmogrification because it was absurd and deleterious; it destroyed the deerskin trade because it was no longer economically feasible or profitable to hunt deer. The problem was that the *dénouement* of the economic system meant that the southern Indians were now locked into the world market system and had to find another resource to reclassify into a commodity. This turned out to be their own lands. Although the transmogrification in the ecological core of the deer population did not result in a permanent change in the southern environment, the *dénouement* of the economic system led to changes in the Southeastern Indians' social system with the ensuing conscious acculturation, land cessions, and finally the Removal (see Figure 4).

This model demonstrates that a human ecological system is composed not only of humans and the ecological core, but that systems of production, consumption, economics, and resource classification play a primary role in how humans relate to their environments. Furthermore, within the capitalist world-market system, a local ecological core becomes part of a larger ecosystem wherein core patterns of consumption and production have a direct bearing on changes in a local ecosystem. The new ecological anthropology must set the ecological core within these larger relationships in order to fully understand human–environment interactions.

Conclusion

This preliminary assessment of human ecological systems and their evolution during the time of European colonization and mercantile expansion emphasizes the complexity of change and the processes of evolution, and that human

ecological systems are much more than the abiotic and biotic flows within an ecosystem. Admittedly, these are not new contributions and may, in fact, seem commonsensical. However, I am continually astounded that many ecological studies still fail to recognize these precepts and continue to ignore change and the effects of the global economy on local ecosystems, but emphasize the ecological core while diminishing core and periphery patterns of consumption. Essentially, this paper is a reminder that, to form a new ecological anthropology, we must approach our studies of human–environment interactions with fuller models than those left to us by past ecological anthropologists.

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