The Historical Ecology of Global Climate Change

Brief summary of *Historical Ecology a Multidimensional Ecological Orientation*
In: *Cultural Knowledge and Changing Landscapes* . Chapter 1, Carole Crumley
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Introduction

The assumption that "culture has triumphed over nature," is mistaken, and characterizes an outdated nature-culture dualism. While in Anthropological human evolution textbooks the first part of the story is couched in evolutionary and environmental terms, the second part denies the environment a meaningful role in human history. Instead values, beliefs and issues, history, and culture constitute the key elements of the explanatory framework. This also reflected in the disciplinary separation of archeologist/physical anthropologists versus sociocultural anthropologists: neither acknowledges their mutual reliance.

Few efforts have been made that incorporate information about how humans have altered the environment or about how environmental change revised human activity. Examples of such changes are subsistence strategies, demographical patterns, and perceptions. To achieve this, there exists a need to develop a multidisciplinary framework. Multidisciplinarity in science is, and has been difficult to establish (Snow). Anthropology plays an important role in the development of such an framework. Its current perspective is integrative and comparative; inclusive of temporal, spatial and cultural dimensions; and dynamic. It motivates an historical focus on the dynamics of change.

Ecology

Ecology is the study of the "*relationships among living organisms or between them and the physical environment.* "
Some characteristics of the scientific study of ecology: :

- Macro-scale ecologists (*global-scale ecology*, '60's) have lost political ground to micro-scale ecologists.
- Landscape ecology recognizes human influence on non-human species, yet persist in distinguishing human from natural landscapes.
- Human ecology concentrates on systematic and evolutionary aspects, while social ecology emphasizes behavior. Both study human-environmenal relationships in distant past or

present. Sociobiology is a paradigm within human social ecology

- Cultural ecology and cultural geography examine adaptive strategies. Both are cognizant of the role of culture in human adaptation, but not interested in long term change.
- Environmental History is the intellectual history of the environmental movement, including the political and economical implications of environmental interaction.
- Environmental Ethics explores value systems as they relate to human conduct.

None of these fields has truly integrative approach, and many lack an explicit historical component. What is needed is a multi-scalar temporal and spatial frame with an explicit focus on the role of human cognition in the human-environmental dialectic.

Historical Analogs

Global climate change is one of the most pressing event of current times. The anticipated changes demand investigations into patterns of human adaptation to climatic variability and change. However, the global climate change models used by physical scientists to predict climatic changes do not discriminate among biotic zones or anywhere near a human scale. Furthermore, many physical scientists assume that "novel circumstances" render any historical analogy to current anticipated global climatic change irrelevant. This attitude is due to:
1) the lack of high quality long term (>100 yr.) instrumentally obtained data
2) local proxy data (such as tree ring) are only valid at the broadest temporal scales.
3) dismay of the comparative messiness of soft social science data
4) vested interest in favor of novel technologies and undervalue of traditional solutions
A regional approach could overcomes this. A region's air mass data, hydrology, soil, topography and species distribution can be used in regional models. Regionally documented ethnography, archeology, and documentary evidence evidences results of human activities and past choices which encompass the entire system. Multiple regional environmental changes can identify sensitive geographical locations. Interregional relationships may then be established and integrated with global data. This approach fosters creativity and the development of local and regional answers to global situations in which sensitive cultural issues play an important part.

Historical Analogs and Landscapes

Two types of historical analogs can be made:
1) purely environmental: the global effects of the volcanic eruption of El Chichon in 1982 was similar to Krakatoa in 1883
2) environmental and human interactions in different time periods

To study the dialectical human-environmental relationships, interactive long term sequences may be traced through the study of changing landscapes. Landscape ecology is the study of

structure, function, and change of a heterogeneous land area composed of interacting ecosystems. Historical ecology or landscape history is study of past ecosystems by charting the change in landscapes over time. Thus, evidence for the historical interrelatedness of humans and environments may be read in the landscape. By interference, changing human attitudes may also be identified and their effects studied. For example, the existence of a forest is the result of both location--which determines temperature and rainfall patterns--and previous and current human management practices.

The introduction of historically informed environmental analyses into regional studies offers an important opportunity for anthropologists, archeologists, historians, and geographers. Archeology is multidisciplinary in nature (natural/physical sciences + humanities) and temporal and spatial breath required for long term analyses. Regional archeology has gone beyond the individual site, seeking to understand distribution, population and economies. Ethnohistorians are anthropologists who critically examine documents for evidence of human actions, relations and attitudes. This includes written (diaries, government documents), oral (stories about storms or pest invasions), and visual (dated drawings) documents. Enthographers study customs based on observations and understandings that guide indigenous peoples' adaptive strategies. This cultural information is transferred in complex ritual behavior or casual conversation.

Historical Ecology is the practice of a globally relevant archeology, ethnohistory, ethnography and related disciplines. While geographic information systems can give practical integration of spatial structures (habitations, soils, river drainage), practical understanding of past and current relationships among these environmental and human systems require a culturally specific temporal and spatial perspective applied at a regional scale.

An Historical Ecological approach to Global Climate Change expects to identify:

- The duration and frequency of air mass patterns that characterizes earlier warm episodes (bv. middle Holocene, Roman Climatic Optimum, Medieval Climatic Optimum)
- What regions where affected?
- How did biotic and human communities respond to these conditions?
- What spatial patterns are characteristic of biotic communities (species diversity and distribution) and human communities (settlement and land-use, population and agglomeration) in the earlier warm episodes?
- How might patterns be mapped in advance of contemporary global warming?
- What measures could contemporary societies employ to cope with supra-annual cycles?
- What human behaviors, attitudes, beliefs, economic strategies, and forms of governance are associated with periods of stable or unstable climate?
- What measures could contemporary societies employ to cope with a marked increase in

climatic instability?

- What values ensure the greatest flexibility in adapting to changed or unstable environment. ?
- Can environmental flexibility be taught?
- How can a global environmental ethic also be culturally sensitive?
- Are some governmental structures better able than others to employ the necessary strategies of adaptation?

Integrative themes and considerations

Practices are maintained or modified, decisions are made, and ideas are given shape; a landscape retains the physical evidence of these mental activities.

- **Contradictions**

Contradictions emerge between human groups because people occupying particular localities develop models of their environment. based on their specific needs and experiences: these models may be at variance with other group, leading to competition, religious conflicts, etc. Contradictions constitute the raw materials for change. Landscapes manifest the resolutions of these contradictions.

- **Scale**

Landscapes cannot be studied in their totalities. Investigation are done at different scales. When a particular scale is chosen during one moment of the analyses, it is because at that effective scale one can comprehend patterns.
Factors of duration, intensity, and periodicity at specific temporal and spatial scales must be examined. These parameters must be considered relative to a specific environment. , because a small change in one environment. could be a major change in another.

- **Culture**

Culture determines the thresholds at which a response will be generated and also the particular

response itself. It frames a society's resilience in the face of environmental and other disturbances.

- **Region**

Any area may be termed region for the purpose of the study of human-environment. relationships, so long as demonstrable homogeneity can be recognized. Its temporal relations (connections with the past and the future) and its spatial relations (connections with other areas at the same scale and larger and smaller areas) need to be specified. A region can be recognized at a certain scale because of its distinctiveness from an interrelations with other such units. This pattern simply begins the analysis.

- **Boundaries**

Boundaries have inherent duality. Arbitrary boundaries are to be avoided, except in the initial stage of investigation. Instead a research area defined at a number of different scales, from observation of a multiplicity of not necessarily coincident boundaries, offers a fertile ground fir discovering the contradictions those divisions manifest. Boundaries are interesting both for social and natural scientists to explore relationships with living organisms. There is a high correlation between the position of biomes (and their ecotones) and the position of climate driven air-mass activity. Administrative boundaries do not nest with but overlap environmental, social, and economic boundaries.

- **Biodiversity**

Biodiversity is critical to the maintenance of ecosystems. Richness and innovative potential of cultural diversity can also be seen as a potent tool in the mitigation of human/environment. relationships.

- **Heterachy**

Heterarchical complex systems are systems in which the elements have the potential of being unranked (relative to other elements) or ranked in a number of ways, depending on systematic requirements. Hierarchical systems are systems in which some elements on the basis of certain

factors, are subordinate to others. A common error of researchers is to uncritically nest levels of analysis, confusing scalar (global-regional-local) with control hierarchies (court system), and leading to the misinterpretation of chains of causation. It is quite possible that effects that occur at the "subordinate level" have major systemic effects: they can change parameters (boundaries) or control levels (center-periphery shifts, scale changes) or the ranking of various elements. Heterarchy reminds us of a natural, multidimensional fluctuation in the importance of elements. This flexibility is essential to a dynamic approach.

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http://anthropology.unc.edu/french/he/hebook.html