

Reviewing the Discourse of Ecology and Health Among Indigenous Peoples in Amazonia. Human Ecological Research on Livelihood, Well-being and Survival

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INTRODUCTION

The purpose of this article is to examine the intellectual roots of what can be designated as the current state of the art within the field of human ecology and health (Follér, 1990 and Hansson, 1996). The links between different aspects of an ecology/health discourse are examined, and the mechanisms of change are analysed.

Human ecology deals with human beings' relationship to their environment. This study focuses specifically on one such region — the Amazon — and its inhabitants. The emphasis is on livelihood, well-being and survival strategies among indigenous groups in this predominantly tropical rainforest environment. The depiction of these strategies is what I call the ecology/health discourse. The article reviews three more or less distinct historical aspects of this discourse by discussing a few representative studies from each branch. The three focus on soil, calorie-intake and protein respectively, as limiting explanatory aspects. They are not mutually opposed approaches; synthesis can be seen, but for analytical purposes they are treated as distinct. These variations of the discourse were mainly dominant during the sixties and seventies within indigenous Amazonian research. Their influence on contemporary research will be debated (see e.g. Carneiro, 1995; Myers, 1992).

Seen from a disciplinary perspective the mapping of the discourse blends elements from human ecology, ecological anthropology, medical anthropology and various medical disciplines such as epidemiology and public health. My interest lies mainly in the humanistic and social scientific approaches to the ecology/health discourse. The research questions, methods and concepts are oriented more towards the humanities and social sciences than ecology and biomedicine. This means that biomedical reports lacking a broader ecological framework are excluded from the inquiry.

The three historically influential theoretical approaches (soil, calorie, protein) are studied to elucidate how scientific theory and methods are shifting over time. This might yield some insight into how co-operation between disciplines gives rise to new knowledge or new research questions, and thereby

provide us with guidelines for reflection on the current situation.

BACKGROUND

My intention is to find links between research trying to integrate ecology and human health and to trace threads of influence and change. Scientific paradigms are shifting, and new attempts are emerging within the humanities and social sciences to examine and understand the relations between human beings, society and the environment. One reason is that the ecological situation has changed dramatically and our awareness of that is reflected in society and within academia. The scientific understanding of the relationship between people's health and their environment has changed together with the reflection in contemporary society and the prevailing discourse of which the researcher is an integrated part. The shifting views in society are mirrored in the ecology/health discourse on the Amazon and in the theoretical debate in academia in general. Some central concepts within this field of research, from the sixties and onward, are 'adaptation', 'niche' and 'carrying capacity'.

Interdisciplinary research fields, e.g. the ecology/health discourse, sometimes straddle traditional disciplines, creating subdisciplines such as ecological anthropology and medical anthropology, or continue to exist as a multi-, inter-, or transdisciplinary research network. These loosely organised entities often borrow methods, theories and data from the already existing disciplines. New research questions are created and new knowledge formations evolve. I am firmly convinced that in the interface between these research fields new challenging research is emerging.

My goal is not to provide exact definitions of ecological anthropology, human ecology or medical anthropology. These terms are vague and differ from country to country, and according to how individual researchers define themselves. In the United States and Britain 'ecological anthropology' and 'human ecology' are practically synonymous. *The Journal of Human Ecology* is the member journal for the eco-

logical anthropologists within American Anthropological Association. Medical anthropology has several branches (biocultural, cultural, critical medical anthropology). Of these, the one most relevant to the purpose of this article is ecological in its approach, as represented by e.g. *Medical Anthropology in Ecological Perspective* (McElroy and Townsend, 1996). Between the above mentioned fields of knowledge there are potential bridges and interconnections, but they have not been used extensively.

My purpose is to review studies about human ecology and health among indigenous groups in the Amazon. A logical starting point is the American anthropologist Julian Steward and his theoretical approach known as cultural ecology. Steward edited the *Handbook of South American Indians, HSAI* (1939-1959) which was an influential work within Amazonian ethnology for a long period of time. HSAI is mainly a synchronic compilation with comparative studies of native Amazonian populations. Steward developed his theoretical discussions in the article 'The concept and method of cultural ecology' in *Theory of Culture Change* (1955). The analytical framework presented in Steward's works is that of the influence the environment exerts on cultures. Steward, Leslie White and V. Gordon Childe are often positioned as belonging to an evolutionist anthropology or materialist evolutionism. Steward's central hypothesis was that cultures evolve into particular forms in the process of adapting to specific environmental conditions, and that the apparent uniformity of evolutionary stages is actually a matter of similar adaptations to similar natural conditions in different parts of the world (Ortner 1984). He emphasises certain aspects of the environment as crucial, namely: quality, quantity and distribution of resources. The elements or special traits that affect the development of cultures are called 'cultural codes'. These are technology, economic arrangements, social organisations and demography.

Cultural ecology is the dominant approach for many of the human ecological studies in the Amazon from Steward onward, up until the 80s. There is a shift in approach from how the environment stimulates or inhibits the development of social and cultural forms, to the question of the ways in which social and cultural forms function to maintain an existing relationship with the environment. The critical review *Ecological Anthropology* by Benjamin Orlove (1980) and *Theory in Anthropology since the Sixties* (1984) by Sherry Ortner are two very different, but instructive, articles examining the materialist wing within cultural ecology from the sixties and onwards.

The cultural ecology school has greatly influenced indigenous Amazonian research. The studies selected are those falling within the ecology/health discourse. The researchers might call themselves human ecologists, ecological anthropologists or cultural ecology anthropologists. Such designations are not the most important thing. The central issue is to explore studies from the Amazon which link ecological aspects related to indigenous peoples' livelihood, subsistence pattern and survival strategies. The way in which health issues are explicitly or implicitly included will be reflected on.

CONCEPTUAL FRAMEWORK AND METHODOLOGICAL CONSIDERATIONS

In the introduction to *Assessing Cultural Anthropology* there is a fruitful discussion of the development of anthropology, and the diversity and divergence of various approaches (Borofsky, 1994). The conceptual framework for doing this is that of studying fragmented and excluded tendencies in anthropology over time. The tendencies of today's social science towards disintegration and fragmentation are partly a consequence of a thematic expansion of the anthropological research field. At the same time, global society is changing in ecological, political and cultural ways. Scientific knowledge is developed or formed according to various factors. One critical question is: which are the epistemological concerns that have divided and fragmented research on ecological and health issues into different subdisciplines?

MATERIALISTIC APPROACHES

Cultural Ecology Globally

Cultural ecology can be seen as a synthesis and further development of the materialist evolutionism represented by Leslie White and V. Gordon Childe. A development can be traced from cultural ecology through systems ecology and cultural materialism to what today are designated ecological anthropology and human ecology. Some classic works within these fields have primarily dealt with the mechanisms relating the natural environment to human physiology, nutrition and disease. One foundational study was carried out by the anthropologist Richard B. Lee among the !Kung Bushmen of Botswana (Lee, 1968). Some interesting data from his studies, related to the ecology/health discourse, show that their nutritional levels, life expectancies, as well as hours of work, compare

quite favourably with many technologically far more advanced societies. Another classic work, very much questioned and debated, is Roy A. Rappaport's field work among Tsembaga Maring on Papua New Guinea. *Pigs for the Ancestors* (1968) is Rappaport's most well-known publication within this field. It can be seen as a landmark for the functionalistic school with cybernetic trends and an ecosystems approach.

Cultural Ecology on the Amazon

In the Amazonian context, as was mentioned earlier, cultural ecology has received attention through Julian Steward's work. The analytical framework of Steward is that of the effect of the environment on cultures. He explicitly does not deal with health/disease, but livelihood and survival strategies instead, and thereby includes the ecology/health discourse. A central concept within this school was and still is 'adaptation' (Alland, 1975, 1987; Bargatzky, 1984; Moran, 1979). 'Adaptation', as a concept, is used in a multifaceted and not always well-defined way within anthropological studies. Often no distinction is drawn between genetic and cultural modes of adaptation. In the *Encyclopedia of Social and Cultural Anthropology* 'adaptation' is defined as the process of accommodating to the natural or social environment (Barnard and Spencer, 1996:169). Emilio Moran is an ecological anthropologist who has performed extensive research in the Amazon Basin. His focus is on the *mestizo* and *caboclo* population, the non-indigenous population, and their adaptation and/or maladaptation to the soil. His ecological approach stresses the manifold of ecosystems and micro climates that exist in the Amazon basin as opposed to the earlier researchers' more homogenous ecological definitions (Moran, 1979).

The materialistic limiting discourses undertaken in the Amazon can all be traced to the adaptationist school, with a definition of 'culture' in accordance with Steward's culture core. The studies examined are all concerned with how the environment promotes or impedes the development of a certain group's opportunity to survive, i.e. to maintain an existing relationship with the environment and not exceed its carrying capacity. These researchers, mainly anthropologists, who were studying indigenous groups during the sixties and seventies focused on three key concepts: soil, calories and protein. These were perceived as central aspects indicating limiting cultural factors. Each researcher weighted the respective limiting factors differently.

THE FERTILE SOIL LIMITING DISCOURSE

Within the portion of Amazonian anthropology which focuses on soil fertility, the work of Betty J. Meggers has been the most influential. I will start with a description of her analytical framework. As early as 1954 she wrote *Environmental Limitation on the Development of Culture*. She starts with a rejection of environmental determinism and adopts environmental possibilism, the idea that the environment is an important conditioner of culture, which one way or another establishes the framework for the development of a specific culture. She continues by asserting that the primary locus of interaction between a culture and its environment is in terms of subsistence, and that the most vital aspect of the environment, from the point of view of culture, is its suitability for food production. Meggers starts her argumentation from the effect that agriculture has had on culture and moves on to the effect that soil fertility, climate and rainfall have on the productivity of agriculture, which in turn regulates population size and other factors related to the survival of the group. Her working hypothesis is that there is a cause-and-effect relationship between the type of environment and the 'maximum cultural development' that can continuously be supported. She does this by comparing subsistence, settlement pattern, technology, socio-political system and religion between four major culture areas in South America: Marginal, Tropical Forest, Circum-Caribbean and Andean. After reviewing these cultural areas and comparing them with Europe her conclusion is that the level to which a culture can develop is dependent upon the agricultural potentiality of the environment it occupies. The culture becomes stabilised at a level compatible with its food resources. Influences from outside she excludes as "elements that disturb the 'natural' course of events (Meggers, 1954:815)." Culture is, in her study, perceived as a closed or bounded system, and her cultural evolutionism is pronounced.

Amazonia, Man and Culture in a Counterfeit Paradise by Meggers was published in 1971, and her focus on soil fertility as a limiting factor was still a central theme. Her emphasis on cultural adaptation was here elaborated even further than in her earlier works. According to Meggers the history of the Amazon is divided into two successive and distinct phases of human utilisation of nature. The first was the arrival of the indigenous peoples, which she says "was evolved under the influence of natural selection from the ingredients brought by the initial human settlers

several millennia before the Christian era (1971:3).” The second was, of course, the arrival of the Europeans during the sixteenth century. These two contrasting kinds of exploitation of the same environment are utilised by Meggers to compare their respective culture-environment relationship. Meggers proposes two theses:

1. Man is an animal, and like all other animals must maintain an adaptive relationship with his surroundings in order to survive.
2. Although he achieves this adaptation principally through the medium of culture, the process is guided by the same rules of natural selection that govern biological adaptation (1971:4).

She also distinguishes between two separate habitats within Amazonia: *terra firme* — land not subject to annual inundation, with elevations varying from immediately above flood level to several hundred meters, and *várzea* — the flood plain of a white-water river, which receives an annual deposit of fertile silt.

From her definition of a culture area and the two ecological definitions mentioned above she sets out to prove her thesis of soil fertility being a limiting factor. The agricultural factors that she calls ‘absolutes’ are the physical and chemical constitution of the soil, temperature and rainfall. She also discusses the importance of primary forest for cultural development.

Meggers’ hypothesis is that if adaptation is a major determinant of culture, then the aboriginal cultures should reflect this environmental situation in two principal ways. First, there should be a general cultural pattern throughout the tropical forest area, which is a response to the generalised characteristics of climate and soil that define the region as a whole. Second, there should be local variations in subsistence emphasis, settlement size, and other cultural features that are correlated with local differences in the availability and abundance of subsistence resources (1971:29).

The comparisons she makes in the book to demonstrate these relationships are between five different indigenous groups, examined in terms of: their location and environment; settlement pattern; dress and ornament; subsistence; other activities; social organisation; life cycle; ceremonies; trade; warfare; religion and magic.

Her conclusion, after comparing these groups, is that the population concentration was greater, and the level of socio-political complexity more advanced, on the *várzea* than on the adjacent *terra firme*. Her interpretation is that this has to do with a sensitive cultural adaptation by the indigenous

groups. Adaptation to this situation sets a ceiling on cultural development and it seems probable that *várzea* groups had achieved the ‘maximum level of cultural elaboration’ consistent with these local environmental conditions.

Donald Lathrap also writes in the adaptationist tradition and focuses on subsistence (1968). He utilises Meggers’ division between *terra firme* — interfluvial groups and *várzea* populations engaged in more sedentary root-crop farming combined with fishing and the hunting of aquatic mammals and reptiles. The main contrast, according to him, between the two ecosystems is found in differential productivity, both in agriculture and animal bio-mass. In *The “Hunting” Economies of the Tropical Forest Zone of South America* he stresses that for the *terra firme* groups it is not the agricultural potential which determines the size and mobility of tropical forest social groups (Lathrap, 1968). His thesis is that most of the groups inhabiting the tropical inland are the remains of evolved agricultural societies forced into an environment unsuitable to the basic economic pattern. They had to rely on the hunting of forest game to provide the protein and fat essential to the diet. As the game was often scarce they were forced into nomadism, a decline in agricultural productivity, and a still greater dependence on wild food (Lathrap, 1968).

In a recent contribution Meggers (1995) discusses climatic instability and variation in Amazonia. She looks for correlations between climatic and cultural change. Her point of departure is carrying capacity, and her view is still very much one of the indigenous groups being homogenous, stable, culturally-closed units. But she is more multifactorial in her explanations than earlier. She includes in her conclusions a discussion of the role of epidemics, slave raids and population reduction due to the arrival of the Europeans. She also discusses the importance of different exchanges between groups of people, and she hereby takes a modest step away from the fertile soil limiting approach.

THE CALORIE LIMITING DISCOURSE

Robert Carneiro does not deny that a minimum level of subsistence productivity is a prerequisite for cultural development but he finds Meggers’ explanation too simplistic and static. He challenges several of Meggers’ notions about the limits imposed on Amazonian culture by a rainforest environment (Carneiro, 1995:47). In a study among the Kuikuru of the upper Xingú River, he estimates the carrying capacity of a slash-and-burn system, and his calculations suggest a much denser population limit and a more elaborate cultural development than Meggers’

estimations (Carneiro, 1960b). He is more multi-factorial in his approach than Meggers, and emphasises the role played by warfare and conquest in accounting for cultural development (Carneiro, 1970). With ethnographic data from the Kuikuru, Carneiro states that "with slash-and-burn as the only limiting factor, a village of some 2,000 persons could live on a permanent basis where the Kuikuru do now (1960b:232)". Carneiro's studies challenge Meggers' ecological limitation of soil fertility, and his studies have mostly focused on the role of other ecological factors related to food crops in the evolution of Amazonian chiefdoms. A famous paper is *Theory of the Origin of the State* (1970) where he points out the existence of indigenous chiefdoms in Amazonia at the time of European contact, and proposes a theory to account for them (Carneiro, 1995).

The theories proposed by Carneiro underwent a new upheaval with the archaeological studies by Anna Roosevelt and her 'maize hypothesis' concerning the arising of chiefdoms in the Amazon. In Carneiro's article *The History of Ecological Interpretations of Amazonia: Does Roosevelt Have Right?* the controversies of the cultural history of Amazonia are unfolded in a scientific dispute (Carneiro, 1995). The calorie controversy in this article deals with the productivity of manioc versus maize, but also considers the importance of external factors on cultural development. For Amazonian studies it deals with crucial issues regarding population size, carrying capacity and influences from other cultures. Its relevance for livelihood, health, nutrition and survival strategies for contemporary and future research will be mentioned later.

THE PROTEIN LIMITING DISCOURSE

The third controversy within the materialistic approach during the sixties and seventies was centred on the role of protein as a limiting factor. The arguments concerned the nutrition, size, density, and settlement patterns of indigenous groups in the Amazon Basin (Lathrap, 1968; Carneiro, 1970; Gross, 1975; Gross, et al., 1979; Beckerman, 1979). There are different views, but I will mainly refer to the dispute between, on the one hand, Daniel Gross' saying that the environment comprises a set of limits and possibilities that are external to the population itself, with focus on the availability of animal protein in the diet (Gross, 1975), and the opposite thesis, presented in some studies, proposing that protein resources are underexploited in Amazonia (Beckerman, 1979). Quantitative data is presented indicating that various indigenous populations have protein resources well in excess of estimated daily requirements. Other

researchers interested in the question of protein limitation have taken the view that throughout most of the Amazon Basin protein resources, particularly game animals, are sparsely distributed, difficult to procure, and rapidly disappearing. Gross, one of the most outspoken advocates for the protein limitation hypothesis, states: that amino acids rather than calories or social dynamics are limiting on the size, density and permanence of native settlements in Amazonia (Gross, 1975: 536)." In *Protein Capture and Cultural Development in the Amazon Basin* from 1975, they examine the proposition that availability of animal protein limits the size, density, and permanence of settlements of indigenous peoples. They utilise the scant protein sources especially that of fish and game, particularly for populations living away from the main rivers. The conclusions are that amino acids, more than calories or social dynamics, are limiting on the size and permanence of native settlements. The hypo-theses are built on arguments concerning e.g. food preferences being a response to potential protein scarcity. In the article also questions why the indigenous populations did not exploit other resources or develop other techniques e.g. animal domestication or increased use of protein-rich cultigens (1975:533).

Stephen Beckerman is of the opposite opinion to Gross and states in *The Abundance of Protein in Amazonia: A Reply to Gross* (1979) that the available protein sources may in fact be underexploited. Beckerman bases his assertion on the presence and abundance of vegetable protein of wild, cultivated, and fermented varieties. With empirical data from anthropological field work from various indigenous peoples and different parts of the Amazon Basin he demonstrates the abundance of protein-rich wild, cultivated and fermented cultigens which are in use. He concludes with an inquiry to Gross: "If there are so many widely available plants, insects, and even protozoan sources of protein in the tropical forest, why do the tropical-forest peoples we know today concentrate so on fish and game in their diets as well as in their subsistence activities (1979:553)?"

The controversy between Beckerman and Gross differs radically as to what they believe the tropical Amazonian population looked like 400 years ago. Gross holds that they have always been small and sparse. Beckerman states that their size today is a consequence of the introduction of Old World diseases. The role of the first contact between indigenous peoples and Europeans and the effect on the size and health of the population is highlighted by Beckerman. The studies reviewed are focused on an attempt to quantify the intake of protein resources without contextualizing the food intake within the

dynamics and changes that human beings enact through exchanges of goods, food and knowledge with other groups, and the ability to cope with diseases. This is one example of a fragmented tendency, where the dialogue is decontextualized and livelihood and health issues have been excluded.

A TRANSITIONAL STATE OF RESEARCH

Meggers' work, which argues, often in a monocausal way, that agricultural productivity imposes an upper limit on cultural evolution in a given area, has been heavily criticised and questioned by other anthropologists. The two ecological concepts *terra firme* and *várzea*, even though already critiqued by Carneiro and others, persisted within Amazonian ecological research into the 90s when they were re-examined and found too simplistic (Balée, 1994; Carneiro, 1995; Moran, 1995; Roosevelt, 1994; Sponsel, et al., 1996). Meggers' statement regarding the central role of primary forest has also been redefined in accordance with what William Balée calls 'the ancestors footstep', meaning that great parts of what earlier was regarded as primary forest have been shown to be anthropogenic forest (Balée, 1994).

The fertile soil discourse is further developed in the agricultural hypothesis. It can be seen as continuing, or sharing many features with, the soil limiting discourse. It is put forward by Emilio Moran (1979, 1993, 1995) and Robert Bailey and Thomas Headland (1991). In this new context the local peoples are tied to influences from the global society, and discussions of the effects these modernisation processes have on them are included.

The soil, calorie and protein explanations as different limiting aspects of the ecology/health discourse are today questioned and rejected, but this can not be taken as a paradigmatic shift. Time after time elements of those discourses are tested and re-evaluated though in a new context. In an article by Katharine Milton a quantitative investigation is conducted of the Maku, an indigenous people living in north-western Amazonia, concerning their diet (1984). She states that her interest in the protein limitation question was stimulated by the reference to the possible relationship between protein scarcity and economic reciprocity. She expands the materialistic approach to touch upon 'nutrient stress' on human populations as a consequence of the scarcity of wild game. Her research indicates that it is difficult to state with certainty whether the Maku are meeting daily requirements for protein and energy. She also states that it seems as if carbohydrate foods are strongly desired by Maku and that they are more preoccupied with carbohydrates than protein, and

that carbohydrate foods appear to be more limited than protein foods in the upland forest. Milton's conclusion from her study among the Maku is that the traditional economic relationship between Maku and Tukanoans has its foundations in an exchange of carbohydrate food passing from Tukanoans to Maku and on protein foods and horticultural labour passing from Maku to Tukanoans. To handle the nutritional stress the two groups co-operate economically through traditional exchange of food and labour.

In the above study some traits emerge, differing from the traditional calorie and protein explanations, showing overlapping epistemological concerns. A challenging interface appears linking knowledge from ecological and medical anthropology. The ecological dimension of the health situation of the group is articulated mainly through a discussion of dietary ecology. Certain environments are interpreted as posing a set of unusually hazardous dietary conditions to their human inhabitants. Milton suggests a multifactorial approach that examines such ecological features as rainfall, soil fertility, flora and fauna, and relates these to observed demographic patterns (1984). But still, this materialistic approach does not take into consideration the peoples' own perception of the environment or health/disease issues. There is still an image of stability even if Milton has opened up the cultural isolation of the indigenous peoples and in an interesting way discusses the mutual exchange of food and labour. The indigenous perception of nature and culture is also still neglected and the ethnocentric approach is obvious. Kenneth Good (1995), another researcher conducting research among the Yanomami in Venezuela, still finds the 'protein debate' valuable as new data emerges. He states that the Yanomami spend about 40 percent of their time hunting and gathering for their survival. With the new data and in a new context the protein limiting explanations concerning indigenous subsistence patterns, in other words, with or without agriculture, is continuing. The materialistic limiting factors discourses are slowly changing, but new multicausal formations emerge as can be seen in the studies mentioned above (Good, 1995; Milton, 1984).

CONTEMPORARY RESEARCH

One question mentioned earlier in this article is: which are the epistemological concerns that have divided and fragmented research on ecological and health issues into different subdisciplines? By searching for the intellectual roots and the theoretical progress of a shared ecology/health discourse, new patterns and linkages are unfolded and a new synthesis is emerging. It still suffers from the lack of a com-

mon terminology for potential practitioners to avail themselves of, but new tendencies can be elucidated. The reviewed articles have mainly focused on how the environment influences the livelihood of the peoples from an ecological perspective. The following studies place more emphasis on the interaction between ecology and the health situation.

Medical Anthropology Globally

Ann McElroy and Patricia Townsend deal in *Medical Anthropology in Ecological Perspective* with how to intertwine ecological, cultural and health approaches. They write in the introduction that medical ecology emphasises the health implications of interactions between human groups and their physical and biological environments, and that human populations adapt to environmental problems, maintain health, and persist over time (1996). In this approach health and disease become indicators of the group's effectiveness in dealing with the environment. In the medical anthropological approach, according to them, adaptation is a central concept. It is used as an analytical tool to understand the health situation and survival strategies of populations in different ecological settings. They also state that medical ecology overlaps considerably in method and theory with ecological anthropology (1996). Therefore this perspective has to be taken into consideration when analysing the ecology/health discourse. Anyhow, not all medical anthropological studies are generally understood in this way. Many studies exclude the biological and ecological aspects, and only focus on social and cultural dimensions of health, ill-health and medicine (Barnard and Spencer, 1996:358). Some new books and anthologies discussing these fragmented tendencies and proposing a culture/nature interaction can be seen. *Medical Anthropology and the World System, Critical Perspectives* is one, pointing out that health is not just a 'cultural construction' and that "... disease must be understood as being as much social as it is biological (Baer et al., 1997:6)." Critical medical anthropologists have strongly criticised the discipline of medical ecology, and especially the publication mentioned above by McElroy and Townsend, for their way of using the concept of adaptation (Singer, 1989; Baer, 1996).

Peter Brown and Maria Inhorn stress that the ecological perspective on disease and human behaviour is an underdeveloped area of research within medical anthropology (1990). In the anthology *Understanding and Applying Medical Anthropology* many illustrative examples of fragmented tendencies within medical anthropology are examined

(Brown, 1998). A range of various theoretical orientations and ethnographic variations are described, but there is also an intention to overlap these by an integrative effort. The editors state in the introduction: "The fact that medical systems are social and cultural constructs, however, should not detract from the fact that we are biological animals (Brown, 1998:3)." The books mentioned all question the definition of human beings as reduced to cultural and social entities, where the biological aspects are not included. They do not discuss the other side of the fragmentation of studies, the one which only relies on biological explanations. The fragmented tendencies and the importance that human beings be set in an ecological context has also been stressed in recent studies dealing with health (Coimbra, 1995; McElroy and Townsend, 1996; Follér and Hansson, 1996; Romanucci-Ross et al., 1991).

Another approach, which is relevant when mapping the ecology/health discourse, is 'ethno-medicine'. Studies included as ethnomedical studies often deal with the study of indigenous peoples and healing systems, medicinal plant use and classification of diseases. Mark Nichter, in the introduction to *Anthropological Approaches to the Study of Ethnomedicine*, makes a lucid classification of studies on health in anthropology (1992).

The parts of medical anthropology which are most relevant for the ecology/health discourse are studies which entail the relationships between social practices, such as agriculture (Santos et al., 1997), food (McElroy, 1996; Freeman, 1996) environmental stressors such as climate (McElroy and Townsend, 1996), urban migration (Schell et al., 1993), house construction (Briceño-León, 1990) and the process of social and cultural change (McElroy, 1996; Santos et al., 1996). Some studies defined as belonging to the ecology/health discourse and containing empirical data from the Amazon will be reviewed.

Amazonian Ecology/Health Studies

An ecology/health discourse with a new and broader analysis is emerging. It is moving away from the adaptionist school, with its monocausal explanatory models, towards a theoretical context with a more synergistic interaction. Cultures are not so much seen as homogeneous stable units, tending to be in equilibrium most of the time. The divergence between people's understanding, interests, motivations and perceptions is also explicitly articulated. Eduardo Viveiros de Castro writes in his review *Images of Nature and Society in Amazonian Ethnology* that "the adaptionist outlook dominant in eco-

logical anthropology has led to valuable studies of certain quantitative dimensions of the subsistence practices of Amazonian groups (1996:184).” The cases shown earlier in this paper concerning the ‘limiting factors’ approaches give a glimpse of this quantification. Anyhow, the ontological and/or epistemological view behind these studies is that the marginal situation of the indigenous groups is taken for granted. They are not set into the historical context of colonialism and concomitant population decrease and displacement to resource-scarce areas. Roosevelt writes about this ‘ethnographic projection’, by emphasising that the situation of today’s Amerindians is a remnant of the peoples that survived the decimation which took place in Amazonia during the European conquest (1989).

Sponsel in his review *Amazon Ecology and Adaptation* also pinpoints the shortcomings of the limiting factors hypotheses and asks for a more holistic, penetrating, contemporary, and applied approach (Sponsel, 1986). Sponsel with co-authors are, according to my view, working within an integrating trend in *Tropical Deforestation, The Human Dimension*, by focusing on the human contexts of deforestation (Sponsel et al., 1996). Both the ecology and human beings are articulated in this approach. What is crucial is that human activities are articulated. The livelihoods of human groups in the Amazon, just as in other tropical ecosystems, display significant cultural variations and differing social organisations. Each population has its particular impact on the forest ecosystem, each with its own risks on human health (Yuill, 1983).

Some empirically well-documented studies within the ecology/health discourse are connecting medical anthropological approaches with an ecological dimension or the other way around. In these studies the dominance of the concept ‘adaptation’ is diminishing, and its limitations are becoming more evident (Santos et al., 1996). The view of culture and societies as more processual and viewable in a context of change makes the adaptionist view of a population’s relationship with its local environment too narrow and stagnant. The processual perspective places a stronger emphasis on historical issues.

The above mentioned studies are rethinking and re-analysing earlier ethnographic materials. In the study by Santos et al. they note one exception to the monocausal trend (1997). In a 1950s paper by Murphy and Steward they find a processual perspective of cultural change (1956). Another article with this early processual thinking is Robert Carneiro’s article from the 60s *The Culture Process* (1960a). He is here conscious of the fact that the theoretical context directs what we perceive. He writes, “... human

psychology and culturology both begin with the same raw data... But each science conceptualises them in a different way. The psychologist sees human behaviour in terms of drives, anxieties... The culturologist, on the other hand, focuses his attention on cultural elements as such: the division of labour, cannibalism, hunting magic...(Carneiro, 1960a:146).”

Santos et al. write, “Although anthropologists have long been interested in the human ecology of native societies of lowland South America, until recently few had explored the relationship between ecological variables and the social and economic changes that follow contact with Western society (1997:547).” In this study they examine the predictions of Daniel Gross and collaborators’ model constructed during the 70s (Gross et al., 1979). These two articles explore in different ways the difficulties indigenous groups face in obtaining a living from their environment. Gross et al. are in some ways products of their time. They have on the one hand an adaptionist view. They express this in their discussion of greater or lesser involvement with the market, such as “This is consistent with the view that greater market involvement is an adaptation to environmental forces (1979:1049).” At the same time they, by including external market economy involvement, are in no way monocausal or isolationistic in their view of indigenous groups, but put them into a historical, geographical and economic context. The natural environment is seen as a dynamic entity; the indigenous groups interact with the market and their lives have been commercialised through commodities from outside would. They have, in current terminology, fallen within the ‘globalisation discourse’. What Santos et al. especially emphasise and make clear is their strong dissociation from the statement by Gross et al. that participation in the market can be seen as an ‘adaptation to environmental forces’.

Santos et al. (1996, 1997) as well as Carneiro (1995) and Balée (1994) are studies from Central Brazil or the Amazon with a contextual and diachronic perspective where they break with the decontextualized and ahistorical trends within ecological anthropology from the region. Adaptation in these studies becomes inappropriate as a concept. Its existence presupposes a model where culture is the mode of adaptation and where the dichotomy culture/adaptation is predominant.

FUTURE TRENDS IN AMAZONIAN ECOLOGY/HEALTH RESEARCH

Whether there is a paradigmatic shift going on, or whether the traditional limiting approaches are just slowly disappearing is a question yet to be addressed.

The processual perspective seems to still retain much theory and concepts from cultural ecology. But something new is emerging, and it is, of course, important to break with approaches that no longer yield fruitful results. With this in mind my inquiry into the materialistic approach to the ecology/health discourse is being carried out. I can see a new synthesis emerging in the processual approach, decreasing the gap between ecological anthropological studies and medical anthropological studies. It has become evident that scholars within these fields are conscious of sharing overlapping epistemological concerns. Where I still miss a linkage is in development towards more awareness of peoples' perceptions of nature and the human-nature interaction. Closely connected to this is the view of the indigenous peoples' local knowledge, especially ecological and medical, and the view of human beings as actors who in different ways influence their lives. Darrell Posey has produced many studies on local ecological knowledge and on local resource management strategies (1999). They all stresses the *emic* perspective, the local perception, and are giving the indigenous peoples a voice. These studies, falling within ethnobotany, have influenced the ecology/health discourse as they often deal with survival strategies.

How can a future ecology/health discourse develop from the intellectual roots outlined? As has been stated, I am not asking for a reinvention of the wheel, just a rethinking of past perspectives to reconsider and assess what is worth preserving from past traditions. There is a benefit in re-analysing earlier aspects of the ecology/health discourse and then rejecting or affirming various forms of continuity from earlier scholars. It is also crucial to reflect on earlier scholars as caught within their time and society. With this in mind what are the priorities for the future to strengthen linkages and connect ecology and health? Traditional materialistic approaches were very much a documentation of indigenous peoples and their 'adaptation' to the environment, carried out in a uni-dimensional and cause-and-effect manner. What can be seen in contemporary research, and needs to be inscribed in the future, is that the local situation always has to be tied to the global system. The local situation is impacted by international and national forces, including development projects and the interactions between local, regional, national and international institutions. Local concerns in this sense include the perception of the people being studied. Besides taking the local view into consideration, the ecological perspective with its consideration of the global context and its attention to the health impacts of major cultural and social change, is essential (e.g. Follér and Garrett, 1996; Santos et al., 1996, 1997;

Coimbra, 1995). The permeability of boundaries through geographic mobility of people and goods including modern communication systems is part of what has to be considered. Global processes supply much of what informs local concerns — health, subsistence, and survival. But this is a two-way interaction. Local peoples choose what to integrate, and are not merely passively integrated into the global world system. It is a process where resistance and accommodation co-act in a global framework of center-periphery, and where dominance and power aspects must be considered.

The fragmenting and divisive tendencies in ecological and medical anthropology studies of the Amazon region might be a rather natural process for a field in progress, but the question is at what point a certain field of study becomes divided? The problem is epistemological as various fields overlap in their search for knowledge and the researcher might end up being rather eclectic. I am aware that even my attempt to bridge ecological anthropology and medical anthropology and to draw local concerns as well as global influences into an ecology/health discourse can in itself result in the creation of a new subdiscipline. As mentioned above, global, national, regional and local aspects are more connected in today's studies. The foci of analysis as well as the process and topics are broader. This pluralized vision establishes new boundaries between research fields. Social and cultural systems change, and yet at the same time remain relatively stable. To explore the dynamic tension of assimilation and differentiation in the interface surrounding these boundaries is the coming challenge.

KEY WORDS Ecology. health. indigenous peoples. amazon.

ABSTRACTS The purpose of this article is to examine the intellectual roots of what can be designated as the current state of the art within the field of human ecology and health. The links between different aspects of an ecology/health discourse are examined, and the mechanisms of change are analysed. The study focuses specifically on the Amazon and its inhabitants. The article reviews three historically used aspects of the ecology/health discourse. These have different focus on soil, calorie-intake and protein respectively, as limiting explanatory factors. Today's state of the art is discussed as well as future trends in ecology/health research.

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