An Invitation to Human Ecology

Understanding Environments, Ecosymbolism and the Change in the Use of Worlds

BY BJÖRN NILSSON

Abstract

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What is the discipline of human ecology? Some consider the ecological study of man to be a holistic, integrative and yet firm discipline that deals with clearly specified questions, some says it is just a point of view. No definition will be proposed in this paper; instead a "human-ecological" way of thinking and working will be evoked. Three things are stressed: first it is suggested that ecology should be studied as a phenomenon of semiotic or informational character, secondly the concept of human ecology is presented as a personal, societal and environmental recursive system. Finally, and through the theories of Anthony Giddens, the strong coupling between different worldviews and the use of the environment is stressed. In the latter case, the aim is to elucidate how important it is for archaeologists to look upon the material world as something that must be evaluated holistically. Material culture is hereby considered as something that exists in both the natural and the cultural environment. A clear distinction between nature, landscapes and artefacts is therefore hard to make, and consequently not a prior goal of description either. To get around this discrepancy between artefactual and environmental archaeology, the question of how people use their worlds is raised, a question that archaeology alone cannot answer, but hopefully together with other long-term human-ecological approaches.

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Introduction

It is obvious that our world confronts a number of problems such as environmental disasters and energy crises, oppressed people, armed conflicts and an unequal distribution of resources. When it comes to the three latter phenomena, you need no argument to define them as products of cultural processes. On the other hand, when discussing environmental or energy problems we have learned that they should be considered as phenomena in the natural world, not as cultural problems. However, environmental degradation is also made possible due to cultural processes. The web of human ecology is therefore more complicated than we may often think. Recycling bottles is not the same as stopping degradation. Man's ecosystem is a complex combination of material, societal and mental aspects.

A legitimate question is what all these modernity problems have to do with archaeology. Briefly, one can argue that science should try to be rooted in reality and that we all are responsible for existing and forthcoming problems. When it comes to the description of human ecosystems, I am convinced that archaeology, with its compressed chronological perspective, is quite sensitive to the subtle traits of cultural changes. And an adequate description of our coupling to nature is very much needed.

The human ecology advocated in this paper should not be confused with the systemic ecology of the 1970s with its natural deterministic view and focus on empty landscapes, inhumane humans or simulated transmission of energy budget flows. My point of departure is derived from cultural anthropology, semiotics and social theories of action and practice. Two important texts deserve to be mentioned, one written by Alf Hornborg, Lund, *Ecology as Semiotics. Outlines of a Contextualist Paradigm for Human Ecology* (1996), and one written by Dieter Steiner, Zürich, *Human Ecology as Transdisciplinary Science, and Science as a Part of Human Ecology* (1993).

A transdisciplinary approach

The study of human ecology is one of those interdisciplinary fields of research that many speak of but no one really defines. During the last 80 years, the notion has been used for various approaches, in both the natural and the social sciences. This paper will not result in a definition, rather a "human-ecological" way of thinking and working. Instead, I am going to put forward some theoretical starting-points for what a human-ecological project involves. Due to the transscientific nature of this intellectual and epistemological theme, it will be evident that an intradisciplinary deconstruction of traditional practices, norms and goals is necessary. An interdisciplinary project will only succeed if the researcher – on a personal level – dares to question his or her scientific identity and enter a purgatory where old intradisciplinary fundaments might be found too small or specialized. On a social and practical level the risk of incommensurability problems is inherent. In spite of this, the advantages are obvious in the case of human-ecological studies. We might gain a broader and less escapist scientific view. The holistic approach allows you to make descriptions of the different levels of reality, where biological, psychological, sociological and geographical expressions could be combined.

This article should be seen as an initial invitation to the theories of ecology, and the expectation is that – at least to a small content – it will elucidate this field of research. It is my conviction that human ecology, seen as a transdisciplinary approach, could offer a very interesting view and some quite elaborate theories which could be applied to the archaeological record.

Ecology as an anthropological field of research

"Culture is the category of phenomena distinguished from others by its contingency upon symbols." (Rappaport 1979, p. 60, quoted in Hornborg 1996, p. 52)

"Indeed ecological relations are based on meanings; they are semiotic. Ecosystems, no less than cultures, are contingent upon communication." (Hornborg 1996, p. 53)

Ecology is most commonly explained as the description of the relationship between nature and organisms. Hence, ecology is the theory of interaction between biotic and abiotic components. The result is often a systemic and mechanistic description of how the world "works" in a quantitative and hierarchical manner. The natural sciences, to which systemic ecology belongs, are quite successful in describing today's environmental problems through complicated simulations, calculations and spatial analyses – but they cannot explain *why* the development of

modern societies gradually becomes more problematic. More recently, we have been trained to conceive of the human being as one of the most important parts of the global ecosystem. Indeed, the everyday reports of pollution, the increased greenhouse effect and other industry-related problems make us aware of the human impact on the natural environment. The loss of faith in technological or "rational" methods of solving environmental problems certainly has affected science, especially systemic ecology. The demand for a more humanistic ecological view or a "deeper" ecological theory is common amongst environmentalists and other related groups. Many social scientists have begun to realize the causality between modern worldview (cosmology), environmental problems and resource handling. This coupling is of utter importance. If we want to understand the roots of our own ecological problem, we have to interpret it as a human-related phenomenon rather than a technological or natural one. In other words, the human use of the world is largely determined by cultural laws rather than natural laws.

Hence, it is obvious that the study of the human ecosystem, regardless of what spatial and temporal level one is working with, is a phenomenon that should be seen as both an anthropological and a biological/technological field of research. A transdisciplinary human ecology is thus based on cosmological and ontological studies as well as on the study of the biological and physical laws of energy transmission between biotic and non-biotic systems. We have to study both *why* and *how* man's ecosystem works. As a consequence, the human-ecological discourse should primarily concentrate on the cultural and natural premises for exchange between the parts of the system. To accomplish this, integration between various scientific languages is essential. The crucial question lies in how to find a scientific language and a new systemic approach so that different views can be made comparable and thus integrated. This inquiry should be the initial quest for human-ecological studies.

Where in the scientific society do we find this new perspective on human ecology? The answer is not simple; it may be found in many places, but primarily in the humanities since we are most capable of finding a new integrative ecological language. Today's most interesting building bricks originate from philosophy and the social sciences. Furthermore, we are the ones who are used to describing people and their doings.

In the following, I will present three issues of understanding that I regard as utterly important for a human-ecologically oriented archaeologist. Those will be followed up later:

1. An ecosemiotic understanding in which ecosystems are explained as semiotic, recursive and informational systems.
2. A comprehensive and integrative strategy to understand the recursive relationship between *individuals*, *societies* and *environments* and allow an interdisciplinary discourse.
3. An understanding of how people *use* the world and how worlduse is interconnected with both cosmological and ontological concepts: the *worldview*.

These three notions will effect our scope of perspectives, the methodology, and more important: how we treat the long-term archaeological record.

The ecosemiosis: ecological understanding must be ecological

The biologist Jakob von Uexküll (1864–1944) played an important role in the emergence of a new human ecology (Hornborg 1996, pp. 53f). During the 1920s, he put forward an idea about how organisms perceive their world. According to von Uexküll, what a living being apprehends with its mind of the outer world is not the thing in itself, rather a collection of signals. The mental image of the outer world is built according to an organism-specific *Bauplan*, or blueprint (cf. Nöth 1995, p.37). Every organism has its own

inner representation of the world, die *Innenwelt*, made of the perceived physical environment or *die Umwelt*. The construction of worlds is "made real" by specific sensors that interpret the signals from *die Umwelt*, all according to the organism's livelihood. The understanding of the environment relies upon a semiotic interface between the outer and the inner. According to this, we all live in the same world but in different *Umwelts*.

Furthermore, and as Thure von Uexküll has pointed out, to be a living being is a question of separating *self* and *non-self* (Uexküll 1982). The interpreted signs of the environment set the limits of the organism's outer extension and make interaction possible. In the case of human environmental understanding, these general cognitive principles are charged with values, filled with meanings. However, the interpretation, whether combined with cultural values or not, is the foundation of the organism's worldview. The modes of information exchange, or rather, the symbolic interpretation of *die Umwelt*, is of the utmost importance when it comes to man's use or disuse of natural and cultural environments.

It is in that Uexküllian environmental understanding we find the first steps towards an ecology of semiotics, and it is from here the cultural theory of ecosemiotics and ecosymbolism evolves. As noted, the semiotic interface could be interpreted as a cultural construct as well as a biologic or cognitive one. The information exchange between outer and inner worlds consists of sets of signals determined by both cultural values and biological qualities. Our relationship to the environment, and the question of how to deal with the things in it, is dependent upon the information connections between outer and inner worlds. The human ecosystem is hence an intricate semiotic web consisting of cultural values combined with certain biological affinities.

Supplementary to the Uexküllian body of organism-environmental theories is the systemic approach that the "universal anthropologist" Gregory Bateson has put forward. Deriving from a critique of traditional cybernetic theory – which Bateson found incapable of describing certain "living" phenomena – he developed a set of theories that rely on the use of recursive[1] and self-amplifying or autopoietic systems (Harries-Jones 1995, pp. 183 f.). Bateson means that the world largely consists of these self-reproducing systems, at the least those of a mental or societal nature. Furthermore, and according to Bateson, the human-ecological system is one as well. The recursive system is kept together by information exchange between the parts of the whole. In that sense the recursive system is a true holistic system that depends on the interconnection of the parts. An example of a recursive system could be mythomania, in which the mythomaniac increasingly has to come up with a falsehood that is even more elaborate in order to maintain the whole situation. The structure of the recursive system tends to increase in complexity over time, as well as the feedback of earlier information inputs is often distorted, amplified or changed. The conclusion is that even a minor information error escalates and could after some time disconnect the coupled parts in the systems structure, which most likely causes a breakdown.

Consequently, an ecological recursive system is kept together by a symbolic mass - tradition, knowledge, myths etc., which truly is an "epistemological phenomenon", as Bateson would have put it.[2] Bateson argues that the "immanent threat of ecological disaster is a product of epistemological error", and worse; "the apathy or addiction which makes it difficult, perhaps impossible, to meet this threat with appropriate action, is likewise a product of epistemological error" (Harris-Jones 1995, p. 169).

A traditional ecosystem is said to collapse when the budget of energy is emptied. Naturally, a Batesonian ecosystem does that as well. However, before that, the quality of energy is *decreasing* and the complexity of the system structure is *increasing*. This results in and is a result of changed or disconnected information

structure (Harries-Jones 1995, p. 169). Hence, there is a chance of tracking a collapse even before the system has collapsed. Ecological understanding must be ecological.

It is this ecological understanding that makes Bateson relevant. A human ecosystem has collapsed long before it is made evident in the physical world. It is values, systems of symbols and cosmologies that change or damage the environment. This is why a change in a human ecosystem could be interpreted as an epistemological change, a change in man's dialogue with the surrounding world. The ecosemiotic consideration relies upon the interpretation of structure and structuration, cultural classification and valuation, rather than systemic and generalistic explanations.

The levels of reality

The Swiss geographer and human ecologist Dieter Steiner has lucidly presented the human-ecological field of research as a triadic system (Fig. 1). In spite of the model's simplicity it very well describes the complexity of true transdisciplinary human-ecological research.

The triangle consists of three levels of reality: (P)erson, (S)ociety and (E)nvironment. These entities relate to different traditional sciences, the intrascientific roots of human ecology: psychology (P), sociology and cultural anthropology (S), and geography and biology (E). Steiner's notion (P) is divided into three levels according to different modes of consciousness described by Anthony Giddens (1986). The triangle is chained up by three recursive systems: (P-E), (P-S) and (P-P). According to Steiner, the systemic relation between Society and Environment is not recursive, it is rather a coupling of a structural nature (Steiner 1993, pp. 56 f.).

Steiner points out that if ecological crises really are human phenomena, the P-S recursive system has to be of the utmost importance as a human-ecological study. In order to investigate this relation, he finds Giddens' theory of structuration to be the most suitable one (Steiner

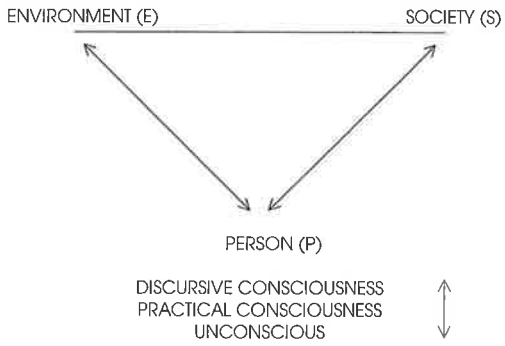

Fig. 1. Steiner's human-ecological triangle (after Steiner 1993, p. 57)

1993, p. 57). This it understandable since Giddens has chosen a recursive view, in which his "duality of structure" plays a superior role (Giddens 1986, p. 19). Accordingly, the individual (P) designs his or her social structure (S) and simultaneously the social structure structurates the person. In this case, I do not intend to conduct any profound investigation of the Giddensian body of theories, although I want to stress his theoretical significance when it comes to people-environmental issues. In the following a brief consideration of three theoretical aspects will be put forward: his comprehension of consciousness, his dualistic notion of resources and the relationship between people and space.

The constitution of consciousness could, according to Giddens, be divided into three general levels: the *discursive*, the *practical* and the *unconscious* level. The highest level is discursive in the sense that the person, or agent, now is aware of what he is doing and verbally can express his thoughts and action. On the other hand, practical consciousness cannot be mediated through words or other media; it depends on practical knowledge or individual gifts, for example, how to ride a bicycle or to have absolute pitch. The practical level is most relevant in terms of understanding people's action and structuration. The lowest level is the uncon-

Table I. Resources in a broader perspective (after Giddens 1986, p. 258).

Allocative Resources	Authoritative Resources
1. Material features of the environment (raw materials, material power sources)	1. Organization of social time-space (temporal-spatial constitutions of paths and regions)
2. Means of material production/reproduction (instruments of production, technology)	2. Production/reproduction of the body (organization and relation of beings in mutual association)
3. Produced goods (Artefacts created by the interaction of 1 and 2)	3. Organization of life chances (constitution of chances of self-development and self-expression)

scious, which can be associated, for instance, with a person's motivation. This level is the hardest to trace without going more deeply into the domain of psychoanalysis (Giddens 1986, pp. 5 ff.).

Obviously, environmental sciences, and modern times in general, have favoured discursive consciousness and explicit knowledge as a source and guide in environmental questions. Could that be one of the epistemological errors that Bateson points out?

The notion of resources is essential in a human-ecological study. From this perspective, a broad and flexible use of the term is needed. According to Giddens, two different types of resources could be defined, which encompass both power over nature and power over people and body, see Table I.

Hence, resources could be of a non-material nature as well as a material one. Without investigating this part thoroughly, such a holistic view is perfectly applicable in research into long-term human ecology.

Giddens' geographical considerations are of great interest as well, especially his concept *locale*. This refers to the setting of human-environmental action, wherein not only physical geographical aspects are considered, but also social and mental meanings. A *locale* describes a person's, or a group's, relation to a certain spatial-temporal domain, and as an analytic instrument the concept could easily be coupled to a spatial human-ecological project. Giddens writes about the constitution of the *locale:*

> "The conduct of an individual's day-to-day life entails that he or she successively associates with sets of entities emanating from the settings of interaction. These entities are other agents, indivisible objects (solid material qualities of the milieu of action), divisible materials (air, water, minerals, foodstuffs) and domains. Domains refer to what I prefer to call the regionalization of time-space: the movement of life paths through settings of interaction that have various forms of spatial demarcation (Giddens 1986, pp. 115 f.)."

Worldview and Worlduse; some archaeological implications

In order to convey a combination of the theories fragmentarily described above, the archaeological record has to be looked upon somewhat differently. Rhetorically, there are only two kinds of environmental-archaeological projects. On the one hand there is the investigation primarily focused on the artefacts, then turning to the outer context, the *landscape*. On the other hand, there is the investigation that starts in the landscape, and secondarily searches for artefactual knowledge. Here a well-known problem is evident: focus is combined with fuzziness. Turning foci, or jumping between levels, means losing the ability to trace the outer couplings between persons, things and environment. The whole is a whole. A more integrating and contextual view is desirable.

Consequently, a long-term archaeological study could try to confront the question: *how have human beings worked and* used *their world?* This might be a fruitful approach since it considers a variety of presumptive source materials. Another advantage is that a notion of *Worlduse* could immediately be coupled to the notion of

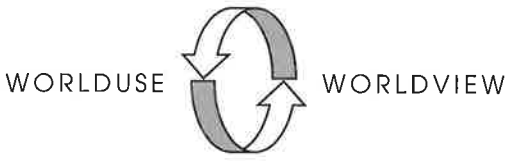

Fig. 2. The Worldview–Worldluse recursive system.

Worldview, in accordance with an ecosemiotic view. Together these entities, the *view* and the *use* of worlds, could be seen as an abbreviation of man's recursive ecosystem.

If trying to work archaeologically with the changes in worldluse in the past as the main goal of description, a great variety of scientific approaches has to be considered. Accordingly, the scope of archaeological source material has to be wide. Here the general human-ecological perspective described in this paper helps us, and again, the resource theories of Giddens are of great importance. Diagrammatically, this somewhat utopian view could be presented as in fig 3.

In my perspective, the transdisciplinary approach expands the archaeological record. Together with the investigations of both physical, social and mental resource patterns it helps us to create a contextual and interpretable unit of raw material, artefacts and landscapes. In the following I would like to address that specific task a bit more thorough and on a more practical level. To understand and capture the change of allocative and authoritative resource patterns, one has to analyse at least three closely affined domains of archaeological patterns - spatiality, temporality and materiality. Briefly, a human-related approach is put forward as some first tentative methodological steps towards a more integrated and encompassing vision.

The spatial domain; from the home to the edge

We live our space, the events of our life *take place*, the geography of our lives is both real and imaginary. There are well known places, and there are more or less unknown places (even though there really aren't any *totally unknown* places in the life-world). As an analytical background for a long-term archaeological study I would like to set forth three different, yet overlapping, levels of space:

- The Home(s) [Hemmet(en)]; the area where one lives ones day-to-day life.
- The Neighbourhood [Trakten]; the well-known area in which the society acts.
- The Known World [Den kända världen]; the spatial totality, the setting of direct or indirect interaction.

The three levels of spatiality are filled with different routines, rituals and traditions. Through movement in space these different settings confront and influence each other. As a main goal, we could try to capture the reciprocity and the relation between the different parts of the analytical room. The benefit of such a course of methodological action is that it allows us to evaluate every society's environmental structuration as unique. It is most probable that separate societies structure their space differently; e.g. a nomadic society vs. an industrial society. The extension of the Home might vary, as well as the size of the Known World. This variation ought to be detectable in an archaeological time perspective. The long-term study

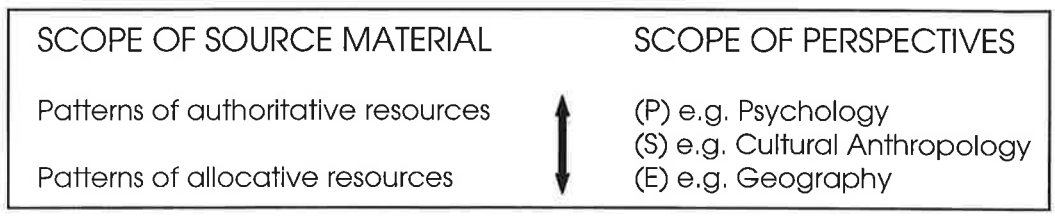

Fig. 3. The ecological-archaeological research strategy.

then could give us an animated picture of how the spatial levels both expand and contract over time. Truly, this is an important sign of how Worlduse is cultural-specific, rather than temporally determined; i.e. following the "evolutionary schedule".

The temporal domain; from event to myth

The transformation of a society's symbolic mass and the changes of Worlduse are closely related to communication with other cultural identities. Here, a spatial and synchronic study is needed. Besides that, the temporal situation is of great importance, or rather, the *diachronic* structure of society has to be reflected on. As well as space, time is also a communicative interface and contact surface between different societies. In order to convey an archaeological human-ecological long-term study, the past in the past has to be considered. Three interwoven classes of past time might be useful:

- The *direct* past; the space of time which a society knows and experiences. The direct past is confirmed within actual events.
- The *indirect* past; the past time which a society embodies in their history, but haven't any living experiences of. The reuse of past monuments, sites and places could be one of example of this class.
- The *mythical* past; The past time, which is mythically explained. Here, cosmologies and beliefs are a profound theme, even though, landscapes and monuments play a significant role as well.

It is obvious that these different aspects of the past tangent each other. The past is rapidly after the event circumscribed due to the society's other preferences. In addition, one can suppose that the past forms our real-time apprehension, and accordingly, it animates and dresses our view of coming times. Long-term archaeology should gain a lot if an explicit perspective of the past in the past is adopted towards the archaeological record.

The material domain; some classificatory consequences

The material domain is the only clue for giving us an archaeological insight into how past people has used their worlds. In compliance with the spatial-temporal analytic scheme discussed above, material culture has to be looked upon in a somewhat unusual way. A gradual and monistic approach is proposed.

First, the difference between natural features and man-made objects has to be played down. Material culture does not have to be elaborate. On the contrary, the notion material culture encompasses everything from landscape features and monuments to raw material and technologically complex artefacts. The distinction between nature and culture is in this sense meaningless, what we deal with is rather a *material corpus.* The important thing is to understand how people due to cultural values use particular properties of the world in order to accomplish implicit or explicit goals, not to divide the prehistoric world into cultural and natural phenomena.

Secondly, it implies a different archaeological taxonomy of material culture, and truly, this is the hardest part. However, there are some aspects on this pre-mature stage that deserve to be presented. In a first attempt to attain a worlduse-related classification of the material corpus in separated archaeological contexts, it might prove useful to focus on anomalies and "border-line material culture" in the archaeological record. When studying a settlement or settlements, the variety and quality, presence or abundance of the following categories could serve as a starting point for further evaluation:

- *Non-local vs. Local* material culture.
- *Anachronistic* (re-used) material culture.
- *Natural* (not man-made) material culture.

Obviously, the characteristics of these material categories are connected to the spatial-temporal analytic scheme. The intentions are quite clear: through a monistic view on materiality, and together with human-related spatial and temporal analyses, archaeology at least could try to approach a more holistic mode of operating. In turn, that will gain and broaden the general field of human ecology, which, and without any exaggeration, is quite essential.

A critical conclusion; the summer's flowers or a botanical record?

There is no exact purpose to this article. I have tried to put forward some theoretical and methodological starting-points for a prehistoric *human*-ecological research. Another intention was to broaden the ecological concept and to blur the boundaries between artefacts and landscape, between nature and culture.

As I see it, interdisciplinary or general human ecology ultimately is an internal critique of modern civilization. It's a science that defies science as the true measure of truth. It openly resists believing in discursive knowledge as the only available knowledge to solve environmental problems. Hence, human ecology willingly admits that our scientific worldview is nothing more than a cosmology, a myth and a cultural explanation as good as any other. Science does not contain any *truths*, only *adequate descriptions of reality* (cf. Hornborg 1996, pp. 48 f.). To correct the epistemological error of environmental thinking, we have to reconsider the concept of nature and culture, and how the two halves of the whole interact. Archaeology might help us here, as well as other anthropological research. Saying this, I do *not* believe it was better before modern times; on the contrary, environmental disasters most likely have existed throughout the history of mankind. The trouble is, problems are now global and unavoidable.

This human-ecological perspective, with its monistic consideration of nature and culture as a unity together with a "subjective" approach, could easily be *mis*interpreted in terms of romanticism, primitivism and non-intellectualism. To let nature inside of culture, and in addition call objectivity and positivism into question, doesn't fit all. In the book *The Edge of Objectivity*, the historian C. C. Gillispie expresses his attitude towards this "pathetic theme" and declares that this is "the science of those who make botany of blossoms and meteorology of sunsets" (Gillispie 1960, pp. 199 f.).

However, here our opinions diverge. I would say that it is only through the blossoms and the sunsets that we can learn to see the world as we see it.

Acknowledgement

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The archaeological thoughts about spatiality and temporality has evolved through some intense discussions with Peter Skoglund, Smålands Museum, concerning Neolithic and Bronze Age settlement and grave patterns in Småland. Consequently, the ideas are as much his as mine.

And finally, David de Léon at the Department of Cognitive Science, Lund University, has helped me more than he knows.

Notes

1. Recursion refers, as Maturana and Varela very simply point out, *to a process that operates on the product of its own operation* (1992, p. 259). This means that a recursive function, or a recursive system, is incalculable or unpredictable.

2. Bateson writes: "Epistemology – A branch of science combined with a branch of philosophy. As science, epistemology is the study of how particular organisms or aggregates of organisms, *know*, *think* and *decide*. As philosophy, epistemology is the study of the necessary limits of, and other characteristics of the processes of knowing, thinking and deciding" (Bateson 1979, p. 246).

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