

Ecology + Anthropology = Ecological Anthropology?¹

Balázs Borsos

Institute of Ethnology, RCH, Hungarian Academy of Sciences, Budapest

Abstract: An attempt is made to summarize the emergence and evolution of a sub-territory in anthropology, namely ecological anthropology. First the name of this discipline is considered, that deals with the interrelationship of culture and nature from cultural ecology to human ecology concluding to ecological anthropology. Here the word ecology appears in an attributive compound suggesting that it is a field of anthropology using ecological concepts as well. The second part of the article provides a brief history of the discipline from the beginnings (determinism, possibilism) through the emergence of the cultural ecology theory by Julian H. Steward and the work of neo-evolutionists (White, Sahlins, Harris), to the most ‘ecological’ investigations of the neo-functionalists (Vayda, Rappaport, Moran) who introduced the use of the category ecosystem in their research. The latter concept is analysed a bit more in details, mainly with the work of Roy Rappaport in the focus. The third part presents the different approaches of the last 30 years, ranging from environmental history up to radical ecology. It emphasizes the importance of ethno-science and cognitive anthropology, which appear in ecological anthropology in the fifties (Conklin) and flourish up today. Finally the process of ‘sacralisation’ of the research in ecological anthropology is outlined, namely the emergence of spiritual ecology and the investigation of traditional ecological knowledge which can help in resources management of the modern world just as well.

Keywords: ecological anthropology, evolutionism, ecosystem concept, ethno-science, spiritual ecology

The recognition that culture as a whole and its partial phenomena can not be studied and interpreted in their full entirety without taking the natural environment into account has emerged in scientific theories dealing with human societies long ago. In the light of earlier research almost no one questions the fundamental assumption that culture and environment interact. The real problem lies in the nomenclature, categories and methodological apparatus which are used to study this connection. Whether the tools of cultural anthropology dealing with human culture are used, remaining thus within the

¹ The article is based on the book by the author entitled *Elephant on the Bridge*. 2004, Budapest: L’Harmattan.

territory of anthropology, or using the toolbox of the other component of the relationship, a natural science discipline studying the natural environment, ecology, the boundary area between ecology and anthropology is covered, assuming all the consequences of the 'border violation' between scientific disciplines. Practice shows that since the 1920s and 1930s anthropologists and researchers of related disciplines tend to use more the categories and methodology taken from biological ecology for the purposes to describe the relationship between culture and environment (NÁNÁSI 1992:71).

THE USE OF THE NAME ECOLOGY IN ANTHROPOLOGY

Although there are some ecologists, who – whenever their science is talked about, try to avoid any kind of attributive compounds (DARVAS 2000:35), practitioners of ecology are sometimes unable to meet these expectations, given the fact that this scientific discipline can be divided into lesser fields. The denomination of these partial fields reflects the conventional division of biology on one hand (plant ecology, animal ecology), and the organisation level of life the object under investigation constitutes on the other (population ecology, community ecology, etc.). These disciplines however all stay within the area of investigation covered by ecology, therefore the attributive compound is more or less justified. This is the reason why the practitioners of this scientific field feel offended by any kind of such 'border violation' when the ramification of another scientific discipline approaching to ecology applies an expression where ecology is not the attribute but the word qualified by an adjective. Such a border violation can be committed by a discipline of natural sciences just as well, for instance when ethology, studying the environmental aspects of animal behaviour beyond the organisation level of individuals, calling this area of the studies behavioural ecology (CSÁNYI 1994:23).² You have to admit, however, that social sciences go astray to 'forbidden waters' more frequently. Since it is most expedient for each branches of science to start clean-up at its own doorsteps. Let's see anthropology! The field within anthropology which studies cultures and their natural environments as a whole in their mutual interactions, that is in an ecological approach, can be called – in a way which can give cause to less critical remarks and describing the discipline more precisely – ecological anthropology.³ Although this term is most wide spread within anthropology, it is still far from being a general expression. Just a few clicks on the world wide web and it turns out that a number of departments and courses teaching ecological anthropology bear the names of cultural ecology, human ecology or social ecology. The problem with these denominations is that in spite of being social sciences they encroach on the property of a branch of natural sciences while not admitting that they were actually parts of anthropology. Additionally, most of these terms and definitions are used by other scientific disciplines such as sociology, politology, environmental economy, what is more even some provinces of biology bear often the same title. The denomination human ecology is particularly popular: disciplines standing quite far apart from each other claim its use for themselves.⁴

² See also DAVIES – KREBS – WEST 2012, and BARTA – LIKER – SZÉKELY 2002

³ See for instance the title of HARDESTY 1977.

⁴ For more information on the use of names see BORSOS 2004: 19–26.

If, in the spirit of what was said above, the name of ecological anthropology is seen as most appropriated for this discipline, the issue of name usage was solved only in the first round, anyway. During the approximately fifty years long history of the ecological anthropology in the narrower sense a number of smaller provinces and branches were set up within this field and at the borderline of other scientific fields, the denomination of which raised the old problem again: the inadequate use of the word ecology. It seems however that to identify all of them depletes human linguistic ingenuity and ecology has to put up with the fact that social scientific and anthropological approaches dealing with the set of relationships between man and the natural environment, but using the aspects and approached of other scientific branches will be given names in which the word ecology appears in an attributive compound, and which identify the original ecological discipline for the purposes of making the distinction with the name of biological ecology (SPONSEL 1997a:138).

You can only talk about ecological anthropology, that is the research of the system of interactions between man and the natural environment from the mid-20th century only. Benjamin Orlove breaks down the period reaching up to 1980 into three parts in the history of the discipline: according to him, the first one is characterised by the work of Julian Steward and Leslie White (1940–50s), the second is termed neofunctionalism and neoevolutionism (1960–70s), while the third one is called processual ecological anthropology, which is characterised (among others) by the research of historical processes, as opposed to synchronous studies (1970s) (ORLOVE 1980:235, 237). He himself admits, however, that these can only be seen as major trends and the three approaches still existed side by side as late as in 1980 (ORLOVE 1980:246).

THE BEGINNINGS

The fact, however, that research with an ecological eye has only become significant in the second half of the 20th century, does not mean that nobody was interested in the relationship of man with his natural environment before. Research before Steward was characterised by two opposite views: one claimed that natural environment defines cultural features specifically (determinism), while the other argued that it merely provided the framework and the opportunity for the existence of human culture, and does not influence it, or maybe it merely excludes the emergence of certain cultural factors (possibilism).

The very first known appearance of the thought of environmental determinism was the humour theory by Hippocrates. In his views the ratio of the various moistures in the human body, which defines the character of the given person, depends on the climate. Consequently, Plato and Aristotle argued, the environment would also determine governance, moderate Greece favouring democracy, and the tropical climate dictatorship. Montesquieu extended this determinism to religion as well – picking out Christianity as it was ‘revealed’ –, claiming, that religions based on passivity (such as Buddhism) and on aggressiveness and individual activity are spread in hot climate and cold climate, respectively. Environmental determinism was revived in the 19–20th century as a response to the technical determinism represented by Marxism and the main cause of its popularity felt even up to day is – according to Donald Hardesty – that it represented a good and easily applied means to categorise human variability (HARDESTY 1977:1–3). The first attempt to

explain ethnographic and cultural differences was made by Friedrich Ratzel (1882–91) with the help of geographic factors (BARGATZKY 1986:24), even though the Ethnology Society founded as early as in 1839 in Paris (*Société Ethnologique de Paris*) called the attention in the research instructions issued to the connections between social life and soil or climatic conditions (SÁRKÁNY 1979:564.). The unilateral cause and effect correlation emerges even in the works of authors from the 20th century, although they already don't deny the existence of cultural impacts.⁵

The set of views summarised as possibilism appeared as a response to geographic determinism and has become widely accepted mainly in the 20th century, which has grown out of the historical particularity school by Franz Boas, who derived the origin of cultural traits from historical impacts as opposed to the environment, although he did not deny the limiting and modifying role of the environment. This concept played a substantial role in determining the cultural areas of North America (the works by Mason, Wissler and Kroeber), which approximately matched the botanical regions of the natural scientists. A significant problem of the cultural area theory is that it proved to be difficult to apply it outside of North America (BARGATZKY 1986:25). The most famous example on the limiting role of the environment was described by Kroeber (1939) in relation to his investigations how corn farming was propagated. This plant can only be grown where there is at least four months for the vegetation period during which time rainfall is sufficient and no killing frosts occur (HARDESTY 1977:4). The British scientist Daryll Forde (1934) can be regarded as a possibilist and a critic of the cultural area concept, who wished to put the emphasis on the study of small cultural units instead of large areas, investigating them both in terms of history and relationships (ELLEN 1979:4). Striving for such a complexity however triggered critiques: such an attitude may only result in the end in a conclusion that 'causation is not simple' (VAYDA – RAPPAPORT 1968:483).

STEWARD, WHITE AND NEO-EVOLUTIONISM

Though the ecological nomenclature appeared in the writings of the scientists belonging to the urban sociologist trend known as the Chicago School as early as in the 1920s (PARK – BURGESS – MCKENZIE 1925.), this trend did not have any substantial impact on anthropology. You can really talk about ecological anthropology only since the emergence of the cultural ecology theory by Julian H. Steward, which had to endure a lot of critique, yet has a significance which can not be by-passed. Unfortunately, he did not summarise the theory in a single major publication, it must be in fact gathered together by posterity from a number of different sources, even though two edited compendiums of his essays (STEWARD 1955, 1977) are available (SPONSEL 1997b:448).⁶ In his view it is true for any culture that the same environment would trigger the same adaptive processes, therefore societies in different environments may undergo different development paths, and though there are repetitive significant regularities, they do not necessarily appear everywhere.

⁵ The work by E. Huntington: *Mainsprings of Civilization* (1945. New York) is referred to by both VAYDA – RAPPAPORT 1968:480 and HARDESTY 1977:2.

⁶ A chapter from Steward (1955) was published in Hungarian in BOHANNAN – GLAZER 1997 (STEWARD 1997). So were studies of Harris (1997), Sahlins (1997) and White (1997).

He maintained that cultural ecology was a 'heuristic device', and he explained with this method the diversity of human cultural development which he called multilineal evolution, trying to replace the futile and unfertile assumption that culture emerges from culture (STEWART 1955:5, 36.). To facilitate the investigation and the comparison between cultures he introduced the concept of cultural core, which includes the phenomena related to the environment and subsistence. He also included political, social and religious patterns in the cultural core, provided their close correlation with the aforementioned factors can be demonstrated (STEWART 1955:37, 89).

According to him, cultural ecology may operate with three distinct methods: the study of interrelationship of exploitative or productive technology and environment, the study of the behaviour pattern evolved in the exploitation of a particular area and the research whether these patterns have an influence on the other aspects of culture (STEWART 1955:40–41). All this, according to him, needs a holistic approach (in other words, the culture as a whole needs scrutiny, ranging from the demography through kinship structures up to settlement patterns). The possibilities which may contradict his theory, namely that it might be possible to find cultures in a given natural environment which is seemingly not bound to it, or that different cultures may also be found in the same physical environment, he tried to bridge by introducing the notion of the level of sociocultural integration. "Cultural types, therefore, must be conceived as constellations of core features which arise out of environmental adaptations and which represent similar levels of integration." (STEWART 1955:42).

The most important objections against Stewart's theory were the following: the significant correlation between the cultural trait and ecological adaptation can not be proven; it can be questioned that a trait will emerge 'inevitably' due to the causing environment; you can not always prove the unidirectional (coming from the environment) impact in the case of a cultural phenomenon; he only took account of the technological adaptation and other cultural features were attached to it, although it is quite certain that for instance religious adaptation can also be developed upon a certain environmental impact; he disregarded environmental factors beyond the scope of self-sustenance (such as diseases); he also ignored the potential of genetic adaptation (VAYDA – RAPPAPORT 1968:485–488); it can be raised that there are some general cultural phenomena which appear in each and every human culture, irrespective of the environment they are developing in (language, prohibition of incest), and in the theory of Stewart the phenomena which belong to the cultural core are not defined accurately enough, what is worse, their importance and hence, their taking into account depends partly on the efforts of the research (SÁRKÁNY 1979:565). Mihály Sárkány faced the theoretical foundations of Stewart with the characteristics of the patrilineal band – investigated by the American scientist himself – in two studies (1979, 1984–85). Mainly through the analysis of the examples taken from the Australian Aborigines, the hydraulic hypothesis by Wittfogel and the 'Asiatic mode of production' Sárkány also detected that the technological determinism held by Stewart impedes the success of his own actual investigations just as well, and in fact the theory of Stewart on culture is not followed by many ever since (SÁRKÁNY 1979:569).⁷ Yet his oeuvre – partly just because his views tended to provoke debates – had a fruitful impact on the

⁷ For further critiques see also CLEMMER et al. 1999.

research efforts in the 1960, and 1970s, and practitioners of ecological anthropology came all forward from Steward's hat.

According to Benjamin Orlove the first level in the development path of ecological anthropology beside Steward is represented by the works of Leslie White (1943; 1949). In White's opinion the comparison and monitoring of the development of cultures can not be accomplished due to their diversity, therefore the focus should be put to the explanation of the development of the human culture as an integral whole. With this standard White looked for a factor to characterise cultural evolution which can be quantified and is not tied up to culture. He found it in energy, which is a key factor in ecological assessments ever since. White associated evolutionary stages with efficiency in energy consumption, where quantum leaps are represented by the exploitation of animal and natural energy using simple machines, later on the depletion of fossil fuels and energy carriers, and in the most recent period the use of radioactive processes for the purposes of power generation.⁸ Though there are only a very few people who would deny the importance of the changes related to the form of energy use in human history, White's theory was of course exposed to substantial critique due to its simplifying, exclusive nature (APPLEBAUM 1987:202).⁹ The so called 'unilinear evolutionism' by White almost necessarily produced the reaction in the form of 'multilinear evolutionism' created by Steward, which however also considers the advancement of technology as the driver of evolution.

THE 'NEW WAVE' OF EVOLUTIONISM

Provided the first generation of social scientists inspired by the dogmas of the Darwinian evolutionary theory (Spencer, Morgan, Tylor) are called evolutionists, the great reformers of the theory suppressed during the activity of Boas and Malinowski (Steward, White) should be called neo-evolutionists.¹⁰ Therefore, in the same spirit, any scientist emerging after them is rather called to be a representative of the 'New Wave' of evolutionists, as opposed to Orlove who call them neo-evolutionists.¹¹ The first step was made by the young Marshall Sahlins when he tried to reconcile the multilinear and universal theories of evolution and created the theory of general and specific evolution. General evolution is the tendency of cultural and social systems to increase in complexity, organization and adaptiveness to environment. While the road travelled by each of the cultures (history at Kroeber, multilinear evolution at Steward) is supposed to be specific evolution (SAHLINS

⁸ See in particular WHITE 1949: 368, 381–382, 386–387.

⁹ The argumentation set forth by White is contradictory in itself, since he states as a postulate that "culture evolves as the amount of energy harnessed per capita per year is increased, or as the efficiency of the instrumental means of putting the energy to work is increased" (WHITE 1949:368–369). Obviously these two is taken into account by him the same extent, yet his conclusions state primarily the improvement of energy efficiency as the key driver behind evolution (WHITE 1997:381–382). See the refutation of White based on empirical data in Rambo 1991.

¹⁰ However, scientists thus 'ear-marked' have always protested against this adjective, White stressed that he merely acknowledges the general evolutionist attitude of the 19th century as his own. (SAHLINS 1960:42)

¹¹ These researchers are called neo-neo-evolutionists by Mihály Sárkány (in consent with Péter Somlai) (SÁRKÁNY – SOMLAI 2003:20). On my behalf, I believe this term is a little bit clumsy.

1960:43). From the perspective of ecological anthropology it is worth noting the while Steward considered natural impact factors as environmental actors, SAHLINS expanded this category to the social-cultural environment just as well (SAHLINS 1964:134).

Uniting (neo-)neo-evolutionists with neo-functionalists by Orlove, is substantiated by the work of Elman Service (1962; 1975). The political evolutionary typology introduced by him (and applied widely ever since) (band – tribe – chiefdom – state) is based on functionalist foundations, because he maintains that the emergence of each stage can be derived of their higher functional efficacy.¹² Ecological approach returns in conjunction with the conflict theory and the environmental factor in the short work by Robert Carneiro (1970), which however made a considerable stir. He thinks political development is influenced by population pressure and the war of cultures. Peoples which are deprived of migration possibilities (for instance the dwellers of the Nile valley in the grip of the Sahara) are dominated by other groups and as a result, the political regime is reinforced and its complexity grows. Though Marvin Harris is reckoned as a neo-functionalist, and by the establishment of the set of tools of cultural materialism wanted to fund an explanation mainly to peripheral cultural phenomena which could be interpreted with difficulties only (HARRIS 1979), he also left his print in evolutionary theory (HARRIS 1977): in his views technological advances were not seen in most societies as the sign of progress, on the contrary, they were resisted, since operation of the new techniques required more time and a higher input of human efforts. According to him cultural evolution is driven by population pressure and consequently the resulting deterioration of the environment, because sustenance of a larger population inevitably requires new and more efficient technology. However, a new technology allows further population growth and additional deterioration of the environment, therefore humanity gets in a circus vicious in the course of the changes called development. It is difficult not to notice how much the central issue of Harris' theory matches the phenomenon called Type One error by modern systems theory, which claims that any alterations accomplished in the partial systems (in technology, in the present case) generate system level (i.e. holistic) changes in the system which can be parried only by further, even more severe technological manipulations which however remain effective for an even shorter period of time (BORSOS 2002:54).

NEO-FUNCTIONALISM – THE SYSTEMS ECOLOGICAL APPROACH

According to Orlove the second epoch after Steward and White was characterised by the work by neo-functionalists beside that of neo-evolutionists. While neo- (and still more neo-) evolutionists maintained that the key issue was the origin of the state, the civilisation and the culture,¹³ neo-functionalists have seen functional adaptation of society and culture to the environment as the most important issue because according to them this adaptation allows functional adaptation of society and culture to the environment, and through this adaptation exploitation of the environment will become possible. Orlove listed cultural materialism – hallmarked with the name of Marvin Harris – as part of neo-functionalism as well. The other branch of neo-functionalism (with the emblematic figures of Andrew

¹² Cf. SANDERSON 1997:175.

¹³ See also e. g. FLANNERY 1972, FRIED 1967.

P. Vayda and in particular Roy Rappaport) is referred to more frequently as systems (ecological) approach due to the strong foundations in biological ecology (SPONSEL 1997a:137).¹⁴ The application of the methods and categories set up by biological ecology thus takes a central position in the toolbox of these researchers. They used population instead of culture as the basic unit of their studies, while the social and cultural system was investigated in a manner analogous with the study of ecosystems. The focus of their research was the measurement of energy flows, assessment of the carrying capacity of the area, and the explanation of the associated cultural responses and phenomena. Cybernetics as the science of self-sustaining systems was held by them in high esteem, because culture was regarded as such, where the various cultural phenomena play the role of negative feedback loops which help maintain the self-regulation of the system (APPLEBAUM 1987:204–205). An important feature of these studies is that cultural traits in maintaining equilibrium were taken into account as non-conscious components.

The specimen copy of the anthropological works based on systems ecology is the book by Rappaport entitled *Pigs for the Ancestors* (1967). The author sees the tribe under investigation (Tsembaga Maring, New-Guinea) in conjunction with their natural environment, in other words he analyses cultural and non-cultural components in a single system. The complex system is maintained by a ritual (called *kaiko*), which regulates dynamic equilibrium in a manner analogous with the natural eco-systems by negative feedback loops. When the study unit is determined, Rappaport initially by-passed the rule set by the system ecological approach, because he did not take biologically correlated populations as a basis, but congregation, a concept developed by the science of culture, which is determined as a collective of individuals who reach their common welfare by joint ritual acts. Namely, congregation in this present case is exogamous, that is it can not be seen as a local population. Therefore he maintains that it was expedient to set up the category of regional population as well, which is the collection of local groups living separately in distinct areas but holding connections with each other. This study unit is finally called by him ecological population and he tries to define it ecologically and culturally alike, how the ritual sustaining the system regulates the connections between the congregation and the environment and how collective welfare of the members is achieved and how the organisation of the society is nourished further (RAPPAORT 1967:1–7).

Naturally, the system ecological approach was exposed to a lot of critics. Four of them were considered by the colleague of Rappaport, Vayda (together with McCay): “its overemphasis on energy, its inability to *explain* cultural phenomena, its preoccupation with static equilibria, and its lack of clarity about appropriate units of analysis” [VAYDA – MCCAY 1975:293 (emphasis in the original)]. In order to improve the system ecological approach, Vayda and MacCay suggested the introduction of the concept of homeostasis enduring larger fluctuations instead of a static equilibrium and the taking into account of ecological factors influencing both community and individual beside energy (VAYDA – MCCAY 1975:302). Most objections were received by Rappaport for the limitations of the applicability of his model, the difficulties encountered in defining the human populations and the negligence of the difference conscious and individual decisions make.

¹⁴ The term ecosystem was already used by (1935) in the 1930s (GOLLEY 1984:33, 1993:8).

Both the operational and the cognitive model were considered as needing further advancement (BIERSACK 1999:6; KOTTAK 1999:23–25).¹⁵

In the course of assessing the general issues related to human adaptation, Rappaport (1977) tried to unify all cultural responses given to environmental issues by highlighting the possibility of maladaptation or mistaken adaptation. This means a cultural response to the challenges of the environment which finally may lead to the elimination of the culture in question.

In the afterword written to the second, revised edition of the book *Pigs for the Ancestors* (RAPPAPORT 1984) (and a further revision thereof RAPPAPORT 1990) Rappaport acknowledged the methodological difficulties of defining the boundaries of ecosystems and populations, but he pointed out that the same difficulties are encountered in cultural delineation just as well. He defined the boundaries of a human ecosystem with the help of the cultural traits of that human group, emphasising, that this is not considered contradictory to the determination of a cultural or social unit, provided the latter also has a relative autonomy. In fact, no exact systems theoretically developed model exists for either the concepts of culture, social groups, or that of population, therefore the ecosystem concept is worth any of the other culture-explaining concepts. It should be also noted, however, that culture has overgrown the level of the most efficient behavioural adaptation, developing its own goals and values, cherishing itself, living for itself and by this it may destructs its own sustaining medium, the ecosystem (RAPPAPORT 1990:61–67).¹⁶

Science as a rule is unable to get itself rid of social processes. The fact that anthropological research of individuals and the role of decisions made by individuals in the 1970s and 1980s has become more and more stressed, can not be separated from the neoconservative approach to society, which reached its heyday at this time, just as ecological anthropology was strengthened again with the deepening of the general environmental crisis (RAPPAPORT 1990:69). In the 1960s ecological anthropology has not yet paid too much attention to the impact of individual differences in opinions and deviations between individuals and groups on the behaviour. Albeit the core of individual actions is determined by the generally accepted social principles, yet deviations from those principles exist. *Kaiko* is more or less the result of a community decision, but specific features of the war acts are already influenced by individual decisions (for instance by personal revenge). It is however important to decide when individual practices start to exert a change on the system (RAPPAPORT 1990:62–63). This idea came to the foreground in anthropology (not accidentally) at the time when biological research started to deal with the role of individuals in selection.

There were two extremes prevailing in the analysis of the role of individuals. One of the approaches claimed that the difference an individual can make can be neglected because the established practices are determined by the laws of the culture, while according to the other the culture is nothing else but the entirety of the choices and acts of individuals who follow their own selfish interests. And – although many scientists tended to accept the latter – you must not disregard the fact that self-interest is also culturally determined and hence, may deviate from the sheer material interest of the individual. Functional troubles of a society are always reacted upon by the group as a whole. Overstressing the role each of the players play may lead to disregarding the environment or to the assumption that it was a steady factor, by

¹⁵ See also FRIEDMANN 1974; FOIN – DAVIS 1987.

¹⁶ See also GROSS 1990:317.

which the fundamental concept of ecological anthropology is lost, that is the research of the correlations between the system and the individuals acts (RAPPAPORT 1990:67).

APPROACHES RANGING FROM ENVIRONMENTAL HISTORY UP TO RADICAL ECOLOGY

The nearly forty years passed since the publication of Orlove's work brought the flourishing of the most diverse ecological approaches. The processualist approach mentioned by him as the third epoch was developed over time into historical ecology, which also identified the relationship between man and the natural environment as its field of research interest, but instead of examining the adaptation strategies applied to the given environment it put more emphasis on the assessment of the environmental transformation impact of human activities. Certain researchers such as William Balée (1994) apply historical ecology as an integrative discipline in order to allow a more comprehensive view to their scrutiny, integrating aspects of ethnoecology, biological ecology and political ecology in their processual framework as well (SPONSEL 1997a:138). Although the term historical ecology appeared in the Anglo-Saxon anthropology relatively early (BILSKY 1980), it was institutionalised in Europe as late as in 1986 only as a branch of the sciences of history (R.VÁRKONYI 1992:32). However, historical ecology in the English-speaking world heads to the direction of an integrative discipline just as it was raised by Balée (CRUMLEY 1994; BALÉE 1998), while the discipline dealing with the history of the environmental changes taken effect as a consequence of human activities is called rather by the term environmental history (SPONSEL 1999:5).

Of the novel ecological approaches, the closest to life sciences is behavioural ecology, in the sense as well that this approach makes efforts to comply with the strict set of conditions applied to scientific experiments (repeatability, quantitative methods, etc.). The theoretical basis for the research in this segment is provided by the theory of biological evolution, focusing mainly on material analysis (for instance, a cost-benefit analysis is carried out in terms of the energy spent on bringing the prey down and gained from its eating). Since according to the currently accepted view in biology selection affects individuals only and no group selection exists (CSÁNYI 1999:35–37),¹⁷ behavioural ecology also sees selection more at the individual level and from the perspective of reproductive success.¹⁸

Although the term environmental anthropology is also applied to replace ecological anthropology, it is more a kind of applied science according to its more generally accepted definition: “the use of anthropology's methods and theories to contribute to the understanding of local or global environmental problems” (TOWNSEND 2000:106). Since its objective is to offer solutions, it does not apply anthropology exclusively: the approach is receptive, using a number of scientific aspects, its area of investigation depends almost on the composition of the research team (MORAN 1996:383, 386–387).¹⁹

¹⁷ It is worth noting that certain more recent theories see the omnipotent role of selection a bit more distinctly, calling the attention on the importance of symbiosis (MARGULIS 2000).

¹⁸ See for this Smith-WINTERHALDER 1992; and in Hungarian BEREZKEI 2002.

¹⁹ See also MORAN 2000; 2006.

Due to the search for the solution it has similarly close ties with political ecology and the green movements just like spiritual ecology: the struggle fought with governments and multinational companies to preserve human, animal and plant habitats is substantiated by anthropological research findings. Attention is called to certain factors which have not yet been investigated by anthropological research too intensively: the dangers involved in exploiting the ‘underground environment’, that is mineral resources, the importance of biodiversity in preserving the health of individual peoples, and the role of environmental harms in the propagation of certain new diseases (TOWNSEND 2000:54–98). Environmental anthropology does not neglect the research of consumer society, either. The concept of ‘ecological footprint’ developed by Wackernagel and Rees (1996; 2001) is used to compare societies living with different self-sustaining modes, which represents the size of the area needed to sustain one person and to dissimilate the outcome of this person’s environmental pollution: this figure is 4–9 hectares in a developed society, while in India for instance it is 1.6 ha.²⁰ In other words, anthropologists extend their system of reference and scientists from other research areas use the special results of anthropologists (TOWNSEND 2000:103).²¹ The newest trends in environmental anthropology emphasize the applied side of this discipline: ‘it has an end goal – it seeks to find solutions to environmental damage.’ (KOPNINA – SHOREMA-OUIMET 2013:1) “The intensive study of human nature (...) can possibly bring out a healthier human-environmental relationship than is currently pursued in the name of consumption and economic prosperity” (KOPNINA – SHOREMA-OUIMET 2013:19).

The radical ecological approach of anthropology was developed mainly in the wake of the environmental movements of the 1960s, and 1970s by the 1980s. Its aim is seen by Carolyne Merchant in searching a new kind of image for society and a new form of ethic ‘of the nurture of nature and the nurture of people’ (MERCHANT 1992:1). One branch of this school is called political ecology and its followers started to get engaged in the study of the impacts originating from the social and societal environment of the native peoples, in particular threats from the state occupying the areas inhabited by the people in question (economic coercion, violent assimilation, ethnocide). Operation of these scientists inevitably meant a political espousal, therefore applied anthropology and action anthropology also emerged as part of their activities (STÜBEN 1988; MILLER 1993; STONICH 1993; LITTLE 1999). Feminist ecology started from the assumption that dominance of man over nature can be associated with the male-female relations of subordination prevailing in most of the societies. This trend focused on a so far neglected area of ecological anthropology: the role of women in the environmental ties of a given society (RODDA 1991; SHIVA 1989). Maybe the best known example to the environmentalist activity of women is the Indian movement called Chipko (‘tree huggers’) (TOWNSEND 2000:97). At the end of the 20th century signs were present that even postmodern thinking, which holds that everything was a mental construction only, may also appear among the trends having an influence on ecological anthropology. This method might bring in new results in the study of how a society created its own set of views about nature and the environment (SPONSEL 1999:8–9). Postmodern

²⁰ http://en.wikipedia.org/wiki/List_of_countries_by_ecological_footprint (Accessed May 28, 2017) Data from 2012, published in 2016. One and a half decade ago these figures were regularly at 4–5 and 0.38, respectively (TOWNSEND 2000:101).

²¹ See more recently SPONSEL 2007, and HAENN – WILK 2006, in particular part 7 (401–468).

critic of science might also encourage to use concepts, models, metaphors and methods borrowed from scientific disciplines other than ecology (DOVE 2001:99; 104).

The latter approaches lead us to the field of spiritual ecology and sacred ecology, partly because the recognition that ethics must not be neglected during scientific cognition and scientific studies is present in them. In the case of anthropology ethics must be taken into account from the perspective of both parties concerned with the research: it does not only determine the fundamental standing of the researcher, it is also involved as one of the aspects in the culture of the people under investigation. Sacred ecology stresses the fundamental recognition that traditional ecological knowledge was never a stand-alone entity, it always constitutes an integral whole with practice and beliefs. Sacred ecology finally tries to provide some assistance to overcome the positivist-reductionist methodology which currently dominates science by presenting and get accepted the world view of traditional societies and religions and their information on the environment as a supplementary factor to Western scientific cognition (BERKES 1999:176–177). Cognitive anthropology (the recognition of a society through the views about itself), ethnoecology and ethnoscience (assessment of the knowledge of a people about their own environment) and finally spiritual ecology provide help in this work.

COGNITIVE ANTHROPOLOGY AND ETHNOSCIENCE

According to the definition of cognitive anthropology it deals with the relation between human society and human thinking, studying how members of a community formulate factors of the surrounding world for themselves and what they think of them. The entirety of factors includes physical objects just as well as abstract intellectual constructions, in other words both a wildly grown plant and the concept on social justice (D'ANDRADE 1995:1). This way it can be seen as a part of cognitive anthropological research when it is studied how a people acquires knowledge on the surrounding world, which kind of opinions are formed about it, and how members of this people relate to the changes of this surrounding world.²²

Even though modern scientific world view differentiates among three distinct modes of recognition (science, religion, art) these three modes do not separate from each other clearly in a traditional society. For the purposes of easier identification and analysis, the study of the so called ethnoscience is usually distinguished. This distinction has the advantage that, based on the different fields of modern science, ethnoscience can also be divided further: you can study ethnohistory (how a people see and record their own history, their relationship to time), ethno-jurisprudence (traditional legal customs from the inside), ethnotechnology (tool-making from the view of the people in question) and a number of other 'ethno-disciplines'. However, the most researched branches of ethnoscience are natural sciences, and in particular life sciences. This is quite obvious as the study of ethnoscience was first inspired by ecological anthropology.

The level of development of these research areas – not surprisingly – also reflect the development trajectory of Western science. The first and foremost important thing is to

²² See also SELIN 2003.

be able to identify and call by their names of the living beings subject to the research (ethnobiology). This is followed by the examination of the functional relationships and systems of interactions between living beings, which also includes the assessment of the role of the people in question itself (ethnoecology) (BERKES 1999:37).

Even though studies of ethnobiological nature have happened for more than a hundred years,²³ proper research in ethnosciences emerged only in the 1950s. Since learning about the knowledge of a people is possible only after learning their language, initially systems of terminology were described and in this work linguistic methods for collecting and analysing data were used. Not by accident was this area occasionally called ‘ethnographic semantics’ (COLBY 1966). As a consequence, the most developed area of ethnoscience is ethnotaxonomy, the science of the classification system for animals, and most specifically of plants. Similarly to all other sciences, however, ‘people ahead of their times’ are found in this field as well: Harold Conklin, beside clarifying the classification system, outlined the environmental relations of the people just as well when studying the Hanunóo in the Philippines, thus he can be regarded as a forerunner to ethnoecological science. He did not only established that they are familiar with 450 animal and 1600 plant species, but he also clarified the thorough knowledge of these people on soil types (10 basic and 30 sub-categories), and on the weather, explaining how the Hanunóo were able to develop the swidden method into a complicated agricultural system sustainable on the long term with the help of crop rotation, the use of appropriate cultivation methods and the composition of the plant communities on the clearings (CONKLIN 1969:228–231). Compared to other systems based on monoculture, the clearing sown and planted with – ideally – a total of 48 plants representing the different levels of vegetation is almost like the diversity of the original native rainforest ecosystem.²⁴ Ethnotaxonomy provides help to modern science in the issue whether the taxonomy developed in the wake of Linnaeus does really fit the system existing in nature (GOULD 1980:207–208).²⁵ This is of course a double-edged weapon, conformance will mean a joint victory of the Linnaean and traditional taxonomy, but non-conformance – knowing science of our days – may easily lead to the negligence of the traditional taxonomic achievements. A part of the general regularities applying to ethnotaxonomy can be summarised following Fikret Berkes as follows: Knowledge on animals and plants in traditional societies covers primarily species important for themselves (food, medicine etc.). For really important species even a lot more detailed categories may exist, while those of lesser importance are simply consolidated. The higher the taxonomic unit (family, order, class), the less traditional and scientific systems correlate. Names are not standardised and may vary according to dialects or habitation areas, and whether they refer to a genus or a species,

²³ In his book *La pensée sauvage* [Wild thinking] Lévi-Strauss cites the work of D. P. Barrows entitled: The ethno-botany of the Coahuila Indians of Southern California published in 1900 in Chicago (Lévi-Strauss 1962:9). In this, the author describes that the Native Americans gathered not less than 60 edible and 28 herbal plants in their arid desert environment. However, the work by Barrows is also surrounded by mysteries. It is not referred by either Berkes, or the great figure of ethno taxonomy, Berlin, even though it could be regarded as a basic work, what is more, even Berkes quotes Lévi-Strauss only (BERKES 1999:38).

²⁴ Cf. GEERTZ 1969:8–9.

²⁵ The Hungarian version published under the same title (GOULD 1990), compiled from two collections of essays, the study expounding this idea is not included.

depends on the context. Traditional knowledge may be frequently different according to sex, women know mainly gathered, males hunted species. A given name usually has an additional meaning as well, which can only be interpreted in the context of the given culture (BERKES 1999:42–45).

In the analogy of academic sciences, the next area of ethnobiology ought to be clearly ethnophysiology after taxonomy. Yet, the research of traditional knowledge related to the life processes (autonomy, pathology, etc.) of grown and gathered plants, bred and hunted animals has never really appeared as an independent discipline, information related to such areas was integrated to ethnobiology, beside ethnotaxonomy. What is more, the widely accepted definition of ethnobiology (e.g. the scientific study of dynamic relationships among people, biota and environment²⁶ already approaches or goes even further than the definition of ethnoecology. This – based on the paragraphs above – might be formulated as follows: inter-cultural comparative assessment of systems constituted by knowledge, practice and beliefs concerning the factors of the living and non-living environment.²⁷

SPIRITUAL ECOLOGY, SACRED ECOLOGY

Thus, according to what was said above, spiritual or sacred ecology deals with the religious aspects of the set of connections with the natural environment, but it must be emphasised that this approach is nourished by neo-functionalism. Namely, the best known ecological anthropological investigations up to date which put the role of the religion in the focus in the course of the analysis of the set of mutual relations between man and the natural environment are still represented by the works of Roy Rappaport in New Guinea (1967; 1979; 1999), and by Marvin Harris on the sacred Hindu cow (1966; 1985). Both the material and spiritual aspects of the relationship between man and environment are stressed by Gerardo Reichel-Dolmatoff in the works written on the Tukano living in Columbia, in the Amazonas valley (1971; 1976; 1996; 1999), and this way his “elaborate and penetrating analysis comes closest to a holistic cultural and spiritual ecology” (SPONSEL 2001:189). The environmental relations of the Tukana consists of self-sustaining activities, myths, rituals and symbols jointly, and sustainable use of the natural resources is controlled by the community under the leadership of the shaman through different prohibitions. Richard Nelson highlights the spirituality of the approach the Koyukon (Athabascan) people in Alaska and Yukon to nature: they do not make a sharp distinction between man and nature, animals are considered living beings similar to humans, who relate to the world of the spirits, and their relationship is controlled by a complex system of taboos and rites (NELSON 1983). Deploying almost the entire toolbox of modern scientific research (multidisciplinary research team, computerised models, etc.) Stephen Lansing (1991) studied the system of rice growing in the island of Bali showing that how effectively a controlling mechanism based on religion is able to check natural processes. Based on these and on the studies by Berkes and others Eugene Anderson (1996) carried out a comprehensive comparative assessment and maybe he was the most successful so far in “providing a holistic and comparative anthropological synthesis of

²⁶ <https://ethnobiology.org/> (Accessed May 28, 2017).

²⁷ Which is also very close to the definition of ethnobiology by Eugene Hunn (HUNN 1996:451).

spiritual ecology” (SPONSEL 2001:190). The consolidation of the spiritual approach and its appearance in the research of culture-environment relationship as an equal party is indicated by the fact that while Rappaport and Harris were more materialistic in their approach, and Nelson was spiritualist (mentalist), Berkes and the three other scientists made attempts to take an integrative approach. Consolidation of the holistic approach is supported by Rappaport (1999) who moved towards the integrative attitude in one of his latest works (SPONSEL 2001:192).

Sacred ecology is assisted in achieving its great goal (that is, to promote the abatement of the environmental crisis by pooling the knowledge provided by traditional wisdom and religion) by innovations in approaches and methodology. Cognitive anthropology dealt mainly with creating cultural models, in other words it studied mental constructions through which a culture is able “to understand and predict the ways in which species interact with each other and with human perturbations” (KEMPTON 2001:59). Ethnoscience and ethnoecology (in Berkes: human ecology) tries to prepare the integration of natural and social systems, mainly in the course of the complex examination of ecosystems and the habitats of human groups, and by revealing the worldview behind the current strategies of environmental use and their research in a unified framework (BERKES 1999:51–55). Spiritual ecology helps this work by not being content with the position of ‘a transdisciplinary arena of academic research’ it has grown into a “social, political and intellectual movement” (SPONSEL 2001:193), making efforts first through conferences and later on by setting up organisations to find a common denominator in the fundamental principles of the various religions leading to an ethical approach to the environment. A manifesto of this efforts was the Assisi Declaration, signed by representatives of Buddhism, Hinduism, Islam, Judaism and Christianity in 1986 and joined later by the Baha’i and Sikh religions, as well as Jainism and Taoism (SPONSEL 2001:183). Selection of the location on behalf of the environmental organisation WWF (World Wide Fund for Nature), organising the Declaration and the conference, respectively, was a conscious one: when it comes to the re-thinking of its relationship with the natural environment, Christianity may draw mainly from the thoughts of Saint Francis and Saint Benedict (BERKES 1999:54).²⁸

Whether and to which extent traditional ecological knowledge and the ecological approach of religions are able to get integrated into the Western scientific system – which is predominantly responsible for the current environmental crisis – is an issue which remains to be seen. The case of traditional ecological knowledge is particularly questionable: while great religions will not disappear overnight, traditional societies are very perishable and they are kept alive in many cases only by the external and internal efforts exerted by the surrounding majority society and their members, respectively. A ray of hope might be derived from the fact, that – albeit complex traditional societies are not formed – sustainable long term resource management practices may still be developed through the recognition of the long term self-interest and by some governmental assistance, such as giving the area to community ownership. Some of the tiny islands in the Caribbean archipelago (St. Lucia, Dominica) which are populated by the descendants of the people enslaved and brought over from Africa and not by the native Americans, provide such examples: resource management practices to be seen in a certain extent as

²⁸ See also GOTTLIEB 2006; SPONSEL 2012; VAUGHAN-LEE 2013.

traditional cultivation has been ‘built up’ during a couple of years or decades in one or more minor communities, which allows sustainable handling of a forest community or some aquatic communities (sea moss, sea urchin) (BERKES 1999:130–139).²⁹

REFERENCES CITED

- ANDERSON, Eugen
 1996 *Ecologies of the Heart. Emotion, Belief, and the Environment*. New York: Oxford University Press.
- APPLEBAUM, Herbert
 1987 20th Century Evolution and Ecological Anthropology. Introduction. In APPLEBAUM, Herbert (ed) *Perspectives in Cultural Anthropology*, 199–207. Albany: State University of New York.
- BALÉE, William
 1994 *Footprints of the Forest: Ka’apor Ethnobotany – The Historical Ecology of Plant Utilization by an Amazonian People*. New York: Columbia University Press.
- BALÉE, William (ed)
 1998 *Advances in Historical Ecology*. New York: Columbia University Press.
- BARGATZKY, Thomas
 1986 *Einführung in die Kulturökologie*. Berlin: Dietrich Reimer.
- BARTA, Zoltán – LIKER, András – SZÉKELY, Tamás (eds)
 2002 *Viselkedésökológia* [Behavioural Ecology]. Budapest: Osiris.
- BERECZKEI Tamás
 2002 Humán viselkedésökológia [Human Behavioural Ecology]. In BARTA, Zoltán – LIKER, András – SZÉKELY, Tamás (eds) *Viselkedésökológia* [Behavioural Ecology], 188–213. Budapest: Osiris.
- BERKES, Fikret
 1999 *Sacred Ecology: Traditional Ecological Knowledge and Resource Management*. Philadelphia: Taylor & Francis.
- BERLIN, Brentd
 1992 *Ethnobiological Classification. Principles of Categorisation of Plants and Animals in Traditional Societies*. Princeton: Princeton University Press.
- BIERSACK, Aletta
 1999 Introduction: From the „New Ecology” to the New Ecologies. *American Anthropologist* 101(1):5–18.
- BILSKY, Lester J.
 1980 *Historical Ecology. Essays on Environment and Social Change*. Port Washington: Kennikat Press.
- BOHANNAN, Peter – GLAZER, Mark (eds)
 1997 *Mérföldkövek a kulturális antropológiában* [Milestones in Cultural Anthropology]. Budapest: Panem-McGraw Hill.

²⁹ See also BROSIUS – LOWENHAUPT TSING – ZERNER 2005.

- BORSOS, Balázs
2004 *Elefánt a hídon. Gondolatok az ökológiai antropológiáról* [Elephant on the Bridge. Thinking of Ecological Anthropology]. Budapest: L'Harmattan.
- BORSOS, Béla
2002 *Azok a bizonyos könnyű léptek. I. Ökológia és rendszerelmélet* [Those Light Steps I. Ecology and Systems Theory]. Budapest: L'Harmattan.
- BROSIUS, J. Peter – LOWENHAUPT TSING, Anna – ZERNER, Charles (eds)
2005 *Communities and Conservation: Histories and Politics of Community-Based Natural Resource Management*. Walnut Creek: AltaMira Press.
- CARNEIRO, Robert L.
1970 The Theory of the Origin of the State. *Science* 733–738.
- CLEMMER, Richard O. – MYERS, L. Daniel – RUDDEN, Mary Elizabeth (eds)
1999 *Julian Steward and the Great Basin: The Making of an Anthropologist*. Salt Lake City: University of Utah Press.
- COLBY, B. N.
1966 Ethnographic Semantics. A Preliminary Survey. *Current Anthropology* 7:3–17.
- CONKLIN, Harold C.
1969 [1954] An Ethnoecological Approach to Shifting Agriculture. In VAYDA, Andrew P. (ed) *Environment and Cultural Behaviour. Ecological Studies in Cultural Anthropology*, 221–233. New York: The Natural History Press.
- CRUMLEY, Carole L. (ed)
1994 *Historical Ecology: Cultural Knowledge and Changing Landscapes*. Santa Fe: School of American Research.
- CSÁNYI Vilmos
1994 *Etológia* [Ethology]. Budapest: Nemzeti Tankönyvkiadó.
- CSÁNYI Vilmos
1999 *Az emberi természet. Humánetológia* [The Human Nature. Human Ethology]. Budapest: Vince Kiadó.
- D'ANDRADE, Roy
1995 *The Development of Cognitive Anthropology*. Cambridge: Cambridge University Press.
- DARVAS Béla
2000 *Virágot Oikosnak. Kisértések kémiai és genetikai biztonságunk ürügyén* [Flowers for Oikos. Temptations on the Pretext of our Chemical and Genetic Safety]. Budapest: L'Harmattan.
- DAVIES, Nicholas B. – KREBS, John R. – WEST, Stuart A.
2012 *An Introduction to Behavioural Ecology, 4th Edition*. Hoboken: Wiley-Blackwell
- DOVE, Michael R.
2001 Interdisciplinary Borrowing in Environmental Anthropology and the Critique of Modern Science. In CRUMLEY, Carole L. (ed) *New Directions in Anthropology and Environment*, 90–110. Walnut Creek et al.: Altamira.
- ELLEN, Roy F.
1979 Introduction. Anthropology, Environment and Ecological Systems. In BURNHAM, P. C. – ELLEN, R. F. (eds) *Social and Ecological Systems*. London: Academic.

- FLANNERY, Kent V.
1972 The Cultural Evolution of Civilisations. *Annual Review of Ecology and Systematics* 3:399–426.
- FOIN, Theodore C. – DAVIS, William G.
1987 Equilibrium and Nonequilibrium Models in Ecological Anthropology. An Evaluation of “Stability” in Maring Ecosystems in New Guinea. *American Anthropologist* 89(1):9–31.
- FORDE, Daryll
1934 *Habitat, Economy and Society*. London: Methuen & Co.
- FRIED, Morton H.
1967 *The Evolution of Political Society. An Essay in Political Anthropology*. New York: Random House
- FRIEDMAN, Jonathan
1974 “Marxism, Structuralism and Vulgar Materialism.” *Man* 9:44–69.
- GEERTZ, Clifford
1969 [1963] Two Types of Ecosystem. In VAYDA, Andrew P. (ed) *Environment and Cultural Behaviour. Ecological Studies in Cultural Anthropology*, 3–25. New York: The Natural History Press.
- GOLLEY, Frank B.
1984 Historical Origins of the Ecosystem Concept in Biology. In MORAN, Emilio F. (ed) *The Ecosystem Concept in Anthropology*, 33–49. Boulder, Col.: Westview. (AAAS Selected Symposium 92.)
- GOTTLIEB, Roger S.
2006 *A Greener Faith. Religious Environmentalism and Our Planet’s Future*. New York: Oxford University Press
- GOULD, Stephen Jay
1980 *The Panda’s Thumb. More Essays on Natural History*. New York – London: Norton.
1990 *A panda hüvelykujja* [The Panda’s Thumb]. Budapest: Európa.
- GROSS, Daniel R.
1990 Ecosystems and Methodological Problems in Ecological Anthropology. In MORAN, Emilio F. (ed) *The Ecosystem Approach in Anthropology. From Concept to Practice*, 309–319. Ann Arbor: University of Michigan Press.
- HAENN, Nora – WILK, Richard R. (eds)
2006 *The Environment in Anthropology*. New York: University Press.
- HARDESTY, Donald L.
1977 *Ecological Anthropology*. New York: John Wiley & Sons.
- HARRIS, Marvin
1966 The Cultural Ecology of India’s Sacred Cattle. *Current Anthropology* 7(1):51–66.
1977 *Cannibals and Kings. The Origins of Cultures*. New York: Random House
1979 *Cultural Materialism. The Struggle for a Science of Culture*. New York: Random House
1985 *Good to Eat. Riddles of Food and Culture*. New York: Simon and Schuster.

- 1997 A kulturális materializmus elméleti alapelvei [Theoretical Fundamentals of Cultural Materialism]. In BOHANNAN, Peter – GLAZER, Mark (eds) *Mérföldkövek a kulturális antropológiában* [Milestones in Cultural Anthropology], 517–551. Budapest: Panem-McGraw Hill.
- HUNN, Eugene S.
1996 Ethnozoology. In LEVINSON, David – EMBER, Melvin (eds) *Encyclopaedia of Cultural Anthropology* 2, 451–456. New York: Henry Holt and Co.
- KOPNINA, Helen – SHOREMAN-OUIMET, Eleanor
2013 Introduction. Environmental Anthropology of Today and Tomorrow. In KOPNINA, Helen – SHOREMAN-OUIMET, Eleanor (eds) *Environmental Anthropology. Future Directions*. New York-London: Routledge.
- KOTTAK, Conrad P.
1999 The New Ecological Anthropology. *American Anthropologist* 101(1):23–35.
- KROEBER, Alfred. L.
1939 *Cultural and Natural Areas of Native North America*. Berkeley: University of California Press.
- LANSING, J. Stephen
1991 *Priests and Programmers. Technologies of Power in the Endangered Landscape of Bali*. Princeton: Princeton University Press.
- LÉVI-STRAUSS, Claude
1962 *La pensée sauvage*. Paris: Plon.
- LITTLE, Paul E.
1999 Environments and Environmentalism in Anthropological Research. Facing a New Millennium. *Annual Review of Anthropology* 28:253–284.
- MARGULIS, Lynn
1998 *Symbiotic Planet. A New Look at Evolution*. New York: Basic Books.
- MERCHANT, Carolyn
2005 *Radical Ecology. The Search for a Liveable World*. New York: Routledge.
- MILLER, Marc S. (ed)
1993 *State of the Peoples. A Global Human Rights Report on Societies in Danger*. Boston: Beacon Press.
- MORAN, Emilio F.
2000 *Human Adaptability. An Introduction to Ecological Anthropology*. Boulder, Co.: Westview.
- MORAN, Emilio F.
1996 Environmental Anthropology, In LEVINSON, David – EMBER, Melvin (eds) *Encyclopaedia of Cultural Anthropology*, 2, 383–389. New York: Henry Holt and Co.
- MORAN, Emilio F.
2006 *People and Nature: An Introduction to Human Ecological Relations*. Malden, MA: Blackwell Publishing.
- NÁNÁSI, Irén
1992 *A humánökológia mint transzdiszciplína* [Human Ecology as a Transdiscipline]. Budapest: ELTE TTK.

- NELSON, Richard K.
1983 *Make Prayers to the Raven. A Koyukon View of the Northern Forest*. Chicago: University of Chicago Press.
- ORLOVE, Benjamin
1980 Ecological Anthropology. *Annual Review of Anthropology* 9:235–273.
- PARK, Robert Ezra – BURGESS, Ernest W. – MCKENZIE, Roderick (eds)
1925 *The City*. Chicago: Chicago University Press.
- RAMBO, Terry A.
1991 Energy and the Evolution of Culture. A Reassessment of White's Law. In RAMBO, Terry A. – GILLOGLY, Kathleen (eds) *Profiles in Cultural Evolution. Papers from Conference in Honour of Elman R. Service*, 291–310. Urbana: University of Michigan Press.
- RAPPAPORT, Roy A.
1967 *Pigs for the Ancestors. Ritual in the Ecology of a New Guinea People*. New Haven – London: Yale University Press.
1977 Maladaptation in Social Systems. In FRIEDMANN, J. – ROWLANDS, M. J. (eds) *The Evolution of Social Systems*, 49–71. London: Duckworth.
1979 *Ecology, Meaning and Religion*. Richmond, Ca.: North Atlantic Press.
1984 Units and their Implications. Epilogue. In RAPPAPORT, Roy A. *Pigs for the Ancestors*, 371–403. New Haven – London: Yale University Press.
1990 Ecosystems, Populations and People. In MORAN, Emilio F. (ed) *The Ecosystem Approach in Anthropology. From Concept to Practice*, 41–72. Ann Arbor: University of Michigan Press.
1999 *Ritual and Religion in the Making of Humanity*. New York: Cambridge University Press.
- RATZEL, Friedrich
1882–1891 *Anthropogeographie. Die geographische Verbreitung des Menschen*. Stuttgart: Engelhorn.
- REICHEL-DOLMATOFF, Gerardo
1971 *Amazonian Cosmos. The Sexual and Religious Symbolism of the Tukano Indians*. Chicago: University of Chicago Press.
1976 Cosmology as Ecological Analysis. A View from the Rainforest. *Man* 11(3):307–318.
1996 *The Forest Within. The World-View of the Tukano Amazon Indians*. Totnes: Themis.
1999 A View from the Headwaters. *The Ecologist* 29(4):276–280.
- RODDA, Annabel
1991 *Woman and Environment*. London: Zed Books.
- SAHLINS, Marshall D.
1960 *Evolution and Culture*. Ann Arbor: University of Michigan Press.
1964 Culture and Environment. The Study of Cultural Ecology. In TAX, Sol (ed) *Horizons in Anthropology*, 132–147. Chicago: Aldine.
1997 Specifikus és általános evolúció [Specific and general evolution]. In BOHANNAN, Peter – GLAZER, Mark (eds) *Mérföldkövek a kulturális antropológiában* [Milestones in Cultural Anthropology], 488–514. Budapest: Panem – McGraw Hill.

SANDERSON, Stephen K.

1997 Evolution. In BARFIELD, Thomas (ed) *The Dictionary of Anthropology*, 448–450. Oxford: Blackwell Publishers.

SÁRKÁNY, Mihály – SOMLAI, Péter

2003 A haladástól a kontingenciáig. Vázlat a szocio-kulturális evolúció változó elméleteiről [From Progress to Contingency. An Outline of the Varying Theories of Socio-Cultural Evolution]. *Szociológiai Szemle* 13(3):3–26.

SÁRKÁNY, Mihály

1979 Kulturális ökológia – távlatok és korlátok [Cultural Ecology – Perspectives and Limitations]. *Világosság* 20(8-9):564–569.

1984–85 Patrilineal Band and the Logic of Cultural Ecology. *Acta Ethnographica Hungarica* 33(1–4):309–320.

SELIN, Helaine

2003 *Nature Across Cultures. Views of Nature and the Environment in Non-Western Cultures*. Boston: Kluwer Academic Press.

SERVICE, Elman R.

1962 *Primitive Social Organisation. An Evolutionary Perspective*. New York: Random House.

1975 *The Origins of State and Civilisation. The Process of Cultural Evolution*. New York: Norton

SHIVA, Vandana

1989 *Staying Alive. Women, Ecology and Development*. London: Zed Books.

SPONSEL, Leslie E.

1997a Ecological Anthropology. In BARFIELD, Thomas (ed) *The Dictionary of Anthropology*, 137–140. Oxford: Blackwell Publishers.

1997b Steward, Julian. In BARFIELD, Thomas (ed) *The Dictionary of Anthropology*, 448–450. Oxford: Blackwell Publishers.

1999 *Culture and Nature. Ecological Approaches in Anthropology*. Manuscript.

2001 Do Anthropologists Need Religion and Vice Versa? Adventures and Dangers in Spiritual Ecology. In CRUMLEY, Carole L. (ed) *New Directions in Anthropology and Environment*, 177–200. Walnut Creek et al.: Altamira Press.

2007 Ecological Anthropology. In CLEVELAND, Cutler J. (ed) *Encyclopaedia of Earth*. http://editors.eol.org/eoearth/wiki/Ecological_anthropology (Accessed May 30, 2017.)

2012 *Spiritual Ecology. A Quiet Revolution*. Santa Barbara: ABC-CLIO.

STEWART, Julian H.

1955 *Theory of Culture Change. The Methodology of Multilinear Evolution*. Urbana: University of Illinois Press.

1977 *Evolution and Ecology. Essays on Social Transformation*. Urbana: University of Illinois Press.

1997 A kulturális ökológia fogalma és módszere [The Concept and Method of Cultural Ecology]. In BOHANNAN, Peter – GLAZER, Mark (eds) *Mérföldkövek a kulturális antropológiában* [Milestones in Cultural Anthropology], 439–456. Budapest: Panem – McGraw Hill.

- STONICH, Susan C.
 1993 *I am Destroying the Land! The Political Ecology of Poverty and Environmental Destruction in Honduras*. Boulder, Co.: Westview Press.
- STÜBEN, Peter E. (ed)
 1988 *Die neuen "Wilden". Umweltschützer unterstützen Stammesvölker – Theorie und Praxis der Ethnoökologie*. Giessen: Focus.
- TANSLEY, Alfred George
 1935 The Use and Abuse of Vegetational Concepts and Terms. *Ecology* 16:205–221.
- TOWNSEND, Patricia K.
 2000 *Environmental Anthropology. From Pigs to Policies*. Prospect Hights: Waveland Press.
- VÁRKONYI, Ágnes, R.
 [1992] *Pelikán a fiaival* [Pelican with her Sons]. Budapest: Liget.
- VAYDA, Andrew P. – MCCAY, Bonnie J.
 1975 New Directions in Ecology and Ecological Anthropology. *Annual Review of Anthropology* 4:293–306.
- VAYDA, Andrew P. – RAPPAPORT, Roy A.
 1968 Ecology, Cultural and Non-Cultural. In CLIFTON, James A. (ed) *Introduction to Cultural Anthropology*, 477–497. Boston: Houghton Mifflin.
- VAUGHAN-LEE, Llewellyn (ed)
 2013 *Spiritual Ecology: The Cry of the Earth*. Point Reyes, Cal.: The Golden Sufi Center.
- WACKERNAGEL, Mathis – REES, William R.
 1996 *Our Ecological Footprint*. Philadelphia: New Society Publishers
 2001 *Ökológiai lábnyomunk* [Our Ecological Footprint]. Budapest: Föld Napja Alapítvány
- WHITE, Leslie A.
 1943 Energy and the Evolution of Culture. *American Anthropologist* 45(3):335–356.
 1949 *The Science of Culture. A Study of Man and Civilization*. New York: Grove
 1997 Az energia és a kultúra evolúciója [Evolution of Energy and Culture]. In BOHANNAN, Peter – GLAZER, Mark (eds) *Mérföldkövek a kulturális antropológiában* [Milestones in Cultural Anthropology], 460–486. Budapest: Panem – McGraw Hill.

See biography of **Balázs Borsos** at the end of guest editors' foreword: Ecological Anthropological Research in Hungary, at page 29.