

JAN I. S. ZONNEVELD¹**THE LANDSCAPE, OUR ENVIRONMENT**

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In landscape ecology various points of view can be taken. Geocentric, biocentric and anthropocentric standpoints are used. In anthropogenic landscape ecology the attention is especially devoted to the relations between the human needs and the potentials (functions) of the landscape. These relations are not only a matter of food production, public health, economic development, exhausting or protection of natural resources, (= using the supporting, production and regulating functions of the landscape), they include the „noötic“ links between the landscape and its human residents as well. In this paper special attention is paid to the need for protection and preservation of landscapes for the sake of maintaining their „information values“.

INTRODUCTION

„Landscape“ is according to many geographers and landscape ecologists, „a part of space, bound to the earth's surface, composed of a complex of relation systems in which the geofactors rock, water, air, relief, plants, animals and mankind are represented“. (cf. Schroevers 1982; Snacken 1984). This complex can be depicted in diagrams like the one in fig. 1. Here the whole system, consisting of abiotic, the living and the „noötic“ worlds is shown by circles and connecting lines. S and K stand for the substrate and the climate respectively; they are independent, fixed data for the region concerned. The soil, water, plants, animals and air conditions [B, W, P, D and L respectively] are dependent from S and K and from each other. The supply of energy (from the sun and from the interior of the earth) is indicated by arrows. And M stands for Mankind in which not only the material and the living (biotic) worlds are manifest, but the human spiritual (noötic) world as well. One of the goals in landscape ecology is to study this complex of relation systems as a holistic entity, a whole that as such is more than the sum-total of its composing parts, a complex phenomenon possessing properties of a general character belonging to a level of integration higher than that of the geofactors rock, water etc. The study of the landscape in this high level of integration is dealing with notions like structure, type and character of systems and (inter-)relations.

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In the practice of scientific work, however, it appears that this pure holistic goal is rarely reached. In most cases the investigations are coloured by the scientific background of the student, and the practical questions that must be answered. The holistic entity can be regarded from different points of view like has been illustrated by Vink (1981), cf. fig. 2 (see also De Boer

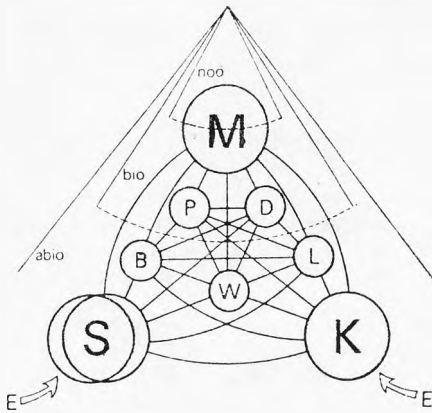


Fig. 1. A model showing the geofactors and their mutual relations.
 S — the substrate {earth's crust and relief}; K — climate; B — soil; W — water; L — atmospheric conditions; P — vegetation; D — animal world; M — mankind; E — energy.

1984). Biologists are inclined to observe the landscape ecological world from a biological standpoint, many of them study landscape ecology as a means for answering biological questions, considering the atmosphere, the soil, the water and the relief merely parts of the environment of a plant, an animal or a life community. The questions concerned are related to problems of, for instance, the evolution of vegetations and complete life communities in a swamp or on a hill slope or the dependence of a certain fauna from the topographical and vegetational conditions in a certain area. Some biologists are even defending the thesis that landscape ecology is a branch of biology, a kind of (bio-)ecology that is studied in the scale and the context of the landscape.

But, as indicated by Vink in fig 2, the biocentric (phytocentric and zoöcentric) view is not the only one. It is possible to carry out landscape ecological work from an anthropocentric standpoint as well. In anthropocentric landscape ecology the various phenomena are studied principally in their relation to humanity. Seen from this point of view the landscape is the environment of mankind. This view is from old taken by many geographers.

Apart from the phyto-, zoö- and anthropocentric points of view it is also possible to consider the landscape ecological reality the environment for abiotic phenomena like running water, weathering, soil formation. It must be held in mind that the word „ecology“ was used by Haeckel to indicate the study of the interrelation between organisms and their surroundings, the abiotic environment in which they are living, their „house“. Interrelations have two „directions“. In (landscape-)ecology (the word was coined by Troll, 19, in order to indicate the integrated study of the various conditions in the landscape) not only the significance of the environment with regard

to the living organism may be investigated, the significance of the living matter in regard of the abiotic world may be studied as well. For each of the various geofactors the totality of the other factors acts as its environment. It is possible to study also the landforms, soils or rivers in their interrelations with their environment. Shortly, it is worthwhile to study the mutual rela-

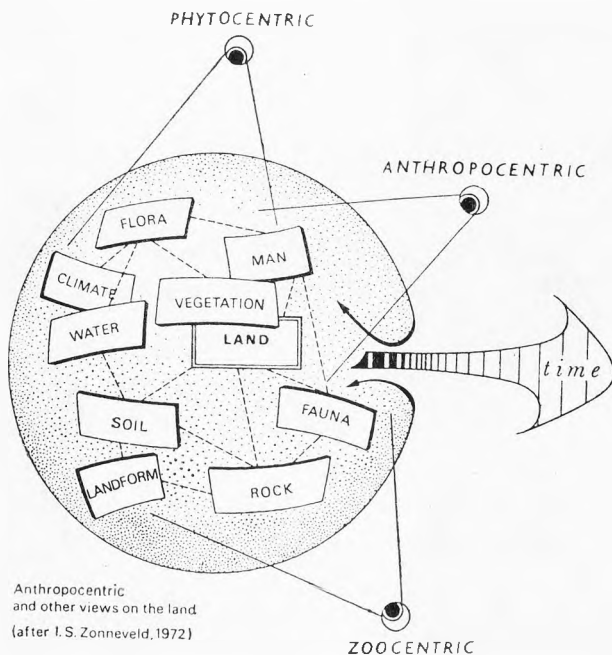


Fig. 2. Some points of view regarding landscape ecology according to Vink [1982]. A fourth „eye“, representing the geocentric approach might be added in the lower left corner of the picture.

tions in the landscape not only for the sake of the knowledge regarding the living organisms, but in behalf of a better insight of the complex phenomena, active in the landscape as well. Many geographers, especially physical geographers, are studying the landscape from this point of view indeed.

Anthropocentric landscape ecology

In this paper, however, the attention is directed especially to the landscape ecological reality as seen from the anthropocentric standpoint. Observing the interrelations between the landscape and its human inhabitants three questions come to the fore:

- What are the needs of mankind in his role of inhabitant of the earth?
- What is the significance of the landscape for these residents; which are the potentials- the functions- the residents can make use of?:

— What are the consequences of human activity in the landscape? As to the first question it is possible to list some eight categories of human needs and activities: (see also fig. 3).

1. Physiologic/biologic maintenance of the body (by eating, breathing, drinking).

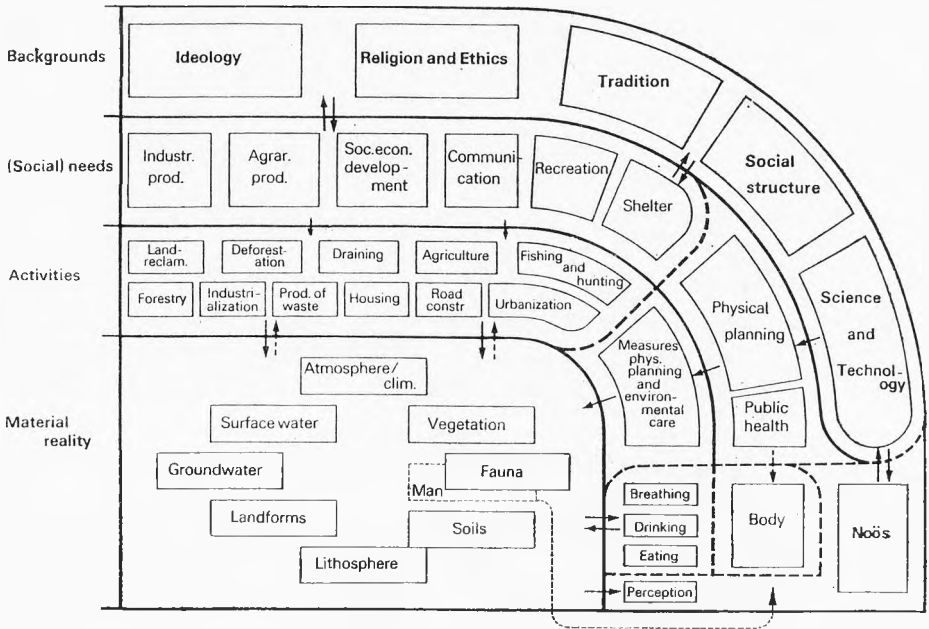


Fig. 3. A model representing the various human activities, needs and backgrounds in relation to the material reality of the landscape.

2. Dwelling; transportation; moving from one place to the other.

3. Use of materials for making cloths, shelter, tools in all scales, from household utensils to large machineries and for generating warmth and energy.

4. Production of food (by hunting, fishing, agriculture, industry).

5. Recreation, pure physical contact with the environment in the form of sun bathing, horse riding, jogging etc. as well as „educational recreation“ such as observing wildlife, visiting cultural monuments etc. (cf. group 7).

6. Aesthetic experience.

7. Satisfaction of curiosity, gathering knowledge regarding the landscape, scientific research.

8. Ethic attitude.

The needs and activities grouped in categories 1 and 2 are completely biological ones, present in all living creatures. Some of the activities of group 3 are also inherent in animals (e. g. nest building, the construction of dams

by beavers etc.) but mankind has obtained the ability to work out more and more sophisticated methods; the same applies especially for the activities of category 4.

Presumably some types of physical recreation (cf. category 5) are exercised by animals as well, but the phenomenon „recreation“ in its full extent is especially developed in mankind. And at any rate the needs and activities belonging to the group 6, 7 and 8 are to be regarded typical human faculties.

The second question, the question how and to what extent the environment, the landscape, does meet the mentioned needs finds its answer in an account of the potentials, the functions of the environment in regard of its human residents. Van der Maarel and Dauvellier (1978) have distinguished four groups of such functions (see also Haase 1978):

a) Production functions: supply of food, air and water for eating, breathing and drinking as well as the supply of materials for building, clothing, tools etc.

b) Support(ing) functions: the presence of firm ground suitable for building houses, constructing roads, the possibility of transport by water etc.

c) Regulation factors: the possibility of maintaining ecological equilibria and, based on these equilibria, the prevention or pushing back of pollution and other damages.

d) Information functions: the potentiality in the landscape to arouse and satisfy human curiosity, the possibilities regarding the enjoyment of aesthetic experiences and scientific research.

Comparison of the two lists makes clear that the production functions correspond to the categories 1, 2, 3 and 4; the carrying support-(ing) functions (a) are connected to the needs and activities of category 2, the regulative functions (b) to category 1. The mentioned groups of functions are in force for all living creatures. The information functions, however, are linked especially with the typical qualities of mankind, coming to the fore in the categories 4, 5, 6, 7 and 8.

In the application of geographical research for the benefit of the human society a great deal of the attention is directed to those potentials of the landscape that are important for the production of food, the choice of road sites, the prevention of hazards. Agriculture, engineering and rural planning have profited largely by maps representing the relevant characteristics of the landscape (see for instance the maps in the Atlas of the Slovak Socialist Republic, and also Barsch 1980, Drdoš, Urbánek and Mazúr 1980, Vink 1980, 1981 and Haase and Richter 1983).

But not only the potentials of the groups a, b and c are worth while to be studied, also the functions of group d, the „information function“ play an important role in the well-being of mankind. As a matter of fact the strife for satisfaction of the „primary needs“ regarding food production and economic improvement has everywhere a high priority and it is completely understandable that in some countries the care for the information functions of the environment remains in the background as long as problems like poverty and hunger are asking the full attention. But it must be held in mind that man cannot live by mere eating, drinking and earning money. The human spirit, the noös, asks for fulfilment also in the sphere of the information functions. A sound society in our modern times cares on subjects like conservation, pro-

tection and management of natural and cultural values in the landscape. In this respect it is significant that many conservational activities are not only linked with values in the sphere of noötic information, but also with the biophysiological and economical functions of the same landscape. Some activities in the field of nature conservation are identical with activities regarding environmental care in the sense of avoiding or preventing pollutions and other phenomena affecting the health of human beings. If the natural regulating functions are frustrated and the original structure of the environment is disorganized the consequences for the human residents may be as unfavourable as they are for the other partners in the ecosystem, or perhaps still worse: „Preservation of nature is self—preservation“.

Another link between the socio-economic interests of mankind and landscape (and nature) conservancy is the circumstance that some areas may acquire economical profits, just they are attractive for recreational and touristic activities. Also in these cases the protection of the landscape and the natural conditions may be in line with the economic way of thinking.

In many other cases, however, the conservation, protection and management of nature and landscape has to be realised for its own sake: preventing or curbing the deterioration of the information functions of the landscape. In our world where overpopulation and industrialisation are imposing considerable pressure on the natural (and cultural) values in the landscape many people are aware of the necessity of this kind of activities. Geographers have a task also in this respect: investigating and mapping the landscape in its informative values, in its significance for the aesthetic and other affective experiences of man as well as for the cognitive aspects of the human appreciation of the world he lives in, like scientific curiosity, scientific research and documentation. And beyond all this is the (ethic) feeling of bearing responsibility for the maintaining of the beauty and the richness of nature and the landscapes of the earth. Mankind, being a constituting part of the system, is in the position to use the environment for his own existence. But he should use it in a wise way, like a steward who cares for the estate that has been confided to him. He is not allowed to subdue and damage it like he does too frequently in our days (cf. Passmore 1974, Westhoff 1983 and many other authors).

The study of the relations between man and his environment is not complete without considering the problems concerning the (psychological) perception, the aesthetic and philosophical experiences, the differences in appreciation of landscapes in the various cultural periods (cf. Brossard, Joly and Wieber 1980, Appleton 1980, Bartkowski 1984, Couterier et al. 1983, Yi-Fu Tuan 1972, Zonneveld 1984).

Geographers can do very valuable work by investigating these „cultural“ relations between man and his environment. That means that not only properties like productivity, carrying capacity, vulnerability of (agricultural) landscapes are studied in regard of their agricultural and economic values, but also the natural and cultural history represented in the scenery, the settlements, the allotments and many other features in the landscape.

Mankind has changed his environment considerably in most parts of the world. The study of these changes should give the answer to the third question put above, the question concerning the way in which mankind has put his

stamp upon the various landscapes, in their distribution over the earth's surface and in their sequence in time.

In the Netherlands the landscape reflects in its various parts the results of agricultural reclamation of sandy as well as swampy areas and the draining of lakes and inland seas, activities carried out in mediaeval, renaissance and modern times. Besides that it is changed in increasing measure by agricultural reallocation and reconstructing, by the extension of towns and industries and by road building. The resulting modern landscapes have their own special character; they have sometimes their own specific beauty and their own right to exist. It is the task of the landscape architect to make the best of it and to „produce“ harmonious new landscapes. But as a matter of fact the scale and the intensity in which the new landscape replaces the older ones are so dominating that it was necessary to organize landscape protection agencies, both private and governmental. The (private) Association for the Preservation of Natural Monuments in the Netherlands (Vereiniging tot Behoud van Natuurmonumenten in Nederland) has acquired in ownership in all more than 50 000 ha. Another 50 000 ha are owned by provincial institutions. The greater part of these properties have the character of reservations. The total area of the reservations belonging to the governmental agencies is approximately 70 000 ha. A governmental proposal includes the designation of „National Parks“, being areas larger than 1000 ha, in which natural values are dominating. „National Parks“ enclose forests, heather landscapes, open water etc. „National Landscapes“ are regions, larger than 10 000 ha in which characteristic agricultural landscapes are present as well. An interesting discussion is going on now, concerning the question if it is really possible to preserve old, „characteristic“ landscapes and how the management of these regions in which the agricultural activities must go on, should be organized. It is possible to maintain the characteristic qualities and phenomena by steering its development skillfully and cautiously without turning it into a reservation, or a kind of „museum landscape“?

At any rate, in the Netherlands the various advising committees like the Nature Conservancy Council, the Commission for Environmental Impact Assessment include not only experts in nature conservancy and public health, but also students in historical geography. Research in this field has been largely stimulated by the need of knowing the historical significance of the landscape in which the road-roller of the industrial and economic development is extremely active. (cf. Haartsen and Renes 1982, Vervloet 1985).

Final remarks

In the first lines of this paper I stated that landscape ecological work rarely is a pure holistic achievement. The subsequent lines were devoted to the circumstance that in the practice of daily scientific life the ecological reality can be studied from different points of view, one of these having an anthropocentric character. Which of the standpoints will be chosen depends on the questions that have to be answered and the problems that have to be solved. At any rate the attention is directed to certain aspects of the whole system and sometimes the study requires rather specialistic investigations. But all these circumstances do not diminish the value of the way of thinking

that may be called the holistic approach. The holistic way of thinking is the scientific behaviour to consider the subject a part of a whole in which the constituting elements are connected by relations of various types, ranging from bi- or multilateral relations to situations that boils down to a mere existence of some phenomena in a region without any mutual influence. (cf. Zonneveld 1983). This way of thinking ensures the investigator's awareness regarding the interconnection of the phenomena and the geofactors in the landscape. It is the philosophy that underlies the geographical synthesis, so ardently propagated by Emil Mazúr, it is the backbone of landscape ecology.

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KRAJINA, NAŠE ŽIVOTNÉ PROSTREDIE

V úvode tohto článku bolo povedané, že práca týkajúca sa krajinnej ekológie je málokedy rýdzo holistickým výkonom. V ďalších častiach článku sa hovorí, že v praxi bežného vedeckého života možno ekologickú realitu skúmať z rôznych hľadísk. Jedno z týchto hľadísk má antropocentrický charakter. Voľba príslušného hľadiska závisí od otázok, ktoré treba zodpovedať, a od problémov, ktoré treba riešiť. V každom prípade sa pozornosť orientuje na určité aspekty celkového systému a štúdia niekedy vyžaduje dosť špeciálne výskumy. Všetky tieto okolnosti však nezmenšujú hodnotu spôsobu myslenia, ktorý možno nazvať holistickým prístupom. Holistický spôsob myslenia je vedeckým spôsobom myslenia, pri ktorom sa subjekt pokladá za časť celku, v ktorom tvoriace elementy sú pospájané vzťahmi rôznych typov, siahajúcich od bilaterálnych alebo multilaterálnych vzťahov k situáciám, ktoré vedú k púhej existencii niektorých úkazov v regióne bez akéhokoľvek vzájomného vplyvu (Zonneveld 1983). Takýto spôsob myslenia zaručuje výskumníkovi uvedomiť si vzájomné vzťahy úkazov a geofaktorov v krajine. Je to filozofia, ktorá je základom geografickej syntézy, horlivo propagovanej E. Mazúrom, je to chrbtová kosť krajinnej ekológie.

Obr. 1. Model geofaktorov a ich vzájomných vzťahov.

S — substrát (zemská kôra a reliéf), *K* — klíma, *B* — pôda, *W* — voda, *L* — atmosferické podmienky, *P* — vegetácia, *D* — svet zvierat, *M* — ľudstvo, *E* — energia.

Obr. 2. Aspekty týkajúce sa krajinnej ekológie podľa Vinka [1982].

Štvrté „oko“, reprezentujúce geocentrický prístup, možno pridať do dolného ľavého rohu obrazu.

Obr. 3. Model rôznych ľudských aktivít, potrieb a pozadí vo vzťahu k hmotnej realite krajiny.

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ЛАНДШАФТ, НАША ОКРУЖАЮЩАЯ СРЕДА

В введении к этой статье я утверждал, что работа, касающаяся ландшафтной экологии, редко когда имеет холистический характер. Далее я обратил внимание на то, что в практике будничной научной жизни экологическую реальность можно изучать с разных аспектов. Один из этих аспектов имеет антропоцентрический характер. Выбор соответствующего аспекта зависит от круга вопросов, на которые необходимо дать ответ, а далее от проблем, которые нуждаются в решении. Во всяком случае внимание ориентируется на определенные аспекты целостной системы и, иногда, подход нуждается в сравнительно специальных исследованиях. Все эти обстоятельства, однако, не снижают ценность способа мышления, который можно назвать холистическим подходом. Холистический способ мышления — это научный способ мышления, рассматривающий субъект как составную часть целого, в котором образующие элементы связаны отношениями разного типа, начиная с двухсторонних или многосторонних отношений вплоть до обстановок, приводящих к голому существованию некоторых явлений в регионе, не имеющих никаких взаимоотношений (см. Зонневельд 1983). Такой способ мышления обеспечивает исследователю возможность осознать взаимо-

отношения явлений и геофакторов в ландшафте. Это и есть философия, являющаяся основой географического синтеза, который так ревностно выдвигает Эмиль Мазур, это осто́в ландшафтной экологии.

Рис. 1. Модель геофакторов и их взаимоотношений.

S—субстрат (земная кора и рельеф), *K*—климат, *B*—почва, *W*—вода, *L*—атмосферные условия, *P*—растительность, *D*—мир животных, *M*—человечество, *E*—энергия.

Рис. 2. Аспекты касающиеся ландшафтной экологии по Винку (1982). Четвертый „глаз“, представляющий геоцентрический подход, можно добавить в левый нижний угол рисунка.

Рис. 3. Модель разных видов человеческой деятельности, потребностей и фонов в отношении к материальной сущности ландшафта.

Перевод: Л. Правдова