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Landschaft und Landschaftsforschung in der Slowakei

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- 1 The generally known concept of landscape is connected with part of natural Earth surface and man who perceives, inhabits, exploits, and recreates this part. In this sense, the landscape is the research object of several sciences and simultaneously that of social interest. However, complexity of cognition of the landscape and its interpretation is closely connected with the subject and different research approaches, as well as options of application of this cognition to education and social practice.
- 2 The beginnings of landscape research in Slovakia in this sense (relationship between man and nature) are represented by the studies of geographers Hromadka (1943) and Luknis (1946). These works applied the concept of French regional geography (*paysage* of Vidal de la Blache) produced at the regional, as well as local scales. Hromadka presented «cultural landscape» as holistic synthesis of natural base, economic orientation and social environment. He also reflected on work, culture, religion, customs and man's life as the specific feature of regional differences in landscape types in order to outline the image of the landscape while capturing its «spirit».
- 3 However, in the middle of the past century landscape research was influenced by development of natural analytical sciences and the holistic concept of landscape study was replaced by natural differentiation of geographical research. The motifs of differentiated landscape cognition encouraged natural competition of sciences and their development in the context of fundamental research. Above all, competition for scientific and social prestige of such spatial disciplines as geographical landscape research, geobotanical research (mapping of potential vegetation) should be mentioned. These sciences, apart from defending their results had also to justify their meaning for social practice.

Fields and orientation of landscape research

- 4 The above-mentioned development of analytical natural sciences (geology, geomorphology, pedology, geobotanics) has also influenced cognition of the material content of the landscape. Its interpretation was influenced by analytical approach but its form was more a sum of data than synthesized cognition. The attempts in synthesis of knowledge were a construction ensuing from cognition of interaction between the elements and their synergical effect and concerned natural landscape. Synthesis was also motivated by practical requirements to solve the conflicts between economic interests and the environment.
- 5 Systemic approach contributed to correctness and exactness of *fundamental landscape research*. Landscape research has always been one of the traditional study subject of Institute of Geography, S.A.S. and acquired an especially important position in the concept of landscape synthesis of Drdos *et al.* 1980. It was based on systemic (geosystemic and ecosystemic) approach to cognition and an attempt to respect the principles of wholeness in diagnosis of landscape in the sense of holistic approach. Procedures of landscape synthesis diagnosed landscape by comparison of the original (hypothetical, natural) with the present (real, cultural) landscape structure. Identification of both structures also formed the basis of assessment of landscape's potential - an offer as well as the developmental limits of society's interests (Drdos *et al.*, 1980; Otahel, Polacik, 1987; Lehotsky, 1991). The concept of landscape synthesis was a certain culmination of integrating approaches to landscape research focused on social practice although it developed theoretical principles of fundamental research (Drdos 1983, Urbanek 1993). Landscape research became more comprehensible by application of remote sensing data. The effect of the method manifested in identification of land cover (Feranec and Otahel, 2001) and acceptance of holistic approach in theoretical (Otahel 1996), landscape-ecological assessment (Otahel, Feranec, 2000), environmental planning (Zigrai, Drgona, 1995; Otahel *et al.*, 1999) or visual qualities assessment (Urbanek, 1994; Otahel, 1999a) works.
- 6 Geosystemic approach to landscape research is now further developed at the Department of Physical Geography and Geoecology, Faculty of Natural Sciences, Comenius University (FNSCU) in Bratislava. Foundations of landscape research laid down by Mician and Zatkalik (1984) were developed in form of concept of detailed geoecological research and mapping (Minar, 1999; Minar, Trembos, 1997; Minar *et al.*, 2001). Several works are also oriented to social practice in the context of assessment of impact of highway on the environment (Trizna *et al.*, 1997) or problems of ecological stability and carrying capacity (Trembos, 1992).
- 7 *The applied landscape research* has drawn closest to the theory of wholeness. Geosystemic (geographical) aspect was the guarantee of complexity of cognition of environment and an ecosystemic key to the solutions to problems of environment of living organisms, above all man. Position of landscape ecology has contributed most to the solution of environmental problems and conflict-free organization of the landscape. Human input into landscape through activities became, as a matter of fact, subject of public control, and of decision-making and planning institutions (Otahel, 1999b). Solutions of particular practical problems led to elaboration of adequate methodological procedures also determined by the need of mutual communication (language) of the research and

design spheres. In this sense especially the procedures of landscape-ecological planning, known from the LANDEP methodology (Ruzicka, Miklos, 1982) proved to be useful. The character of procedures is normative and they were applied to concrete examples at different hierarchic levels directly addressing the public-administrative and designing organizations. The LANDEP methodology provided space to several theoretical generalizations (Miklos, Izakovicova, 1977; Ruzicka, 1996) but above all it facilitated continuity for further territorial-designing and evaluating studies of research workers of the Institute of Landscape Ecology, S.A.S. (Hrnciarova, 1996; Izakovicova, 1995). Their results and followers will undoubtedly influence the theoretical base of the state institutions involved with territorial planning and landscape architecture (URBION), environmental protection (Slovak Environmental Agency) or nature protection (Midriak, 2001). Applied studies deal with processing of territorial systems of ecological stability, environmental impact assessment and most recently implementation of sustainability principles in territorial planning. Adoption of the Act on environmental impact assessment gave origin to several private companies which prepare analysis of technical intentions to be realized in landscape and the evaluating report for the Ministry of Environment of the Slovak Republic. This is the way how applied research is involved with landscape creation, design of man-introduced greenery (Supuka, 2000) and architectural projects.

- 8 *Education* is an important part of the continuity of preparation of professionals while it strives for observation of the basic principles and application of modern techniques in landscape research. Apart from geographical departments in Bratislava (FNŠCU), University of Presov and University of Nitra, foundations of landscape research are also lectured at the Department of Landscape Ecology in Bratislava (FNŠCU) and Technical University in Zvolen. Creation of new text books should be also mentioned here (Drdos, 1999; Drdos *et al.*, 1995; Kminiak *et al.*, 1999; Kozova *et al.*, 1997).

Landscape types (regions) of Slovakia

- 9 Hromadka (1943) was among the first authors that presented landscape types of Slovakia. His types of cultural landscape of Slovakia excellently reflected the relation of natural conditions and human activities in the first half of the past century. Mazur *et al.* (1980) presented detailed classification of types of natural (geoecological) landscape in cartographic form while Mazur and Krippel (1980) presented the present (cultural) landscape. The attempt in integration of original natural (reconstructed) landscape and the real state of land cover presented by Otahel *et al.* (2000) built upon the above-mentioned studies.
- 10 The natural landscape of Slovakia is determined by the mountain arc of the Western Carpathians, characterized by alternation of genetically different mountain ranges separated by basins and valleys. Relief, which culminates by the alpine parts of the High and Low Tatra Mts., in the northern part of Slovakia drops in the south-western and south-eastern directions to the lowlands. Lowland landscape boasts the best conditions for land use and has prevalingly agricultural character (Danubian and East Slovakian Lowlands). The Zahorie Lowland is characterized by occurrence of infertile aeolian sands (dunes) with important share of forest and recreation landscape. The mountainous landscape is differentiated by concave surface forms of valleys, furrows and basin mosaics. Slovakia is known as the basin landscape. Basins are settled along

the streams by concentrated settlements, towns and villages, in hinterlands of which rural agricultural landscape prevails. According to bioclimatic conditions they can be classified into warm (Trencin, South Slovakian and Kosice basins) moderately warm/cool (Zilina, Ziar, Zvolen) and cool (Orava, Liptov, Spis) types. Promontories and plateaus (Myjava, Krupina) have specific dispersed settlement surrounded by heterogeneous agricultural land use. Uplands to lower highlands, especially in places where they contact warm lowlands, are characterized by viticulture and heterogeneous agriculture (Low Carpathians, Povazsky Inovec, Tribec, Slanske vrchy Mts.). Forests, in lesser extent pastures, prevail in higher highlands. The highest positions of the Carpathians represent very cold high mountain type. This type is especially important from the point of view of nature conservation (National Parks) and tourism (Low and High Tatra Mts.).

Figure 1. Natural landscape of Slovakia.

Table 1. Landscape types of Slovakia.

Natural (reconstructed) landscape	Contemporary landscape (land cover/land use)
	Lowland landscape
Fluvial plains with floodplain forests on Fluvisols	Urban landscape (Capital), agricultural (arable) landscape with concentrated settlements (towns and villages)
Aeolian-fluvial plains (dunes) with oak-pine forest on Regosols	Forest landscape, recreational landscape
Loess hilly lands with oak forests on Chernozems and Luvisols	Agricultural (arable) landscape with concentrated settlements
Polygenetic hilly land with oak-hornbeam forest on Cambisols	Heterogeneous agricultural landscape (arable land, pasture, forest) with concentrated settlements
	Montane landscape
	Basins and valleys
Warm basins with oak forests on Cambisols	Agricultural (arable) landscape with concentrated settlements
Moderately warm/cool basins with oak-hornbeam forests on Cambisols	Agricultural (arable) landscape with concentrated settlements
Cool basins with beech to spruce forests on Cambisols	Heterogeneous agricultural landscape with concentrated settlements
	Promontories and plateaux
Promontories and plateaux with oak to spruce forests	Heterogeneous agricultural landscape with dispersed settlements
	Uplands and highlands
Uplands to lower highlands with oak-hornbeam to spruce forests	Vineyard landscape, heterogeneous agricultural landscape, pasture landscape, forest landscape
Highlands with oak-hornbeam to spruce forests	Pasture landscape, forest landscape, recreational landscape
	High mountain landscape
Very cold high mountain landscape with spruce forests, dwarf pine scrubs and alpine meadows on Rankers and Lithosols	Forest landscape, alpine meadows and rocks, recreational landscape

Stages of landscape development

- 11 Reconstruction of natural landscape is used for documenting the hypothetical state of landscape of Slovakia before it was influenced by human interventions in the contemporary climatic conditions. The original natural landscape is the layer of reference for the analysis of land use and its gradual changes. Man started to change the original, almost continuously forested landscape, in the Neolithic Age by founding permanent settlements and farming. The effect on the original landscape during historical development was connected with different stages of settlement and occupation of land for farming (colonization). Gradual deforestation concerned highlands and uplands while extensive way of use also affected high-mountain landscape. Socialist industrialization and collectivisation of agriculture meant a deep intervention into the cultural landscape. Especially extensive construction of settlements and communications, industrial and technical structures, surface mining of minerals and large-scale cultivation of agricultural land determined the character of the present landscape.

Table 2. Landscape development in Slovakia.

Stages of development	Character of landscape
Neolithic Age	Forest mountain landscape, continuous settlement of lowlands (loess hilly lands) and warm basins with first agricultural areas
Aeneolithic to Roman Ages	Continuous settlement of cool basins with agricultural areas, larger settlements with stone buildings and fortifications
Slavonic settlement Era (5 th - 8 th century)	Cadastral community farms, rural settlements, agricultural areas, vineyards
Great Moravian Empire Era (9 th - 10 th century)	Christianity influence, sacral buildings and cemeteries in settlements, farms, development of Nitra and Bratislava (Devin) regions
Hungarian State Era (11 th - 13 th century)	Development of towns, market towns, villages, cloisters, (the most urbanized part of the Kingdom), agriculture landscape
(14 th - 17 th century)	German citizens influence, ore mining, character of towns in Central Slovakia and Spis region, shepherd colonization of highlands
(18 th - 19 th century)	Industrial influence, renewal mining, water supply system near Banská Štiavnica, character of towns, Bratislava Capital, baroque elements in landscape
Czechoslovak Republic period (1918-1948)	Constructions of railway and road communications, industrialization of towns, development of spa and centres of tourism
(1948-1992)	Socialist collectivization and urbanization, large area of agriculture lands, new residential part of towns, water reservoirs, industrial plants
Slovak Republic period (1993-)	Transformation processes, character of towns and rural landscape, extensification of agriculture, exploitation of forests

The present landscape and future development

- 12 Political and economic transition after 1989 and the related changes of property owners have substantially influenced character of the landscape. Opening of frontiers manifested itself in the economic, cultural and social spheres, and life style. It affected the nature of settlements, towns and especially the Capital. First of all it was restoration of centres of large cities accompanied by privatisation and arrival of foreign capital. It was followed by construction of new residential quarters and large stores and shopping centres in the outskirts of the Capital. Foreign capital has also financed construction of new industrial parks and plants. Gradually also the rural settlements are being restored which results in solution of dwelling problems and commuting to towns, restoration of rural areas, agrotourism and weekend houses. Approximation to the EU law influences waste management (waste water treatment plants) and infrastructure of rural settlements (gasification, water mains, sewage). The new face of countryside includes motorways, petrol stations and roadhouses. Intensity of agricultural production has also changed. Diminishing areas of arable land, orchards and partially vineyards was connected with transformation processes and change of the subsidizing policy of the state. Possible positive changes can be expected by development of extensive forms of agriculture, also with regard to the fact that Slovakia enjoys long tradition in pasture management. Retardation in development of travel and tourism industry is caused by sluggish transformation of services and amenities of centres. Privatisation also affected forest management as the first effects were rather negative for increased exploitation of forests. Stabilization of political sphere will probably bring about the growth of economy and further development of

urban complexes, industrial parks and exploitation of natural resources. Inner policy of the state, respect of principles of environmental protection and sustainable development will play an important role in this context.

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ABSTRACTS

The paper analyzes landscape research in Slovakia, above all in the fields of fundamental and applied research and education. It also briefly evaluates landscape types starting from hypothetical state of natural landscape through decisive historical stages and ending up with their present state. The trends of future development as influenced by transformation processes are suggested.

Der Beitrag analysiert die Landschaftsforschung in der Slowakei, vor allem in Grundforschung, angewandter Forschung und in der Ausbildung. Er faßt auch die Landschaftstypen zusammen, von hypothetischen Naturlandschaftstypen, über die ausschlaggebenden historischen Etappen bis ihren heutigen Charakter. Die zukünftigen Tendenzen der Landschaftsentwicklung unter dem Einfluß von sozio-ökonomischen Transformationsprozessen werden auch bezeichnet.

Cet article analyse la recherche sur le paysage en Slovaquie, principalement dans le domaine de la recherche fondamentale et appliquée ainsi que de l'enseignement. Il propose un bref descriptif des différents types de paysages, partant d'un état hypothétique du paysage naturel en passant par les grandes étapes historiques pour en arriver à l'état présent. Les tendances en matière de développement futur induit par les processus socio-économiques de transformation sont également décrites.

INDEX

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