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INTERNATIONAL SYMPOSIUM ON "RESEARCH, CONSERVATION, MANAGEMENT" (1.-5. MAY 1996, AGGTELEK - JÓSVAFŐ, HUNGARY)

Between April 30 and May 8, 1996, I took part in the International Symposium on "Biodiversity monitoring and other research in nature conservation areas as the basis of nature management"; "Research, Conservation and Management" for short. The main organizer of the meeting was the Aggtelek National Park in cooperation with the Speleological Institute of the National Authority for Nature Conservation, the Ministry of Environment and Regional Policy in Budapest, CEE-WEB - Central and East European Working Group for the Enhancement of Biodiversity at Miskolc, Slovak Karst Protected Landscape Area, SEA, Banská Bystrica.

The symposium was held in the Hotel Cseppkő and the buildings of the Aggtelek National Park Directorate in Aggtelek and Jósvafő. Aggtelek and Jósvafő, two small villages, are situated in north-east Hungary, about 250 km from Budapest and quite near to each other, only 7 km.

The subject of the symposium was the results of biodiversity monitoring and other research conducted in nature conservation areas and its applicability to detect the adverse changes early, to follow the effects of the applied management methods, to implement the old conservation strategies and to elaborate new ones. Nowadays the three concepts given by the title of the symposium are completely inseparable. The protection of a valuable area, a vanishing habitat or rare species is unimaginable without the knowledge of the basic attributes of the object, the conditions of its survival, etc. In our quickly changing world where only small patches of untouched nature can be found, management is the primary condition of nature protection. At the very best management means closing and guarding, but in most cases active management is necessary to keep up a diverse and worth-conserving system or to approach the appropiate near-natural conditions. The most important part of nature management are the exploring investigation and the state assesment of the conserved object. This could help to set up the management strategy and to predict the results. It could be the basis of further monitoring to follow the changes. Nature protection would be unthinkable without the unselfish work of our researchers and experts.

The symposium brought together the researchers and the experts of nature conservation to present their results, to communicate, to share experiences and to work out new strategies.

The aims of the symposium were to review the current and recent works on the above fields and to discuss new approaches and potential future

developments in view of the problems of nature protection facing the changing world of today, especially questions related to adequate implementation of the Convention on Biological Diversity.

The main symposium started in the afternoon of 1st of May with the Opening Lectures and Welcome Party. It ended on 5th of May with a Plenary discussion and Closing words. An excursion to the territory of Slovak Karst Landscape Protection Area and the Aggtelek National Park was organized on 3rd of May. The other days started with a plenary lecture with discussion afterwards. The rest of the days were devoted to shorter contributions and poster sessions.

Two main sessions were planned: one for presenting the results of the research, monitoring and management of the wildlife for conservation purposes and the second dealt with the results of the investigation, monitoring and management of the abiotic values (e.g. caves) in protected territories. As part of the last session I presented my poster with the title: "The Speleological Researches for Protection and Safeguarding of Škocjanske jame". It deals with karst researches in this region; the Karst Research Institute tries to determine the "natural equlibrium" and to gather the basic ecological assessments based on the actual knowledge ("null state") of Škocjanske jame with only partial possibility of ascertaining the original, i.e. natural state. Helped by such data one would contemporaneously or at given intervals compare the main parameters in the cave with the "null state" and determine whether the caves are appropriately safeguarded, does the ecology regenerate or even improve, or are the conditions worse so that additional measures have to be taken.

The lectures, abstracts of papers and the text to posters, as well as the guide-book for all excursions, were already published in a special volumes before the symposium.

The post-symposium field trip from 6.-8. of May was organised to visit other Hungarian national parks: Bükk and Hortobágy National Park and several interesting caves of the Slovak and Aggtelek Karst (Rakoczi cave in Bodvarako, Baradla cave in Aggtelek, Gombasek cave and Zadiel Gorge in Slovakia). Bükk (Beech) National Park measures 150.000 ha and its characteristic is "original beech forest" which is protected by law. We visited the birds rehabilitation centre of the Hortobágy National Park with mostly raptors and owls. The last night of the post-symposium excursion we slept in a real castle in Tiszafüred.

My participation at the Conference was made possible by the Karst Research Institute ZRC SAZU and Ministry of Science and Technology of the Republic of Slovenia. Without their help my active participation at this important Symposium would not have been possible.

GEOLOGY OF THE SURROUNDINGS OF VILLAGES JÓSVAFŐ AND AGGTELEK

The Aggtelek National Park is situated in the Aggtelek-Rudabánya Mountains, NE-Hungary. Its territory consists of segments of widely different geological history. Originally these segments were situated far away from each other. They became juxtaposed in the course of the Cenozoic era as a result of large scale horizontal movements of the Earth's crust. The earliest known events of the geological history of the area date back to the Late Paleozoic, when after a long-lasting continental period subsidence and a gradual transgression of the sea began. The geological record shows that climate was hot and dry at that time, and along the coastline in the shallow lagoons aridity resulted in the evaporation of sea water. During the driest periods anhydrite, gypsum and other evaporite minerals had been precipitated. When - from time to time - the climate became more humid and wet, clay minerals of continental origin accumulated on the sea bottom. Due to its plasticity this sedimentary complex exerted a strong influence on subsequent tectonic events. Under the influence of mountain building processes, huge rock masses could glide and therefore be displaced on the surface of the evaporite beds, which have acted as natural lubricants and therefore promoting the movements. Large blocks could collide with each other, they became folded and piled up, and thus the mountains were formed. The understanding of such complex deformation processes is as difficult as deciphering a cryptogram. Also the efficacy of the two is largely similar: though the essential might be figured out, many of the details remain a secret forever. Starting with the beginning of the Mesozoic era the gently sloping continent has been gradually overridden by the sea. After the evaporites, the first sediments deposited in the coastal belt of the subsiding basin were sands, silts and clay, transported by inflowing rivers originating in the continent. A great number of shells and other creatures were in the sand. Later on, as with the advance of the sea the water became deeper and deeper, deposition of calcareous sediments set in and less fine clastic material could reach the place from the far-away continent. A thick sequence of carbonate sediments (consisting of limestones, calcareous marls and marls) was formed, with thin claybeds intercalated in the limestone, testifying that the finest land-derived material still was able to reach the basin. In the meantime the sea-arm became isolated from the open sea by an underwater topographic barrier. As a result of the closure, sea water became impoverished in dissolved oxygen in the deeper parts of the lagoon. Episodically oxygen-rich water, rich in swimming and floating organisms, could enter the isolated lagoon through the barrier. This water, however, could not subside to the bottom of the embayment: instead it was spread over the surface of the anoxic water mass. Therefore the oxygen-rich water never reached the bottom of the gulf. Without oxygen, bottom-dwelling organisms could not survive in the deeper parts of the basin, so they could not destroy

the fine organic detritus deposited together with the clay and silt. Rocks formed of these oxygen-poor sediments are therefore black (rich in organic matter). This long-lasting dynamic equilibrium was upset by endogenic forces originating deep in the Earth's interior. Continental plates were broken up and their pieces forced apart by the intrusion of ophiolites (kinds of basaltic magma), rising up along fractures or rifts, and resulting in the birth of new oceanic crust in the place of the former continent. In the ever deepening water of the embryonic ocean the precipitation of carbonates was shut down because of undersaturation of the sea water in respect of carbonates. During such periods skeletons of carbonate-secreting organisms get quickly dissolved as after the death of the animal they begin to settle in the water column. As a consequence, in such cases there is no carbonate deposition in the sea bottom. Instead silica (called chert by the geologists) may occur, sometimes alternating with carbonates. Remnants of such chert and "cherty-limestone" beds are described from the upper Bódva valley. Meanwhile, most of the present area of the National Park still remained a continental fragment, where conditions similar to that described above persisted for a long period of time. Finally also the rate of subsidence of this fragment has been accelerated, as a result of which reefs (strictly dependent on shallow water) could not survive. They became covered by a fine mud consisting of tiny little skeletons of floating unicellular organisms characteristic of the open sea. The most important group of these organisms are the Radiolarians, the skeletons of which are made of silica instead of carbonate. Deep water sedimentation continued also in the Jurassic period. The results of shallow water sedimentation on distant carbonate banks were transported into the deep sea by underwater slumps. Their products, called olistolites, are of great interest here. Olistolites are huge blocks of rocks found in an alien sedimentary environment (in this case embedded in sediments of the open sea). Traces of volcanic eruptions of an island arc, characteristic of the subduction of oceanic crust into the underlying mantle are also present in the Jurassic sedimentary complex here. Towards the end of the Mesozoic, in Cretaceous to early Cenozoic times, the area became uplifted and subject to intense erosion. The climate permitted the formation of red clay (terra rossa), and/or bauxite. After that, in Oligocene-Miocene times the area was again flooded by the sea. The sediments of this period are known, however, from very few places only. They were almost all eroded from the surface and are preserved only underground. Towards the end of the Miocene a large freshwater lake, the Pannonian lake - was formed the sediments of which comprise clays, sands, gravel and - along its margins - also coal seams. Overlying various kinds of older rocks, these Pannonian sediments are exposed along the rims of the limestone area and within small basins in between the hills, as for example in the vicinty of Bódvaszilas. Since Pannonian times the area has been subject to more or less continuous uplift. The resulting erosion stripped the Cenozoic cover of the limestone and dolomite

complex. The eroded material of the older rocks was deposited as alluvial gravel and sand in the valleys. Part of the surface became covered by fine airborn dust which - on weathering -was converted into red clay. Occasionally in this the red clay blanket, reworked fragments of the old Mesozoic bauxite can also be found. The youngest geological formations are: slope scree, alluvial fans, young unconsolidated alluvial sediments of the present-day valley bottoms and the sandy-silty, sometimes gravelly fillings of the caves.

THE FAUNA AND FLORA OF THE AGGTELEK AND SLOVAK KARST

The most important features of the Aggtelek and Slovak Karst are its marginal and transitional position. Biogeographycally it is situated in the overlap of the Carpathian and Pannonian flora-sector and as an independent flora-district, Tornense came into existance here, in specific karstic conditions. Most of the territory is covered by Middle-European deciduous forest, but many differences from this forest type can be observed. Edaphically unwooded or less closed stands can occur only on steeply fractured slopes and dolomite ridges. It is worth mentioning those areas where the extensive use (grazing, mowing) over centuries made it possible for specific secondary, but near-natural associations to develop. In spite of the fact that they are not primeval, they are also included in the biosphere reserve because of their significant species diversity. The extraordinary high habitat and species diversity of the territory is showed by the series of completely antagonistic faunal and floral elements and relic species. There are several north-carpathian, east-carpathian-south-balkan and boreo-mountain species living in the extrazonal beech forests of the northern hillsides, cool dolinas and the ravine forests of deeply incised valleys. Some illyr-carpathian elements increase the variety of the rockforest fragments on the steep rocky slopes. The stepp and forest-stepp (ponto-pannon and subponto-south-siberian) species are dominant in the fauna and flora of the grasslands and the underwoods of the scarcely wooded calciphilous oak forests. The oak forests of the warm southern hillsides, the shrub forests with pubescent oak and the rocky grasslands are rich in submediterranian, pontomediterranian and balkan representatives. The vegetation (with heather, juniper and robur oak) which is quite similar to the West-European Heide vegetation occur on the covered karst and it makes the picture more colourful with its character (completely different from the karst vegetation). According to the list (not final) based on the data of museums and the literature and the results of complex ecological survey: there are nearly 1500 plant species (70 species protected in Slovakia and about 110 protected in Hungary). Tornaian yellowdrop (*Onosma tornense*) is registered in the World Red Data Book and 4 other plant species are included in the European Red Data Book. In the territory 42 fish, 13 amphibian, 9 reptile, 178 (127 nesting) bird and 57 mammals species had been identified so far. The avifauna includes 23 species that are endangered at the European scale. One of the mammals,

European ground squirrel (*Citellus citellus*) is a seriously endangered species, registered within Bern Convention.

EXCURSION TO SLOVAK KARST

Gombasek cave was discovered in the year 1951. The cave is open to the public, and a national nature monument. Characteristic are the 2-3 m long straws (long, thin dripstone formations). Limestone production is clearly evident on the adjacent slope of Plesivec plateau.

Zadiel Gorge; national nature reserve, most beautiful gorge in Slovak Karst and formated by Blatnicá brook. Length of the gorge approx. 2200 m, depth around 300 m, width of bottom in some places is only 10 m, entire rise in elevation 205 m, the walls of the gorge in places are vertical interesting characteristics include the morphological formation Cukrová cone, unique plants and animals, and the inversion of vegetation zones due to local climatic conditions. An information trail is also present.

The waters of the Blatnisky Potok pounded on the limestone plateau massif for millions of years. In that time they broke the way up to the Turna basin and created a monumental george of the Szádelői (Zadiel) valley. For its specially botanic and zoologic values it was declared a state and later national nature reserve. Its area is 214,73 hectares and is located in the cadaster area Borka and Háy. The nature reserve documents the influence of water upon the morphology of landscape, the evolution of flora and fauna in the postglacial period and the influence of the terrain relief on the occurrence of species.

GEOMORPHOLOGY

From the morphologic point of view the Slovak Karst is a conspicuous unit, which is beyond the whole landscape picture of the West Carpathians and consists of a system of plateaux edged by the steep slopes bending to the bottoms of adjacent basins, or canyon-like valleys and gorges. The most beautiful morphologic phenomenon of the Slovak Karst is undoubtly a gorge of the Szádelői (Zadiel) valley. The water of the Blatnicky Brook cut into the limestone rocks, in which its riverbed is still deeper. A gorge was created by step-by-step collapse of ceilings of the passages and caves. The walls of the gorge were firstly shaped by vertical erosion. A slight sign of the original bridge over of the valley can be seen on its upper end. The length of the proper gorge is about 2200 m, and its depth is about 300 m, when right side is some 50 meters higher than the left one. The width on the botton of some of its places is only 10 meters, the lowest point of the gorge above the Szádelői (Zadiel) village is 270 meters above sea level and its mouth in upper part is in the height of 475 meters. Total elevation is thus 205 meters. The gorge runs from north to south; its walls are in some places almost vertical. In the upper two thirds they widen in a V shape. On both its sides can be

seen rock ridges going vertically, in higher parts extremely weathered and creating numerous spires. Among these valley ribs hollows can be found, in the higher part these are covered with forest growth, changing over in the low part to the broken rocks, which at the valley create talus in places. Attention is attracted by a cone rock shaped by the erosive activity of water. The rock was named a Sugar Loaf for its shape. The Blatnicky Brook flows alternately in the right and left sides of the road and creates small waterfalls and cascades. In the gorge's walls the traces of previous action of running water can be seen. Water with its pressure and with the help of rock fragments polished in the walls different bowls and hemispherical pits, so- called pressure giant pots. While on the right side of the gorge spread the forest plateau of Horny vrch (the Upper Hill), on the left side is the Zádielska planina (the Szádelői (Zádiel) Plateau), which is mostly bare with groups of broad-leaved growth. A few smaller caves were found in the Szádelői (Zádiel) valley, of which the most important are the Kostrová, Královska and Bobková caves.

EXPOSED CARBONATE ROCKS

The most characteristic sign of the karst surface are exposed carbonate rocks and calcareous fields. Vegetation is varied especially in the spring, when there is still enough moisture in the soil. First flowers are usually *Draba lasiocarpa* and *Pulsatilla slavica* and *Pulsatilla grandis*, later flowers *Potentilla arenaria*, *Aster alpinus* and *Iris pumila*. On the rocks is the scented *Dianthus lumnitzeri*. With its eye-catching appearance is *Dracocophalus austriacum and* the shrubby ones *Chamaecytisus hirsutus* and *Genista pilosa*. *Sedum sexangulare* and *Sempervirum tectorum* are adapted to the extreme conditions. In the chinks of limestone rocks *Asplenium ruta-muraria* and *A. trichomanes* take refuge. The typical character of the limestone surface of plateau is given by grassy growths of *Carex humilis* and *Festuca pallens*. On the karst plateaux not only characteristic flora, but specific fauna was developed as well. Of reptiles is worth mentioning a lizard *Lacerta viridis* and *Lacerta muralis*. Butterflies are represented in great numbers, and very rare is *Saga pedo* and Praying mantis *Mantis religiosa*.

FLORA

The Szádelői (Zádiel) valley is an important finding place of rare species, some of which found their refugium in the glacial period, and others have their north border of distribution here. Plant communities in the gorge document an inversion of vegetation zones. On sunny margins at the elevation about 600 m above sea level, plant communities with important xerothermic species can be found, such as: *Scorzonera austriaca, Bupleurum affine, Aurinia saxatilis, Melica ciliata, Aconitum anthora, Allium flavum* and others. On the bottom of the valley, where cold and moist air gathers, dealpine kinds occur, such as: *Bellidiastrum michelii, Phyllitis scolopendrium, Valeriana tripteris, Saxifraga*

paniculata, *Campanula carpatica*, *Primula auricula*, *Aster alpinus*, *Arabis alpina*, *Crepis jacquinii* and others. In the upper part of the valley *Petasites hybridus* is abundant. On the vertical slopes *Cyanus triumfettii* grows, in late summer *Anthericum ramosum*, in broken rocks *Campanula carpatica*; of ferns *Gymnocarpium dryopteris* and *Cystopteris fragilis;* on soaked places of broken stones *Lunaria rediviva* is in great numbers. While on the elevated spots and rocky ridges the original European larch tree and Scots pine is preserved; in gorges we can find autochthonous yew, which has here one of the lowest situated sites of its natural occurrence in this country.

FAUNA

Contingent upon the climatic conditions were developed zoocoenoses characteristic of the steppe and forest-steppe zone in the region of the Szádelői (Zádiel) valley. On the damp and cool places, specially on the bottom of the gorge, the alpine and subalpine species found the optimum conditions, as the plants did. Important group of fauna, alas only sporadic, includes birds, whose names have been for long years in the list of protected species. Before anything else is an eagle *Aquila heliaca*, which can be sometimes spotted circling above the valley, exploiting the air currents. No less rare is a falcon *Falco cherrug* and *Falco peregrinus*. More frequent in the Szádelői (Zádiel) valley is a raven *Corvus corax*, less common is a stork *Ciconia nigra*. All these birds, regularly nest in the Szádelői (Zádiel) valley in great numbers in the past. Of the mammals it is necessary to mention *Lynx lynx*, *Felis silvestris*. *Meles meles* and as the case may be also *Martes martes* and *Martes foina*; of the even-toed ungulates the red-deer, roe-deer and wild boar are common. Of an interest are the animals perfectly adapted to the conditions underground, as is for example the troglobiot *Mesoniscus graniger*. In rocky holes and caves live the bats *Rhinolophus ferrumequinum* and *Rhinolophus euryale*.

FOREST ASSOCIATIONS

Primeval forest growth gave way in the past to the booming grazing, and shallow soil loosened by grazing cattle was gradually washed away. The extreme conditions are best tolerated by bushy communities, which we rank among *Corneto-Quercetum*. Of the original woody species we can find *Quercus pubescens*, *Q. petraea*, *Q. cerris*, *Fraxinus ornus*, *Cerasus mahaleb*, *Acer tataricum*. Bushy character vegetation obtains thanks to *Cornus mas*, *Prunus spinosa*, *Crataegus monogyna*, *C. laevigata*, *Euonymus verrucosus*, *Spiraea media* and others. In some places *Staphylea pinnata* occurs. Significant components of the herbaceous synusion are the species of steppe and forest steppe character. Of grasses the sedges *Carex humilis* and *C. michelii* and *Festuca valesiaca* are very well represented.

BIBLIOGRAPHY

Baross, G. & Kövesdi, J. & Újvárosy, A., 1995: Caves building up on conservation purpose in Aggtelek National Park.- Simpozio Internazionale / International Symposium Show Caves and Environmental Monitoring (Frabosa Soprana 24-26/III/1995), p. 51-55

Guide to excursion to Slovak Karst as part of the OUVERTURE program

Hazslinszky, T., 1991: Aggtelek - Baradla-Höhle.- TKM Egyesület az Aggteleki Nemzeti Park Igazgatósága, Debrecen, 16 p.

Horling, R., 1988: Magyarország Barlangjai, Baradla-Cseppköbarlang, Aggtelek - Jósvafő.- Magyar Diafilmgyártó Vállalat, Budapest

Kiss, E., 1988: Látogatás az Aggteleki Nemzeti Parkban.- Országos Környezet - és Természetvédelmi Hivatal, 36 p.

Kovács, G., 1980: Hortobágy - Meggyes-csárda.- TKM Szervező Bizottsága és az Országos Környezet, Debrecen, 16 p.

Ponzio, R. & Enggist, P. Renaturierungsarbeiten auf dem Reisfeld von Karácsonyfok in Ungarn.- Natur- und Vogelschutzverein Hortobágy, Debrecen

Salamon, F. Breeding Birds of the Saline Pastures of Hortobágy.- Országos Környezet - és Természetvédelmi Hivatal Hortobágyi Nemzeti Park Igazgatósága, Debrecen

Tóth, K., 1988: Die Nationalparke Ungarns - National Parks in Hungary.- Directorate of National Park, 15 p.