

KARST and CAVE

BULLETIN OF THE HUNGARIAN SPELEOLOGICAL SOCIETY

SPECIAL ISSUE

ON THE OCCASION OF 7TH INTERNATIONAL SPELEOLOGICAL
CONGRESS HELD IN ENGLAND 1977

Landmarks in the history of Hungarian karst and speleological research

Dr. Sándor LÁNG

Chairman of the Hungarian Speleological Society

Ties between man and karst in Hungary go back to very early times as in the instance of settlements established 1,500 to 2,000 years ago in what is now Budapest. These owe their birth and survival to the presence of karst springs. Karst and speleological research in the modern sense developed about 200 years ago when individuals began to explore the caves of the Carpathians and other mountains and then to survey and map them and analyse data by scientific methods. Pre-eminent amongst early workers was the engineer, Imre Vass, who in 1825 discovered the extension of the Baradla Cave, surveyed it very correctly and published a brilliant bilingual monograph about it.

Later on, cave surveying and mapping was extended over greater areas, both geographically and thematically. During the past 100 years or so an inventory of Hungarian karst areas and caves was built up and scientific and practical research gradually developed. Much early data and analysis e.g., in the fields of archeology and geomorphology, etc., remain valid today. Notable contributions include the start of paleo-anthropological research in Hungary as a consequence of cave excavations by Ottó Herman, a Hungarian polymath who made very remarkable progress in various scientific fields; Jenő Cholnoky's explanation of the relationship between caves and rivers in his synthesis on karst morphology; Ottokár Kadic's contribution to the classification and systematization of caves; and the outstanding results obtained by Lajos Steiner in speleoclimatology—the first research work of these kinds to be undertaken in Hungary.

Speleobiology was highly advanced as early as 50 years ago, due to research work carried out by Endre Dudich in the Baradla Cave. Published as a monograph, the results obtained by this outstanding scientist have been fundamental achievements.

All in all the representatives of the five or six early generations of Hungarian speleologists are to be praised for their hard work and achievement of lasting results of an inestimable value, despite working with very modest facilities. Their legacy in a number of fields, in part mentioned above, has been fundamental and is still used.

Because karst and cave research requires much collective work, cave discovery and exploration gradually became the object of organised effort as early as 100 to 150 years ago. Following the War of Independence of 1848, the first organisers of Hungarian speleology were various scientific societies operating informally, such as the Society of Hungarian Physicians and Nature-Lovers, the Hungarian Geological Society, the Hungarian Geographical Society and, later and locally, the Hungarian Association for the Carpathians and the Transylvanian Association for the Carpathians. By the turn of the century the time was ripe to establish a special Commission on Speleology within the Hungarian Geological Society which in 1926 became an independent Speleological Society. The new society published a periodical of high scientific standing as well as other occasional scientific publications.

Since the Second World War, Hungarian karst studies and speleology has developed by leaps and bounds. Significant publications of this period are several times greater in number than those published during the preceding 150 years. Hungarian State organisations have become increasingly interested in using the research

results. The last three decades of Hungarian speleology have been characterised by the initiation of interdisciplinary research projects aimed at, amongst other things, discovery of concealed caves from geomorphological, geological and hydrological evidences above ground. One consequence of this development was the discovery by László Jakucs in 1952 of Béke Cave, the second lengthiest decorated cave in Hungary. Funds invested in karst and speleological work, as in any other kind of scientific research, depend upon growth of the gross national product and standard of living. Because national income and living standard have tripled or quadrupled during the last thirty years financial support from governmental and non-governmental sources for exploration and development is now much higher than ever before.

Objectives of karst research today are related to general trends of economic development. On the one hand, a major principle adopted is that the science of today is the practise of tomorrow; on the other hand given the regrettable fact that Hungary is poorly supplied with mineral and energy resources and industrial raw materials, even the karst regions may represent important raw mineral resources. Consider the bauxite mining of Hungary, which is second in output in Europe and requires comprehensive karst scientific input to geological reconnaissance, prospecting and mining because the deposits occur in highly karstified areas. Another up-to-the-moment field is that of karst water prospecting which has developed in its modern complexity only during the past thirty years. A few enthusiasts initiated work during the late 1930s. Now there are more than fifty research specialists occupying full-time positions in various scientific institutions.

To prospect for karst water is a much more complex task than the investigation of surface karsts because of the intricate and complex vertical pattern of subsurface karst aquifer distribution in Hungary. Karsted rocks at 0–3,000 meters depth underly about 1/3 of the national territory. However, only 6–7% of this occurrence is represented in outcrop, the remainder being concealed by younger rocks ("deep karst"). On the "surface" of hidden karst rocks or between them there may be accumulations of bauxite or possibly of coals or other sedimentary rocks of industrial value. Because the deep karst rocks tend to be more fractured than adjacent strata they tend as a rule to have twice to three times the yield of thermal water commonly expected from other sediments, as has been established by drilled wells.

The above example has been just one small instance picked at random from the enormous mass of information on Hungarian karst hydrology that is now available both to theoreticians and to practical scientists, promoters of the development of the people's economy.

With increase of scientific knowledge of the karsts of Hungary, it has become possible to carry out practical projects of increasing sophistication. Examples include the control of karst water draining into mines and the utilisation of this waste water by industrial plants, power stations and municipal water authorities, etc. Here there is collaboration between two entirely different interests: on the one hand, the wish of miners to dispose of unwanted water and, on the other hand, the wish of industrial managers etc., to obtain reliable and economical water supplies. A good instance of this collaboration is the water supply system of the northern and western shores of Lake Balaton.

Excessive karst water withdrawal, however, may upset the equilibrium of the natural environment. Hungarian karst scientists are now seeking to persuade miners that rates of karst water withdrawal must not exceed average annual rates of infiltration, which are approximately 500 cubic meters per minute in the Transdanubian Mountain Range and about 750 cubic meters per minute on the national average. Two special meetings of Hungarian karst researchers recently have been devoted to the problem of drastically waning recharge to the country's famous spa, Lake Hévíz, due to uncontrolled water pumping from mines. Here karst research is becoming associated with nature conservancy and environment control. There is plenty of work to do, for in Hungary quarrying has reached the point of devouring the nation's most scenic limestone hills e.g., the Nagyarsány, the Nagyszál, the Esztramos, the Bélkő and others. Hungarian researchers have developed and submitted proposals for long-term, economical limestone quarrying operations without spoiling the scenic beauty of the mountains and hills.

The recognition that a cave's atmosphere may favourably influence the recovery of persons suffering from illnesses of the respiratory tract has enhanced development of a new branch of knowledge—speleotherapeutics. This new branch is an off-shoot of speleoclimatology. To be able to cure people in a cave it is necessary to be familiar with meteorological conditions of its atmosphere and their variations, particularly if the cave is visited frequently by patients or tourists. Speleotherapeutics, like karst hydrology and cave tourism, is one of the new developing areas of practical use of caves.

Both the classical and new areas of cave and karst research are pursued by large numbers of Hungarian workers. As a rule, research is co-ordinated by the Hungarian Academy of Sciences, the Federation of Hungarian Scientific and Technical Societies or the government ministries or other relevant State organisations. The ranks of the Hungarian Speleological Society include more than half a dozen Ph.D.'s, more than ten Ph.D. candidates and an even larger number of M.Sc.'s. Their exemplary activities stimulate new generations.

Prof. Sándor LÁNG,
Eötvös Loránd University
Geographical Department
H-1083 Budapest
Kun Béla tér 2.
HUNGARY

English translation revised by D.C. Ford.