A REVIEW

by
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Lying on the southwestern margin of the Bakony, between the Little Hungarian Plain (Kisalföld) and the Tapolca Basin, where mountains and plain meet, Sümeg is a favourite touristic highlight abounding with cultural and historical monuments of the Lake Balaton region (Fig. 1). Few of the visitors to and even of the residents of Sümeg are aware of the opulence with which this region has preserved the records of the geological past, the traces and marks left over by geological phenomena. The diversity of geological formations is worthy of attention not only from scientific viewpoint, but some of them can be exploited as raw materials for the building industry and aluminium industry, proving eventually suitable for being used even to fuel future power plants. As evidenced by archeological finds, the Mogyorós-domb to the south of the town was the scene of an extensive flint mining already in prehistoric times.

Geoscientists have for a long time been aware of the geological significance of the area.

In his travelogue of Hungary published in 1825, Beudant, the famous French geologist, did already mention some formations from the study area, describing limestone beds with Hippurites and Radiolites from the vicinity of Sümeg.

The first regular geological survey was carried out in the 1870's. On the 1:144,000-scale map of János Böckh published in 1875 the geological features and the major formations of the Mesozoic block of Sümeg were already well outlined.

The discovery of the Upper Cretaceous coal seams of Ajka also falls in the fifties of the last century and this development pushed the exploration of the Sümeg area, with its geology similar in many respects to the former, into the fore. It was first of all the works and papers of János Böckh and Miksa Hantken that called attention to this circumstance.

Marked progress after these pioneering ventures came with the activities of Lajos Lóczy Sr. Lóczy's recognition of the particular geological importance of the area is proved best by the fact that in his Balaton monograph he devoted special chapters to the geology of the Sümeg area, even though it does not belong to the immediate neighbourhood of Lake Balaton.

It was in this Balaton monograph, that a description of the Jurassic of Sümeg, the first paper ever penned by Elemér Vadász, came to daylight.

Between the two world wars, encouraged by the surface and subcrop indications and the particular geological features, the first steps toward mineral prospecting and first of all the exploration of coal and bauxite deposits were taken.

Between 1929 and 1935 Sándor Vitális reported in a number of papers on the occurrence of coal near the surface. In this context a few exploratory holes were even drilled. These ventures, however, had but little success.

Tangible results were achieved in bauxite exploration. In 1929 Károly Telegdi Roth found traces of bauxite to the southeast of Sümeg and he declared that area worthy of continued exploration. Eventually the exploration was continued under Elemér Vadász's guidance and the extraction was started, too.

In the interwar period some monographic works mainly of stratigraphic orientation were written (K. Barabás 1937, R. Hojnos 1943). Even though widening the knowledge, these works, on account of the misleading conclusions drawn, did not add much clarity to the geological picture.

A link between pre- and postwar prospecting was represented by the activities of J. Noszky Jr. and S. Vitális. Noszky started his detailed geological mapping of the area in the first half of the 1940's and the results would be published in the postwar years.

During the detailed geological mapping that was carried on in the 1950's an exact survey and description of the outcropping geological formations were made.

In the fifties, the enormous efforts toward industrial development put up again the need for bauxite and coal explorations. Upon S. Vitális' proposal, the Hungarian State Collieries included exploratory drillings in its plan in 1948 already, but its implementation—upon G. Kopek's pro-

posals—could not until 1957 be started. Re-launched in 1950, the bauxite exploration too would witness a marked upswing only in the late 1960's and led to remarkable results to the east and south-east of Sümeg, respectively.

From the late 1950's on, upon J. FÜLÖP's incentives and under his guidance, a so-called Geological Key Section Program was launched which was to examine the connections between geological features and facies relations and to enable a reliable stratigraphic classification and to clear the tectonic setting as a scientific base to rely on by mineral explorers. Laying foundations for an up-to-date synthesis, these efforts during the 1970's would develop to a regular geological surveying.

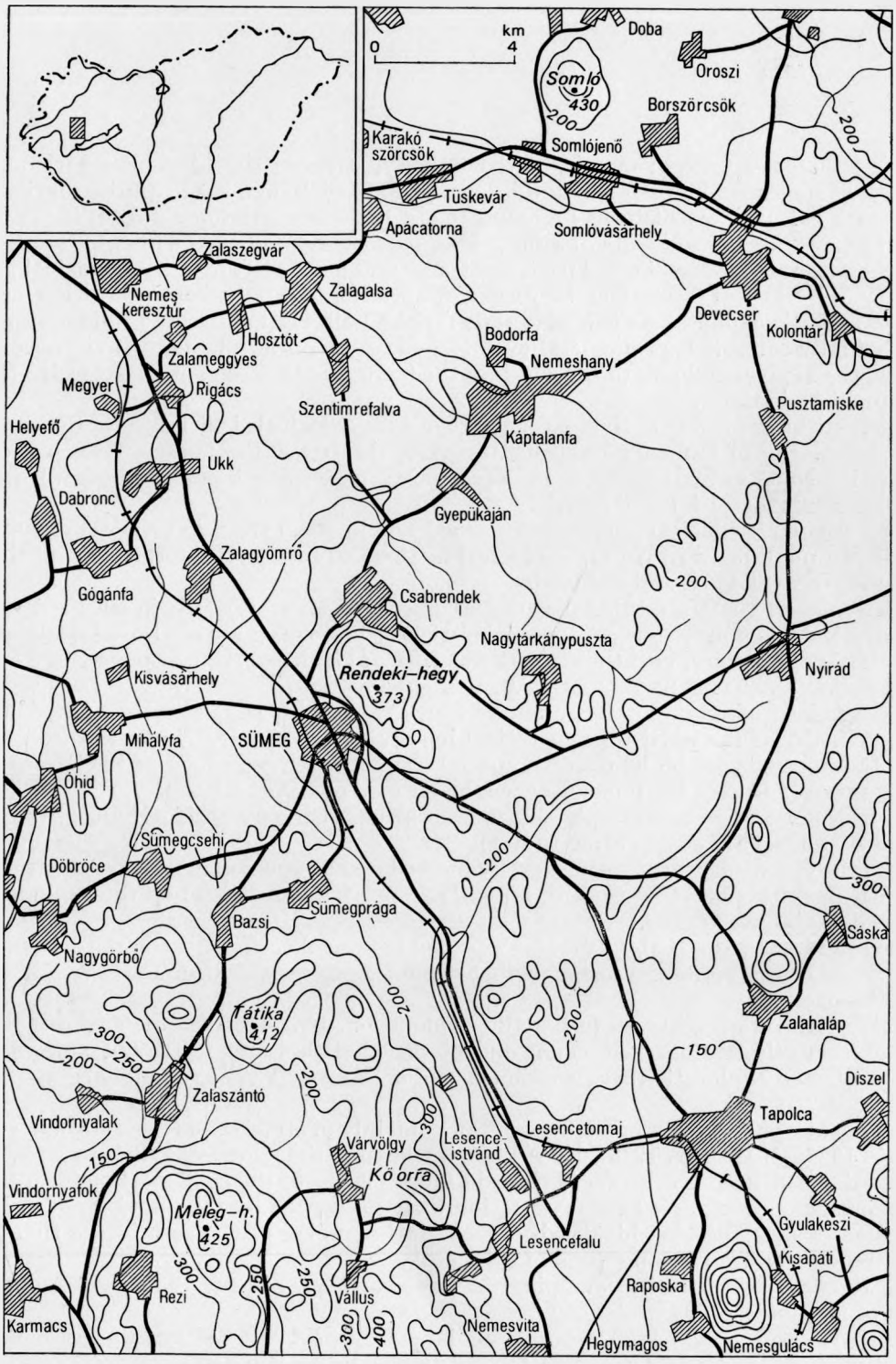

Fig. 1. Geological chart of Sümeg and its surroundings (the Sümeg area)

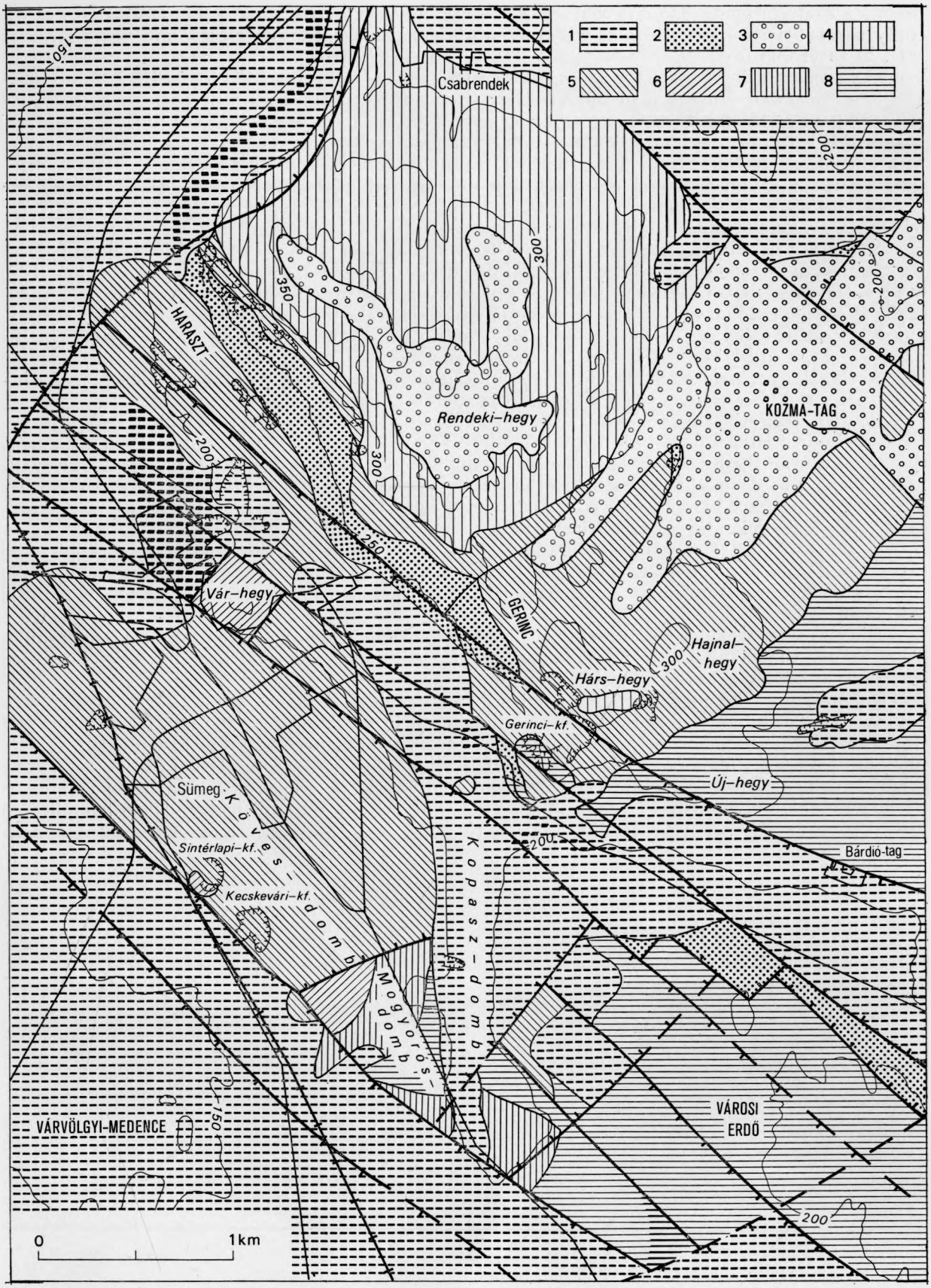

Fig. 2. Geological scheme of the Sümeg area

1. Pannonian, 2. Miocene, 3. Oligocene, 4. Eocene, 5. Upper Cretaceous, 6. Lower to Middle Cretaceous, 7. Jurassic, 8. Triassic

As a result of more than one century of research an ever clearer portrayal of the geology of the study area is being achieved. Armed with present-day knowledge, let us overview now the study area (Fig. 2) as visible from the Vár-hegy, a castle hill soaring high from amid the houses of the settlement and representing a textbook example of a high-perched horst bounded by faults from all sides.

The range extending east of the Vár-hegy (Rendeki-hegy, Hárs-hegy, Szőlő-hegy) is the most elevated part of the basin-surrounded Sümeg horst-block. The northern and the highest structural unit of this is the Rendeki-hegy composed of Eocene rocks overlying an Upper Cretaceous sequence with outliers of an Oligo-Miocene gravel sheet. On the Hárs-hegy occupying an intermediate position even topographically, Senonian marine sediments crop out with a few bauxite-filled dolinas and Eocene outliers on their karsted surface. Surrounded by gentle slopes, the Szőlő-hegy is constituted by Upper Triassic Hauptdolomit.

The rocky basement of the so-called "urban terrace" was trimmed to a subhorizontal face by the Pannonian abrasion. Above it the littoral boulders and pebbles, sandy argillaceous sediments of the one-time Pannonian inland sea occur in isolated patches. In the underlying beds the formations of the Miocene marginal sea can also be encountered, though the bulk of the underlying, often steeply-dipping sequences belong to the Senonian cycle or to pre-Senonian parts of the Mesozoic. On the Köves-domb, a hill lying to the south of the settlement, there are rudist-bearing reefs of Senonian age, on the Mogyorós-domb in turn it is exposures of unmatched beauty of Lower Cretaceous formations that unfold before the eyes of the observer.

Bounding the urban terrace westwards, the young stepped fault system is of regional significance, representing actually the western tectonic ending of the Bakony. In the Várvölgy Basin separating the Bakony from the Keszthely Mts, the Mesozoic basement lies at hundreds of metres depth, while in the Nagygörbő depression representing the northern foreland of the Keszthely Mts even the surface of the Upper Cretaceous sequence is deeper than 1 km. Along deep-penetrating faults basalt lava extruded in Pannonian time, as testified to by the mesa-buttes of Sümeg–Uzsa.

To the north lies the lowland of the Little Hungarian Plain (Kisalföld). As shown by geophysical surveys and some boreholes, the Sümeg block extends well into that area in a northwesterly direction towards Ukk, where Mesozoic formations are hidden beneath a Pannonian overburden of reduced thickness.

The above mozaic, however roughly outlined, is based on evidence derived from a maze of minor observations, that have had to be put together bit by bit. The facts and the conclusions deduced therefrom are detailed in the following chapters.

One may pose the question, if the publication of a geological monograph on the study area does not give the students a ready-made stuff, minimizing their efforts towards the solution of problems? Our answer is that to teach an up-to-date stock of learning and modern techniques requires up-to-date fundamentals and a higher level of understanding will encourage the formulation of the tasks to be solved on a higher level. We wish to instruct the would-be scientists so as to enable them to approach by modern tools and sophisticated techniques to the solution of the more difficult and more complicated tasks they may be confronted with in the years to come.