

History of lignite exploration in Hungary

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The history of lignite exploration differs in many aspects from the history of hard and soft coal exploration in Hungary. The economic significance of lignite deposits came into the foreground later only and their systematic exploration followed coal exploration with some delay of several decades. It was observed only in the decades following World-War II. that lignite of considerable thickness can be found near the surface, lying nearly horizontally, making the establishment of fully mechanized, big scale open pit mining possible. Lignite represents actually more than 1/3 of the total coal reserves.

The first data about Hungarian lignites appear in 1841. From this year on several mining-geological, paleontological, stratigraphical reports are consecutively published about the individual Hungarian lignite deposits. The most important of them being the descriptions of the following lignite deposits: Hidas by K. PETERS (1861), Budafapuszta by D. STUR (1869), Herend by BÖCKH (1874). After a long interruption the study of K. TELEGDI-ROTH was published about Várpalota (1924), followed by a very detailed study of Z. SCHRÉTER about the coal and lignite district in Borsod and Heves county. S. VITÁLIS published the description of the lignite deposits at Selyp and Rózsa-szentmárton in 1941. F. SZENTES described the lignite deposits at Erdőkürt (1943) and S. JASKÓ those in the western part of Vas county (1948).

The descriptions published in the past century contained only the stratigraphical sequence and the determination of a few typical fossils, but did not supply some more detailed geological-paleontological data. More detailed examinations of the collected material were begun in the twentieth century only. The fossil flora was examined by J. TUZSON, S. SÁRKÁNY, F. HOLLENDONNER and Á. HARASZTI. From the most recent publications the monography about the palynological examinations of some Upper-Pannonian lignites at Mátraalja, compiled by MRS. L. NAGY in 1958, shall be mentioned. The microscopic petrographical characteristics and chemical composition of different lignite sorts are described in the paper published by E. VADÁSZ, and T. GEDEON in 1940. The very rich Mollusca fauna in the lignit basin at Várpalota is described by L. STRAUSZ, and T. SZALAI.

The different investigations proved that lignite deposits were formed in Hungary during the Helvetian, Tortonian, Lower-Pannonian and mainly during the Upper-Pannonian. In contrast the Sarmatian shows some insignificant, scattered occurrences only.

Before 1959 exploration was carried on in small scale and unsystematically. Drillings were located by the local leadership of some mines to solve occasional

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production problems only. Exploration drillings were completed in this period mainly in the vicinity of Hidas, Várpalota, and Rózsaszentmárton. In addition to drilling, the sinking of small exploration shafts, and the driving out of some short prospecting galleries played also a relatively important role, carried out usually at some lignite outcrops, or to follow some seams penetrated by water-well digging. They were not very deep and when flooded they were given up immediately. This scattered, small scale exploration was continued with poor technical equipment, lacking sufficient capital funds. Especially numerous small scale mining locations were developed during the years following the first World War, in the time of big coal shortage between 1919—1925, to satisfy local demands. They could not survive and were soon shut down. Only the subsurface mines at Várpalota and Rózsaszentmárton survived after the termination of the coal prosperity.

Some big scale exploration began in 1959 to explore lignite deposits suitable for open pit mining. First the area between Visonta village and Tarna-stream was investigated by numerous exploration drillings, located along a regular grid. During the following years also the southern foothills of the Mátra, Bükk and Cserhát mountains, further on the area around Szombathely in Western-Hungary were explored the same way. About these drillings some short data were published by L. CSILLING and S. JASKÓ. The unpublished reports, describing the geological conditions and the amount of reserves suitable for open pit mining are more voluminous. They were compiled in addition to several geologists also by the contribution of many different organizations, since the tasks were divided according a predetermined schedule. The most favourable deposits are found at Ecséd, Visonta and Bükkábrány along the foothills of the Mátra and Bükk mountains and Torony, respectively, in Western-Transdanubia.

Formerly it was a generally accepted opinion, that only those parts of a lignite deposit can be mined, which are above the static level of the artesian water. It was thought that it would make mining very costly to go down below the water table due to excess expenses of water lifting, thus making mining rather uneconomic.

Under the formerly existing production circumstances this opinion was correct, but now conditions are different. The efficiency of big scale, fully mechanized open pit mines is surpassing the efficiency of the ancient hand dug shafts in such an extent, that water lifting expenses are negligible. Therefore in case of lowering the water table by pre-draining in time, makes open pit mining fisible also under the natural water table. As e.g.: the open pit mining around Visonta (Mátra foot-hills) is conducted also under the static artesian water level.

The application of this principle augmented the amount of producible reserves in a great extent along the Mátra—Bükk foot-hills. E.g.: the total estimated reserves in situ („geological reserves”) of the planned open pit mine at Bükkábrány make some 863 million tons, out of which some 551 million tons can be depleted.

About the practical results of exploration, i.e. about the growth of reserves, country-wide data are available only since 1916. K. HAUER, M. HANTKEN and S. KALECSINSZKY compiled some tabulated data about some individual lignite occurrences already during the last century showing the geological age, quality and yearly production, yet they did not publish any data about the available reserves. In 1916 the big iron ore and coal monography of K. PAPP was published. The monography contains already the reserves of the individual occurrences

grouped according to the grade of investigation and quality differences. Hidas, Várpalota, Mátraalja are described by K. PAPP as lignite deposits. Consecutively some more publications were made by other authors about lignite reserves. The tabulation below shows the in print published data in different time periods. It can be seen very clearly, that the amount of reserves continuously increased despite growing production. This is valid especially with respect to Pliocene lignites the reserves of which were given in 1939 as being 180 million tons, increasing to 320 million tons in 1945 and to 1500 million tons in 1966. The considerable increase is the result of two factors. First: the exploratory drillings placed along a systematic grid proved the extension of lignite deposits over a much bigger area; second: the more recent reserve calculations consider also the reserves under the static artesian water level, which were not taken into consideration before.

Lignite reserves of Hungary (in million metric tons)

	K. PAPP* 1916	I. VITÁLS 1939	SCHMIDT, TELEGDI-ROTH 1945	BARTKÓ, HEGEDŰS, KÓKAY 1966
Miocene lignites (Hidas, Herend, Várpalota)	1.0	100.0	100.0	272.0
Pliocene lignites (Mátra-Bükkalja, É-Borsod, Ny-Dunántúl)	1.2	180.0	320.0	1500.0
TOTAL	2.2	280.0	420.0	1772.0
Ratio of lignites in the total coal reserves of Hungary, per cent	0.2	20.0	28.0	34.0

* only those in the area of present Hungary.