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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 lignite appear in 1841. From this year on several mining-geological, palaeontological, 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 detained 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 Rózsaszentmárton 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 detained geological-palaeontological 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 monograph 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 lignite basin at Várpalota is described by L. STRAUSZ, and T. SZÁLAI.

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. Boreholes were located by the local leadership of some mines to solve occasional production problems only. Exploration drilling was 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 prospection 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 founds.

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 the Tarna stream was investigated by numerous exploration boreholes, 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 boreholes 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 pre-determined 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 feasible 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 foothills. 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 monograph of K . PAPP was published. The monograph 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 lignite 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 drilling 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)

	Papp 1916**	Vitális 1939	Schmidt, Telegdi-Roth 1945	Bartkó, Hegedűs, Kókay 1966
Miocene lignite (Hidas, Herend, Várpalota)	1.00	100.00	100.00	272.00
Pliocene lignite (Mátra-Bükkalja, É-Borsod, Ny-Dunántúl)	1.20	180.00	320.00	1500.00
TOTAL	2.20	280.00	420.00	1772.00
Ratio of lignite in the total coal reserves of Hungary	0.20%	20%	28%	34%

** only those in the area of present Hungary.

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(Földtani Közlöny, Bull. of the Hungarian Geol. Soc. (1980) 110. 12 —14)

PERT: Program to compact EDS card image files

by T. Jasko

1. Purpose

This program creates compacted uniform fixed field records from EDS card images by suppressing redundant fields and repeating keys for each record.

2. Procedure for Well Stratigraphic Framework files

```
$A1 9=input filename
$A1 8=output filename
$TJ:PERT
004 004 009 100
001 009 057 001 045
002 032 066 046 090
003 035 066 091 132
004 036 062 133 170
004 065 066 171 172
```

3. Parameters

First card: Job name (first 7 characters will be displayed)
Subsequent cards have the format 5 (I3, 1X). Record card: Output type, record sentinel, print full, print total.

Field group cards: input card type (4th column), range of columns in input, byte range in output. Up to 10 field groups can be defined. Where card type is not matching any of the field groups defined, the card is ignored.

4. Input and Output

Units 1, 2, 4, 5, and 21 are used. Default assignments:
1=SYC [program parameters]
2=SL0 [messages and Job summary]
4=input of EDS card images
5=output [blocked]
21=scratch

In the printout the job name is followed by input parameters. Then the first few output records are listed (as requested by the 'print full' parameter). On termination, the number of input cards and Output records is given.

5. Associated program elements

Main program in Fortran IV [SEL MRTM]
Uses subroutines RDEDIT, EYAS.

6. Requirements

Core size 12 pages. CPU time required for converting
6900 cards to 2160 records: 3 min 27 sec.

7. Note

Does not use M:ERRFLG.

(Software Update no.15, 28 May 1980)

MOSS : CI to DA conversion

by T. Jasko

1. Purpose

This program converts files of fixed field card image records (record size may be 48 A4 or less) into direct access flies.

2. Procedure

$A1 5=input file
$A1 DA=output file
$TJ:MOSS
>>NNNNN-EEEE-LLLLL:RRRR<<

3. Parameters

NNNNN = starting block number (I5).
EEEE = end sentinel word to fill a full block after last valid record (a4).
LLLLL = last record number preceding presently loaded records in updating file (I5).
RRRR = run heading word (A4).

4. Input and Output

4.1 Files used
All units have catalogued default assignments.
l=SYC [program parameters]
2=SL0 [messages and Job summary]
5=Input of fixed field card Images (72A1)
DA=output [direct access file]

4.2 Listed Output

In the printout the Job name is followed by input parameters. Then the first 2 and the last 3 blocks of output are listed. Records are Output as read, in character format, except for a (binary) integer record number in last word of quarter block.

5. Associated program elements

Main program in Fortran IV [SEL MRTM].
Uses subroutines RDEDIT, EYAS.
Direct access output uses R:OPEN and R:WRITE.

6. Requirements

Core size 14 pages.
CPU time required for converting 300 records: 4.80 seconds.

(Software Update no.16, 7 July 1980)

New Data on the Neogene Development of the Eastern Mediterranean Basins

S. Jasko
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The Neogene sedimentation basins of Europe and the Middle East are orogenic foredeeps, tectonic graben or epirogenetic depressions. Geologic age, structure, form and size of these basins show some variations but a common feature is their continuous development for relatively long periods.

This way, the accumulation of incoming sediment could keep pace with the sinking of the basin floor.

On the other hand, the deep cauldron like collapse of the Mediterranean, the Black Sea and the Southern Caspian happened suddenly and for this reason these could not be filled with sediments. Near the shore, in deltas, formations are thicker; they are getting thinner towards the centre of the basin.

Fig. 1 shows the rate of sedimentation decreasing from the coast towards the centre of the Mediterranean; and increasing gradually, corresponding to the rate of subsidence, in the North Caspian and Pannonian Basins.

The deep cauldrons of the Mediterranean, Black Sea and the Southern Caspian do not fit among the Neogene foredeeps of the young orogens of Neo-Europe. They differ in form and the mechanisms generating them were different too. The collapse of these cauldrons has changed the development of the orogens. Some parts of the orogenic chains sunk and merged into the accompanying molasse foredeeps.

This process did not proceed uniformly everywhere. The Mediterranean was formed in the south of Neo-Europe and on the margin of the African plate in the early Pliocene; while to the north of Neo-Europe and on the margin of the Russian Platform the Black Sea and the South Caspian Depression came into existence in the late Pliocene and early Quaternary.

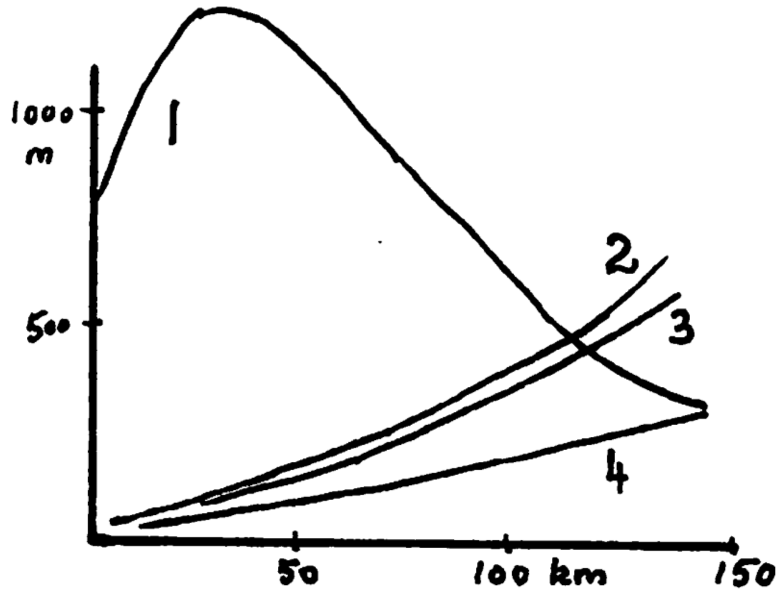

Fig. 1. Variation of sediment thickness on the margins of basins
1 - Mediterranean: Post-Messinian (Pliocene + Quaternary)
2 - North Sea: Pliocene + Quaternary
3 - Pannonian Basin: Upper Pliocene
4 - North Caspian: Upper Pliocene and Quaternary

Meanwhile, the spatial arrangement of sediment types has changed too.

In the foredeeps of orogenic chains the various lithofacii formed long drawn zones parallel to the strike of the orogen.

By contrast, only two litho-facies provinces can be distinguished in collapsed cauldrons. One occupies the central, major part of the basin consisting of fine grained sediments. The other, smaller marginal zone surrounding the central province consists of very variable rock types.

In terms of bio-facies the difference between fore-deeps and cauldrons is less sharply defined. Both types of basins had potential for marine, brackish and freshwater sediments depending on local palaeogeographic conditions i.e. whether an oceanic connection was enabled.

(In: The Geological Evolution of the Eastern Mediterranean. Abstracts of papers [Edinburgh]; p.58, 1982.)

DAEDAL : Database Editing and Listing

by T. Jasko

This program can be used for the serial editing of databases: updating existing datasets, inserting new datasets, or to display data serially.

Accessing the program

In TSM> type EDITD

Setting the range of editing

First, the user is requested to enter the following initial parameters:

database name
mode of Operation
password

The program declares the database, opens it and asks for

- repeating group name

- key item name; if none specified i.e. CR only input, the default is 'all' and no more parameters are asked

- logical relation (2 letter code): EQ, GE, GT, LE, LT, LB, LO

- value(s) of the key item

The appropriate nesting level is then entered and the designated repeating group is located. Each item of the dataset is displayed/accepted in turn.

Display and entry of data

Insert mode: name of database entry is displayed, followed by a prompt for the user to enter desired value. If skipped, the item will be inserted with the appropriate 'nil' (default) value.

Retrieval mode: name of item and its current value is displayed. No user input is requested except at the end of a dataset.

Update mode is a combination of Insert & Retrieval modes, displaying name, current value and prompting to enter modified value. If skipped (no valid value entered), current value remains unchanged.

The end of each dataset is indicated by printing the name of the repeating group and count within the range scanned. The user is prompted to enter skip control (if desired) or continue.

Skip control

The user can direct the program to skip to the next item, data set etc. or to redefine the repeating group, key, or database used by inputting a CR, N, R, D, X, H (!N, !R, etc. when a character item value is expected, i.e. on updating/inserting character or date type values).

Control Input	**Action taken**
CR only	No skip - but leaves value unchanged etc.
Innn	Skip to item nnn, where nnn = item sequence number (as displayed with item name)
N	Next data set
R	Redefine repeating group and/or key
W	Redefine where clause range (key, relation, value(s))
V	Redefine where clause relation & value(s)
D	Redefine database, access mode
X	Exit from program

(Software Update No.4: 22 December 1981)