

In memory of Professor Dr. Vilma Széky-Fux, the scientist and geologist

Emlékezés Dr. Székyné Fux Vilma professzorra, a tudós geológusra



20 May 1916 – 24 March 2006

On 24th March 2006 the Hungarian and international geological community lost one of its leading personalities in 20th century Central Europe. The doyenne of the first generation of women geologists and a highly rated teacher-researcher of two science universities died at the age of 90. She was laid to eternal rest beside her beloved husband, the lawyer-turned-geologist Dr. Ferenc Széky, who had died in 1993 at the end of a respectable life encumbered with vicissitudes. The Protestant funeral service in the Farkasrét cemetery in Budapest on 18th April was not only attended by her family but illustrious representatives of national scientific life, well-known personalities of the Academy of Sciences, science and technical universities, national institutions, professional and social organisations and a large company of friends, admirers and students. Farewell speeches were held by Dr. Miklós Kozák and Dr. György Vitális in the name of colleagues and students and on behalf of the Hungarian Geological Society, respectively.

Her family came from the Felvidék (northern part of historical Hungary), the mining town of Gölnicbánya (today Gelnica, Slovakia), famous for its medieval precious metal and copper mining later replaced by iron ore mining. Her ancient ancestors might have been those Saxons who were invited from Thuringia in several periods, primarily in the 12th century, to look after mining. The mountainous forested landscape with its richness in mining and geological formations, atmospheric old buildings and traditions founded the Earth and Nature loving character of those grown up there.

Her father, Antal Fux (1881-1974) the first representative of the family branch changing its name from 'Fuchs' to 'Fux' received his teacher's degree in Budapest, then from 1903 he taught chemistry and commodities in the Trade School of Debrecen where he later became director and school-inspector. He got married in Debrecen to Anna Eibl (1896-1945), who finished her studies in the same school and gave birth to three girls and a boy.

Their first child, Vilma Fux was born on 20 May 1916 during World War I in Debrecen, where she spent her childhood and school years. She was admitted to the Science University in Debrecen named after Count István Tisza, in the newly built central building of which she received her diploma in 1939 as a science - chemistry teacher. At that time science involved geology and biology and usually it was paired with chemistry or geography. She chose chemistry.

Thanks to her excellent talent, diligence and the knowledge of the German and French languages she was involved into the research work at the Institute of Mineralogy and Geology of the university as a student where she later became practicing assistant lecturer and from 1942 lecturer. Her famous teachers (Károly Telegdi-Róth, András Hoffer, István Ferenczi, Gyula Vígh) and her young colleagues (Kálmán Balogh, György Wein, László Dudás, etc.) who were or later became outstanding geologists of the century influenced immensely her early teacher's and researcher's development. Her attention was drawn primarily by mineralogy-petrology and geochemistry, however, she gained significant knowledge in the fields of geological mapping, laboratory analysis and rock microscopic investigations. Thanks to her family and teachers she knew well and visited on numerous occasions the Upper Hungary, Transcarpathia and Transylvania territories torn from the country by the Peace Treaty following World War I. Apart from study trips she carried out geological mappings as well in these regions.

In the course of these activities, following an American idea, she worked out a method to classify the Gemeric and Carpathian Mesozoic (mainly Triassic) limestones, lacking fauna on the basis of studying their solution residue. She wrote her doctorate theses from this topic in 1940 and she received summa cum laude doctorate degree in mineralogy-petrology and geology. She was a very creative, assiduous and productive researcher and these attributions characterised her throughout her career. She

published the results of her research in several languages so that the number of her publications amounts to 120 complemented by 20 reviews and conference reports and the same amount of long research reports unpublished.

She married the young lawyer, who later turned geologist, Ferenc Széky (1913-1993) in 1943 with whom they lived an exemplary and affectionate married life. They had two children, Péter Széky (1945-1985) a teacher and journalist and Annamária (1953-) an English specialist college associate professor. In the existentially difficult years of the war the husband of Vilma Fux received a job in Budapest therefore, giving up her firm job in Debrecen, she followed him. Due to her professional work done by the time, her excellent language skills and disarming character she received an appointment as assistant lecturer at the Science University of Budapest, in the Institute of Mineralogy and Petrology lead by the internationally acclaimed professor Béla Mauritz. In acknowledgement of her successful educational and research work she was then appointed assistant professor there from 1st November 1947. Like many others, her husband was taken POW at the end of WW II and spent seven long years in captivity. During those hard years she had her child, younger brother and retired father to look after besides doing her professional work. It is truly remarkable that in spite of all those difficulties she was able to produce such outstanding educational and research achievements.

Her attention was driven to the still unclear genetic questions of clay mineralization by the research of bentonitized rhyolite tuffs around Kőbánya, Budapest and she regarded this theme as her main research orientation marked by investigations at Komlóska and Telkibánya and by her educational handout on bentonites.

Following her movement to Budapest she became profoundly interested in the processes and productions of magmatism. She analysed the intrusions of trachidolerite veins of the Cretaceous alkaline volcanism in the Mecsek cutting through the Liassic coal seams, considering both the increasing of carbonification and magma crystallisation. Her dissertation, on the basis of which she received the title of candidate of earth sciences in 1952, was composed of her widely discussed papers on this topic. At that time (from 1950 on) the department was lead by Professor Elemér Szádeczky-Kardoss (a holder of the Kossuth Award) who, similarly to his predecessor, also acknowledged her research abilities. She was appointed associate professor from 1st January 1951.

The re-evaluation of the ore mineralization in Telkibánya, that used to be of European significance, had drawn her attention from the beginning. She took part almost continuously in the research of the Tokaj Mountains. First, she studied the petrogenesis of the volcanics around Telkibánya with Margit Hermann, then observing K₂O accumulations and recognising their significance, she continued her research focusing on the ore zones. Together with the reputable Gábor Csajághy, widely known for his contribution to geochemical analysis and the versatile professor Emil Scherf, engaged in carrying out mining geological mapping and other research, they analysed the questions of the process and accompanying phenomena of ore mineralization like greenstone

formation, potassium metasomatism, argillitisation, silica and iron saturation. One of the most interesting results of this work was the creation of a process to produce potassium salt from potassium trachyte, patented in 1956. They solved the quantitative extraction of potassium from feldspars thus chemically exposing potassium feldspars, which had presented a problem for half a century. Meanwhile, they also revealed the crystal lattice details of the process.

At that time of industrial development their results received significant attention among both the professional-industrial and industrial political public. Partly thanks to this, her private life took a favourable turn. When through her husband's cleverness she obtained evidence that, after many ordeals and almost 6 years of capture Feri had been transported into a domestic labour camp, she came out with a concrete demand. Her intervention may have had a significant role in the release of her husband from the brainwashing camps at Kecskemét and Kazincbarcika. Of course he could not carry on, due to the characteristically strict punitive habits of that age, with his occupation. He became qualified as a geological technician with the support of her wife and received a job in the Geological Institute of Hungary. The initial manual chores away in the country were later replaced by data processing and administrative work to be carried out in Pest. With the consolidation of the political situation he managed to advance, became an economic advisor and retired from the Geological Institute.

After his return from capture, their daughter, Annamária Széky was born in 1953. She is an associate professor of English in the Budapest Business School. The growing family, which included the daughter-in-law, Mrs. Széky, 'Zsóka', also a teacher, and the economist son-in-law, Dr. Zoltán Rapp as well as a lovely bunch of grandchildren presented much joy and pride for the Széky parents and grandparents.

Vilma Széky-Fux kept on performing her research and educational work with significant enthusiasm and intensity through the lively and eventful decades. In the 1950s she studied the Eocene and then the Tertiary volcanism in Transdanubia in detail, analysing their spatial distribution and genetic relationships noting their potentially larger extent than it was presumed previously. These works presented excellent comparisons to her later research in the Tokaj Mountains and in the Trans Tisza region in northeastern Hungary. She took part actively and had an important role in the research of the subsurface parts of the ore containing formations in Telkibánya between 1955 and 1965. She took part personally in the field study, sampling and paragenetic investigation of the genetically and industrially significant adits, watching always the changes of the phenomena accompanying the ore bearing zones and recognising their belt like appearance. In these works a great step forward was presented by the studying of the formations exposed by the Ferdinánd sub-adit constructed with aims of research and drainage together with the analysis of the samples from the 1240m deep borehole Telkibánya-2 drilled in the Baglyas valley. These results were compared to the rock analyses and alterations experienced in the Kánya and Gyepű hills approaching the genetic interpretation of the relationship of the processes.

She recognised that potassium propylite represents out-wash while potassium metasomatite represents accumulation environments. She revealed that ore occurs in two horizons: the accumulation of mesothermal lead, zinc and copper occurs in the deeper strata under the near surface epi-mesothermal precious metallic – pyrite zone. Her statements regarding the zone like appearance of clay mineralization accompanying ore formation and the relationship between potassium metasomatism and greenstone formation attracted international attention. In recognition, she received an award from the academy.

The results of the research in Telkibánya were published in numerous domestic and international papers and as a conclusion her academic doctorate theses were written in 1965.

She studied the carbonified, silicified tree trunk remnants found in propylitised andesite in Telkibánya and the results were published in 1959. Later in the 1970s she came back to the problem, when together with Maury, the French professor they analysed the temperature of the rhyolite flood tuffs and propylitised andesite lava in the Tokaj Mountains based on the infrared spectra of embedded carbonified tree remnants.

Her many-sidedness is indicated by the fact that she tried to extend clay formation over other processes apart from ore formation. In the course of studying alkaline soils carried out together with Károly Szepesi, the conclusion was drawn that alkaline hydrolysing calcium compounds have an important role in the decaying of silicates in carbonate containing loess deposits and this process might have a role in the formation of bauxites as well.

Vilma Széky-Fux considered her research in Telkibánya as a surpassingly important part of her life. On discussions with Gábor Pantó and professor Szádeczky and other colleagues, she extended the question of metallogenesis towards clearing the role of the basement. For standardisation and comparison she used information on ore bearing areas of the northeastern part of historical Hungary and Transylvania collected during several field trips to the Miocene complexes of the inner Carpathian volcanic arc with special regard to the ore bearing areas. With this extensive knowledge she summarised the most important results of her research in Telkibánya in a book published by Akadémia Kiadó in 1970. She became the Doctor of Earth and Mineralogical Sciences in the same year (889 TMB/1970.01.28.) and then she received the Szabó József medallion from the Hungarian Geological Society in 1975 for the outstanding values of the book. She received her appointment as professor on 1st July 1971.

The formations of domestic ophiolite magmatism known on the surface and from boreholes were reviewed with her active participation together with prominent co-authors in 1967 as an early antecedent of plate tectonics in Hungary. In the same year a fundamental summarising work was published with her involvement regarding domestic neovolcanics. As a continuation she analysed the genetic relationships of magmatism in Hungary and the Carpathian Basin and the ore forming processes of the associated hydrothermal activity.

Following the receiving of the academic doctorate she was appointed as head of the Department of Mineralogy and Geology, Kossuth Lajos Science University of

Debrecen by the Minister of Education on 1st February 1974. She held that post until 1981. She was head of the Department Group of Earth Sciences several times between 1975 and 1981. In 1994 she became Professor Emeritus of the University. From 1994 she led a sub-programme in the Doctoral School of Earth Sciences and she still held lectures, consultations and was involved in the life of the Department actively until the end of the year following the turn of the millennium. Thus, she came back to her beloved birthplace at the summit of her career and, although she had to commute, she started the renewal of the Department and boosted professional public activity and international connections with unbroken dynamism.

An excellent form of co-operation was developed with the colleagues of the Institute of Nuclear Research of the Hungarian Academy of Sciences (ATOMKI) in Debrecen who carried out isotope age measurements. Numerous joint programmes of the Department and the Institute were carried out, especially with Kadosa Balogh and Zoltán Pécskay. As a result, numerous examinations were performed to determine the K/Ar radiometric age of the volcanics sampled from surface outcrops in the Tokaj Mountains and boreholes in the Trans Tisza region. As it can be seen from the attached list of publications these joint research projects were very productive.

The publication with the physicists Ádám Kovách and Bálint Schlenk is an interesting experiment presenting the opportunities of high frequency and high voltage photography in mineralogical-petrological applications. For the experiment, typical textured volcanic rocks covered by flat film and polished thin lamina of ore samples composed of constituents with different conductivity were used. By charging and discharging them with a condenser, a new technique of representation was developed, unfortunately, however, its further improvement in geological applications is yet to be seen.

Researching the buried Miocene volcanic complexes of the Trans Tisza region, regarded as a blank area from many aspects, was a highly significant part of the second period professor Vilma Széky-Fux spent in Debrecen. The work, started as a state commission in the framework of the research direction named “Researching the natural resources of the country”, had many work stages and lasted for many years in several periods. The complete staff of the Department and the experts of a few co-operating institutions invited (e.g. ATOMKI) were involved in the programme. With the general processing of more than 1,200 deep boreholes, the spatial distribution and the depth of the complexes could be determined. Data were collected successfully regarding the Miocene formations older than Pannonian from 400 boreholes. Then the information base was further limited to the water and hydrocarbon boreholes drilled with sectional coring, samples of which were made available for the research group with the permission of the National Oil and Gas Trust and the Water Exploring and Drilling Company. Apart from traditional macroscopic and microscopic investigations and main and trace element analyses, ore geological, thermoanalytical analyses, K/Ar radiometric age measurements, etc. were performed. The results added numerous elements and led to the recognition of interrelationships in the image on Miocene volcanism of

the Pannonian Basin. They fit well to the volcanism of the neighbouring domestic and foreign areas shifting slightly the paroxysm of volcanism towards the centre of the basin. These results were only partly published in the form of presentations in domestic and international conferences and scientific papers. However, they presented the base of the northern Hungarian maps and guides of the project entitled "Neogene volcanism of the Carpathian Basin" by the international work group No. IGCP 356/7.

Apart from the above mentioned activities, thanks to professor Széky-Fux the Department in Debrecen took part in the complex analysis of the ore exploring boreholes Teresztenye 1. & 2. and Szöllőssardó 3. in Recsk.

Her active creativity and tireless educational work were greatly supported by the appreciative and affectionate family background, the time spent together on outings, hiking or picking peaches in the peace and quiet of the garden in Csúcs-hegy. She had a sense of community and made an effort to maintain her social circles from church to friends to relatives. She was inspired by the many relationships with friends and the love and respect surrounding her personality.

The harmony of the family was shattered first by the tragically early death of their son, Péter and then the death of the affectionate husband in 1993. In time, she managed to regain her vigour relying on the family background and the continuous research and education work in the Department together with the wide range of activities in the Geological Society.

It would require a separate paper to describe her activities in the Geological Society, an institution she highly esteemed from 1940 almost to her death. She was the first co-president of the Geochemical Group (later Section) and she was also president of the Youth Committee and the International and Education Committee. She was elected president of the Clay Mineral Section twice (1966-1972, 1991-1994), however, she liked to visit the meetings of other sections, general assemblies, regional conferences, travelling meetings, all sorts of meetings, discussions and her valuable comments helped her colleagues frequently. She was the co-president of the Geological Society from 1972 and she was member of the editorial board of the Bulletin of the Hungarian Geological Society for a long period.

She passionately urged the establishment of the Education and Public Education Section. She was among the first to support morally and financially the plan of the re-involvement of geology in public education and the initiations for textbook publications and school collection distributions.

As a person respecting tradition and values she took huge efforts to make the oeuvre and the walk of life of prominent predecessors, significant peers and school founders neglected or lesser known in Hungary familiar and available for her students, colleagues and the wider domestic scientific public. The number of her science historical publications and the accuracy of her reviews command respect, although some of them were only presented as lectures or remained only in the form of manuscripts. The Science Historical Section named her eternal honorary president and the Geological Society

voted her to become honorary member rightly as even in her last years she tried to collect the data of events in the third half century of the Society.

Her activity in the Society cannot be separated from her science management work. They were interlocked frequently, since she took part in different international conferences and congresses as either university, or academic or even Society delegate, frequently referred to as one of the "travelling ambassadors" of Hungarian science. Using her excellent German and French, she often presented her results abroad and she reported the events in the Bulletin of the Hungarian Geological Society conscientiously. Some of the important events attended are as follows:

- 1963 CIPEA Intern. Clay Min. Conf., Stockholm, Ministry of Culture delegate
- 1965 CBGA Congress, Sofia, oral presentation
- 1966 Freiberg, Breithaupt Seminar Colloquium, oral presentation
- 1967 CBGA, Belgrade, oral presentation
- 1968 International Geological Congress, Prague, participant
- 1968 University of Belgrade, Yugoslavian study trip
- 1974 IAGOD International Symposium, Varna, English oral presentation
- 1975 Reading, England, Delegate of the Hungarian Geological Society in the meeting of the European Geological Societies
- 1978 Amsterdam, 2nd meeting of European Geological Societies (as the co-president of the Hungarian Geological Society and Professor, head of department in Debrecen)

Thanks to her work and international activity, her personal and institutional connections covered almost all of the scientific centres of Europe. Furthermore, she received numerous off-prints with warm personal dedications from overseas as well. She maintained especially friendly relationships with the mineralogy-petrology and geochemistry departments of the universities in Kassa (Kosice), Kolozsvár (Cluj Napoca), Belgrade, Paris, Freiberg, Greifswald and with the Geophysical Institution of the Taras Schevchenko University of Kiev. These co-operations resulted in joint publications and exchanges as well.

There is one emerging from her many personal friendships that with Amália Szőke, a geologist herself in Transylvania, whom she met during a study trip to Romania. Their friendship continued after Amália's moving to Finland and on her last journey abroad, Professor Széky-Fux visited the marvellous remnants of the volcano Santorini in her company.

All these visits presented useful opportunities not only for herself but for Hungarian science as such, building links with professional organisations that were not easily accessible in those decades of the iron curtain. Some of her commissions, not meant to be exhaustive but pointing beyond those above are without claiming completeness as follows:

- Secretary of the Geochemical Committee of the Hungarian Academy of Sciences, organiser of international events, committee president;
- Hungarian representative of the Igneous-Metamorphic Committee of the Carpathian-Balkan Geological Association, president
- Member of the Earth and Mining Subcommittee of the Paragenetics Committee of the IAGOD
- Member of the Earth and Mining Subcommittee of the Scientific Qualification Committee
- Member of the Earth Sciences Work Committee, Ministry of Education
- Member of the Hungarian Geological National Committee
- Member of the National Geography-Geology Board of the Scientific Documentary Association
- Member of the National Board of the Science Association
- Member of the editorial board of the Bulletin of the Hungarian Geological Society (Földtani Közlöny), the Természet Világa (World of Nature) and the ACTA Geographica, Geologica et Meteorologica of Debrecen

The presentation of the oeuvre of Vilma Széky-Fux would not be complete without highlighting her educational and documentary works. Faithful to her teacher's degree, she regarded an important mission of her life to hand over the knowledge obtained via hard work to the successors as accurately as possible. With this in mind, she prepared for her lectures and seminars exigently, she regarded demonstration and understanding as highly important. She took part in the training of geology, geophysics, geography, biology and chemistry students through decades and her students always remembered affectionately her logical, clear, professionally accurate lectures of high standard and her humanistic teacher's personality. Her 'Crystallography' university textbook served the preparation of students in numerous re-prints over more than 35 years. Her remarkable merit is the raising of the professional successors, scientific researchers and exigent teachers. She took part in preparing the new geologist syllabus (1961), constructing the plans for external professional practice (1962) and in modernising the demonstration material already in her position in Budapest. She became the leader of the geologist Students' Scientific Competition in 1964 and took charge for it at the Faculty from 1965 onwards. She organised the 7th National Students' Scientific Competition. Aware that geology requires a very wide range of vision and local knowledge, she was among the first to organise study trips abroad for her students in order for them to get acquainted with the famous mining regions of Transylvania.

She continued this kind of activity at a professor's level in her years in Debrecen. She supported and motivated the Students' Scientific activity of talented students, furthermore, she was the supervisor of the dissertations of numerous doctoral students and scholar practitioners. Among them there were Hungarians living abroad coming to her from Switzerland and Canada to defend their theses, as well as domestic students and non-Hungarian geologists as well (e.g. Nazih Aly Saad, a

geologist from Cairo who was her aspirant for 4 years). Her views and reviews were also appreciated in her position as consultant and opponent of candidate and academic doctoral dissertations.

She was strongly devoted to supporting the scientific advance of her younger colleagues. Her doors were always open to committed students and the colleagues with personal or scientific problems. Many are proud that such an excellent personality motivated their walk of life, sometimes from the Students' Scientific Competition to the Academic Doctoral Degree. Many of them are acknowledged personalities in science or in public life. She set a role model for us not only as a scientist but as a person of honour and moral strength, respecting man and talent even in those thinking differently from her.

Although, her middle class origin and the hardships inflicted on her husband did not make her a favourite of the regime, her fascinating talent, spirit and commitment, coupled with sincere helpfulness earned her respect in all circumstances. This was indicated by the awards that she received, including the Silver (Ministry of Culture) and then the Gold Degree (Hungarian Academy of Sciences) of the Order of Labour and in 1975 the afore mentioned Szabó József medallion. She became Excellent Worker of Higher Education (Ministry of Education) and Excellent Worker of Geological Research (Central Geological Office) in 1979 and then in 1981 she was honoured by the insignia for her Excellent Work. In 1993 she was among the first to receive the Széchenyi Award that presented a high level of honour. Finally, in 1994 she became Professor Emeritus at the University of Debrecen.

On the basis of the oeuvre outlined above and the following list of publications it is clear that Dr. Vilma Széky-Fux was one of the most prominent representatives of the first great generation of domestic geologist women and a leading personality of international significance of the domestic geology in the 20th century. Her memory will be preserved with love and respect.

Publications of Dr. Vilma Széky-Fux

Book, chapter

- SZÉKY-FUX V. (1960): A földkéreg (The crust of the Earth) In: A Föld (The Earth). Természet Világa publication Gondolat Press, Budapest 134-210.
- SZÉKY-FUX V. (1965): Die Erdkruste der Speicher mineralischer Rohstoffe. In: Die Erde = Leipzig-Jena-Berlin, Urania Verlag. pp. 104-200.
- SZÉKYNÉ FUX V. (1970): Telkibánya ércesedése és kárpáti kapcsolatai (Ore formation of Telkibánya and its connections to the Carpathians). Academic Press Budapest (with English abstract) 266 p.
- SZÉKYNÉ FUX V. (1974): Az ásványok és kőzetek elnevezéséről (On the nomenclature of minerals and rocks). In: Erdei-Grúz T. & Fordor-Csányi P. (ed.): A magyar kémiai elnevezés és helyesírás szabályai (Rules of the Hungarian chemical nomenclature and spelling). in three volumes Academic Press Budapest 9-11.
- SZÉKYNÉ FUX V. (1974): A legfontosabb ásványok és kőzetek nevének szójegyzéke (List of words of the

- most important mineral and rock names). In: Erdei-Grúz T. & Fordor-Csányi P. (ed.): A magyar kémiai elnevezés és helyesírás szabályai (Rules of the Hungarian chemical nomenclature and spelling). in three volumes Academic Press Budapest 19-55.
- SZÉKY-FUX V., M. KOZÁK (1991): Collections of the Department of Mineralogy and Geology at the Kossuth Lajos University, Debrecen. In: Vitális Gy. - T. Kecskeméti (ed); Museums and Collections in the History of Mineralogy, Geology and Paleontology in Hungary 16th Int. Symp. of INHIGEO, Dresden pp. 273-285.
- SZÉKY-FUX V. (1994): A telkibányai érces terület bányászati és kutatási eredményei a középkortól napjainkig (Results of mining and exploration in the ore bearing area in Telkibánya from the Middle Ages until nowadays). In: Szakáll S., Weiszbürg T. (ed) A telkibányai érces terület ásványai (Minerals of the ore bearing area in Telkibánya). Topographia Mineralogica Hungariae (A Hermann Ottó Múzeum kiadványa, Miskolc) II. pp. 45-80.
- SZÉKY-FUX V., KOZÁK M. (1994): A Debreceni Kossuth Lajos Tudomány-egyetem Ásvány- és Földtani Tanszékének Gyűjteményei (Collections of the Department of Mineralogy and Geology at the Kossuth Lajos University, Debrecen). Tanulmányok a Magyar Földtudományi Gyűjtemények Történetéről (Reports on the history of Hungarian Earth Scientific Collections). Studia naturalia 4. MTM Budapest. pp. 219-228.
- DUDICH E., SZÉKY-FUX V., DOBOS I. (1998): A Magyarhoni Földtani Társulat harmadik félszázada (The third half century of the Hungarian Geological Society). A Magyarhoni Földtani Társulat jubileumi külön kiadványa (Jubilee special publication of the Hungarian Geological Society), Budapest 116. p.
- Professional papers**
- FUX V. (1940): A pelsőcardói triász mészkövek és dolomitok közzettani vizsgálata (Petrographic study of Triassic limestones and dolomites in Pelsőcardó). TISIA. A Debreceni Tisza István Tudományos Társaság III. (matematikai-természettudományi) Osztályának munkái (TISIA. Publications of the 3rd division (mathematic – nature science) of the Tisza István Scientific Society of Debrecen). pp. 201-240.
- FUX V. (1941): Kőzettani vizsgálatok Jószaftó környékén (Petrographic studies in the vicinity of Jószaftó). TISIA. Közlemények A Debreceni Tisza István Tudomány-egyetem Ásvány- és Földtani Intézetéből (TISIA. Publications from the Institute of Mineralogy and Geology, Tisza István Science University of Debrecen). 21 pp. 18-38.
- FUX V. (1942): Bagamér-Nagylétei gypvasércek (Bog iron ore in Bagamér-Nagyléte). Debreceni Szemle Vol. 16, No. 172 pp. 208-210.
- SZÉKY-FUX V. (1944): Kőzettani adatok a Kis Békás-völgy títón és kréta mészköveiről (Petrographic data on the Tithonian and Cretaceous limestones of the Kis Békás valley). TISIA. VI. Közlemények A Debreceni Tisza István Tudomány-egyetem Ásvány- és Földtani Intézetéből (TISIA VI. Publications from the Institute of Mineralogy and Geology, Tisza István Science University of Debrecen) pp. 139-150.
- SZÉKY-FUX V. (1948): Bentonitosodott riolittufa Budapest – Kőbányáról (Bentonitic rhyolite tuff from Budapest-Kőbánya). Földtani Közlöny (Bulletin of the Hungarian Geological Society) 78. pp. 185-196.
- SZÉKY-FUX V., Hermann M. (1951): Telkibánya-Alsókéked környékének petrogenézise (Petrogenesis of the surroundings of Telkibánya-Alsókéked). Földtani Közlöny (Bulletin of the Hungarian Geological Society) 81. pp. 250-263.
- SZÉKY-FUX V. (1952): A magmás kőzetek szerepe a komlói kőszénösszletben (Role of igneous rocks in the coal formations of Komló). Magyar Tudományos Akadémia Műszaki Tudományok Osztályának Közleményei V. kötet 3. szám (Publications from the Technical Sciences Division of the Hungarian Academy of Sciences Vol. 5, No. 3) pp. 187-209.
- SZÉKY-FUX V. (1952): Die Rolle der magmatischen Gesteine im Steinkohlenkomplex von Komló. Acta Geol. Acad. Sci. Hung. Tom. 1. Fasc. 1-4. pp. 269-294.
- CSAJÁGHY G., SHERF E., SZÉKY-FUX V. (1953): Kálisó előállításának lehetősége Magyarországon (Possibility of potassium salt production in Hungary). MTA Műszaki Tudományok Osztályának Közleményei, VIII. kötet 3-4. szám (Publications from the Technical Sciences Division of the Hungarian Academy of Sciences Vol. 8, No. 3-4) pp. 609-628.
- CSAJÁGHY G., E. SCHERF, V. SZÉKY-FUX (1953): Theoretische und praktische Ergebnisse der chemischen Aufschliessung des Kalitrachyts. Acta Geol. Acad. Sci. Hung. Budapest, Tom. II. Fasc. 1-2. pp. 15-32.
- SZÉKY-FUX V., Barabás A. (1953): A dunántúli felsőeocén vulkánosság (Upper Eocene volcanism in Transdanubia). Földtani Közlöny (Bulletin of the Hungarian Geological Society) 83. pp. 217-229.
- SZÉKY-FUX V. (1957): Adatok a Dunántúli medence harmadkori vulkánosságához (Data for the Tertiary volcanism of the Transdanubian basin). Földtani Közlöny (Bulletin of the Hungarian Geological Society) 87. 1. pp. 63-68.
- SZÉKY-FUX V. (1957): A komlóska bentonit keletkezése (Formation of the bentonite in Komlóska). Földtani Közlöny (Bulletin of the Hungarian Geological Society) 87. 2. pp. 135-146.
- SZÉKY-FUX V. (1957): Angaben zur hydrothermalen Genese des Bentonits auf Grund von Untersuchungen in Komlóska. Acta Geol. Acad. Sci. Hung. Tom. IV. Fasc. 3-4. pp. 361-382.
- SZÉKY-FUX V. (1959): Szenesedett, kovás fatörzs: Propilites piroxénandezitből (Coalified siliceous tree trunk from propylitic pyroxene andesite). Földtani Közlöny (Bulletin of the Hungarian Geological Society) 89. 3. pp. 310-312.
- SZÉKY-FUX V., Szepesi K. (1959): Az alföldi lösz szerepe a szikes talajképződésben (Role of infusional loess in the formation of alkaline soils). Földtani Közlöny (Bulletin of the Hungarian Geological Society) 89. 1. pp. 53-64.

- SZÉKY-FUX V., K. SZEPESI (1959): The role of loess in alkali soil formation. *Acta Geol. Acad. Sci. Hung.* VI. pp. 153-171.
- SZÉKY FUX V. (1961): Die Rolle von alkalisch hydrolisierenden Ca-Verbindungen in der Bildung und im Abbau der Tonminerale, *Acta Universitatis Carolinae, Geologica Supplementum 1. Praha*, pp. 447-456.
- SZÉKY-FUX V. (1964): Propylitesedés és kálimetaszomatózis Tokaji-hegységi vizsgálatok tükrében (Propylitisation and potassium metasomatism reflecting studies in the Tokaj Mountains). *Földtani Közletény (Bulletin of the Hungarian Geological Society)* 94. 4. pp. 409-421.
- SZÉKY-FUX V. (1964): Propylitization and Potassium Metasomatism. *Acta Geol. Acad. Sci. Hung. Tom. VIII. Fasc. 1-4*. pp. 97-117.
- SZÉKY-FUX V. (1965): Vertical zoning of clay minerals accompanying a hydrothermal mineralization. *Acta Geol. Acad. Sci. Hung.* IX. pp. 259-270.
- SZÉKY-FUX V. (1966): Die Paragenese der erzführenden Gesteinsumwandlungen von Vulkaniten. In: *Probleme der Paragenese von Mineralen, Elementen und Isotopen, Breithaupt-Kolloquium in Freiberg*, VEB Deutscher Verlag für Grundstoffindustrie - Leipzig 1968. pp. 187-195.
- SZÉKY-FUX V. (1966): Ércesedést kísérő agyagásványosodás mélységi övei a Tokaji-hegységben (Vertical zoning of clay minerals accompanying ore formation). *Földtani Közletény (Bulletin of the Hungarian Geological Society)*, 96. 1. pp. 1-12.
- SZÁDECZKY-KARDOSS E., JUHÁSZ, Á., PANTÓ, G., SZEPESHÁZY, K., SZÉKY-FUX, V. (1967): Budapest, Der sog. ophiolithische Magmatismus in Ungarn. *Acta Geol. Acad. Sci. Hung.*, Tom. 11. Fasc. 1-3. pp. 71-76.
- SZÁDECZKY-KARDOSS E., PANTÓ G., SZÉKY-FUX V., PANTÓ Gy., KISS J., PÓKA T., KUBOVICS I. (1967): Die Neovulkanite Ungarns. *Acta Geol. Acad. Sci. Hung. Tom. 11. Fasc. 1-3*. pp. 161-180.
- SZÉKY-FUX V. (1968): Petrometallogenesis of late tertiary hydrothermal ore deposits in the Carpathian region. *Acta Geol. Acad. Sci. Hung. Tom. 12, Fasc. 1-4*. pp. 67-77..
- SZÉKY-FUX V. (1970): Petro- and Metallogenetic Problems of Carpathian Post-magmatic Ore Mineralization. *Acta Geol. Acad. Sci. Hung. Tom. 14*. pp. 223-241.
- SZÉKYNÉ FUX V. (1974): A legfontosabb ásványok és kőzetek nevének szójegyzéke (List of words of the most important mineral and rock names). *Chemical reports* 41. pp. 459-493.
- SZÉKYNÉ FUX V., KOVÁCS Á. SCHLENK B. (1975): Nagyfrekvenciás, nagyfeszültségű fényképezés ásványkőzettani alkalmazásai (Mineral-petrological application of high frequency and high voltage photography). *Földtani Közletény (Bulletin of the Hungarian Geological Society)* 105. 4. pp. 495-505.
- MAURY, R., V. SZÉKY-FUX, (1975): Temperature data for tuff flows and lavas of the Tokaj mountains from the I.R. spectra of organic matter in fossil woods. *Acta Geol. Acad. Sci. Hung. Tom. 19. Fasc. 3-4* pp. 233-241.
- SZÉKY-FUX V., R. MAURY (1978): Tokaji-hegységi riolituffárák és propilites andezitláva hőmérséklete szenesedett fatörzsek szerves anyagának infravörös spektruma alapján (Temperature data for tuff flows and lavas of the Tokaj mountains from the I.R. spectras of organic matter in fossil woods). *Földtani Közletény (Bulletin of the Hungarian Geological Society)* 108. 4. pp. 564-570.
- SZÉKY-FUX, V., KAD. BALOGH, S. SZAKÁLL (1980): The age and duration of the intermediate and basic volcanism in the Tokaj Mountains, North-East Hungary, with respect to K/Ar datings. *ATOMKI Közletények* 22. pp. 191-201.
- MOLJAVKO, V.G., OSZTAFIJCSEK, I.M., TOLSZTOJ, M.I., SZÉKY-FUX V. (1981): O szootnosényii "szubszekventnava" i "finálnava" vulkanyizma Centrálnüh i Západnüh Kárpát. (Comparison of the subsequent and the final volcanism of the Inner and the Western Carpathians). - *Vaproszi Prikladnoj geohimii i petrofiziki, Kijev, "Viscsa Skola"*, pp. 3-16.
- SZÉKY-FUX V., BALOGH K., SZAKÁLL S. (1981): A Tokaji-hegység intermedier és bázisos vulkánosságának kora és időtartama a K/Ar vizsgálatok tükrében (Age and time of the intermedier and basic volcanism of the Tokaj Mountains on the basis of K/Ar measurements). - *Földtani Közletény* 111. 3-4. pp. 413-423.
- BALOGH KAD., PÉCSKAY Z. SZÉKY-FUX V., GYARMATI P. (1983): Chronology of miocene volcanism in North-East Hungary. *Travaux du XII-éme Congrès de l'Association Géologique Carpatho-Balkanique. - Annuaire de l'Institut de Géologie et Géophysique, Vol. LXI*, pp. 149-158. Bucuresti,
- SZEKY-FUX V., KOZAK M. (1984): A nyírség mélyszinti neogén vulkanizmusa (Covered Neogene volcanism of the Nyírség). *Földtani Közletény (Bulletin of the Hungarian Geological Society)* 114. 2. pp. 147-159.
- SZÉKY-FUX V. (1985): Covered neogene volcanism of NE-Hungary. *Acta Geologica Hungarica Tom. 28. Fasc. 3-4*. pp. 127-139.
- SZÉKY-FUX V., PAP S., BARTA I. (1985): A Nyírségi Nagyecséd-I. és Komoró-I. sz. fúrások földtani eredményei (Geological results of the drillings Nagyecséd-I. and Komoró-I. in the Nyírség). *Földtani Közletény (Bulletin of the Hungarian Geological Society)* 115. 1-2. pp. 63-77.
- PÉCSKAY Z., KAD. BALOGH, V. SZÉKY-FUX, P. GYARMATI (1986): Geochronological investigations on the Miocene volcanism of the Tokaj mountains, *Geologicky Zbornik - Geologica Carpathica*, 37. 5. pp. 635-655.
- GYARMATI P., KOZÁK M., SZÉKY-FUX V. (1986): A Telkibányai opálelőfordulás földtana és genetikája (Geology and genetics of the opal in Telkibánya). *MÁFI Évi Jel. 1984-ról (Annual Report of the Geological Institute of Hungary on the year 1984)* Budapest, pp. 355-376.
- SZÉKY-FUX V., PÉCSKAY Z., BALOGH KAD. (1987): Észak- és Közép-Tiszántúl fedett miocén vulkanitjai és K/Ar radiometrikus kronológiájuk (Covered Miocene volcanics and their K/Ar radiometric chronology of

- the North and Central Trans Tisza region.) *Földtani Közlöny* (Bulletin of the Hungarian Geological Society) 117. pp. 223-235.
- SZÉKY-FUX V., Z. PÉCSKAY, KAD. BALOGH (1987): Miocene volcanic rocks from boreholes in Transtibiscia (Hungary) and their K/Ar chronology. *BULLETIN T. XCII de l'Academie Serve des Sciences et des Arts Classe des Sciences naturelles et mathématiques Sciences naturelles* No. 27 pp. 109-128.
- SZEKY-FUX V. PECSKAY Z., BALOGH KAD., GYARMATI P., (1987): A Tokaji-hegység miocén vulkánosságának K/Ar geokronológiája (K/Ar geochronology of the Miocene volcanism in the Tokaj Mountains). *Földtani Közlöny* (Bulletin of the Hungarian Geological Society), 117, pp. 237-253.
- KOZAK M., PECSKAY Z., SZEKY-FUX V., ANDO J. (1990): K/Ar Radiometrikus koradatok földtani értelmezése ÉK-Kubai kőzetmintákon (Geological interpretation of K/Ar radiometric age data on rock samples from northeastern Cuba). *Acta Geographica ac Geologica et Meteorologica Debrecina*, 26-27. pp. 143-155.
- SZEKY-FUX V., PECSKAY Z. (1991): A Fruska Gora-hegység harmadkori vulkanizmusa és a vulkanizmus K-Ar radiogén kora (Tertiary volcanism and its K/Ar radiogene age of the Fruska Gora Mountains). *Acta Geographica ac Geologica et Meteorologica Debrecina* Tom 28-29. pp.: 203-216.
- PECSKAY, Z., LEXA, J., SZAKACS, A., BALOGH, K., SEGHEDI I., KONECNY V., KOVACS, E. MARTON, E. KALICIAK, M., SZEKY-FUX, V., POKA, T., GYARMATI, P., EDELSTEIN, O., ROSU, E., ZEC, B. (1995): Space and time distribution of Neogene-Quaternary volcanism in the Carpatho-Pannonian Region. *Acta Vulcanologia* 7/2 pp.: 15-28.
- ZELENYA T., E. BALAZS, KAD. BALOGH, J. KISS, M. KOZAK, L. NEMESI, Z. PECSKAY, Z. PÜSPÖKI, †Cs. RAVASZ, V. SZÉKY-FUX, A. ÚJFALUSSY (2004): Buried Neogene volcanic structures in Hungary. *Acta Geologica Hungarica* Vol. 47/2-3, pp.: 177-219.
- †SZÉKYNÉ FUX V., KOZÁK M., PÜSPÖKI Z. (2007): Covered Neogene volcanism of the northern Trans Tisza region. *ACTA GGM Debrecina, Series Geology, Geomorphology, Physical Geography* Vol. 2, 79-104.

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Memoir of the colleague

A kolléga emlékezete

Dr. Vilma Széky-Fux, Minka taught crystal forms and systems in the practice room of the mineralogy department in the university in Budapest every week in the 1940s. Maybe my most memorable event associated to geology is when the three of us, she, „uncle” Emil Scherf and myself carried out surveying on the Kánya hill. We were mapping together for a few days searching the limits of outcropping potassium trachyte. Then we investigated the numerous

“horpa” (excavation ditch) in Telkibánya, the ancient excavations of gold in the woods and later we surveyed the manganese oxide vein exposed by the research adit in Komlóska. We walked across the mountains with Minka from Telkibánya to Komlóska where Jancsi Kiss waited for us with the equipment for entering the mine. She surprised me with one of her questions while walking. She was my only teacher who asked first and last how I felt in Russia. Incidentally, her husband was captured as well. ‘Dante had already written it’ I replied. July heat, blind wagon, salty fish, scrubby freighter on the Black Sea, storm, magnetic mine, explosion, starvation, malaria, cholera, jaundice, slavery, underground prison and many death. Soviet GULAG in the Caucasus. I told her I was hoping her husband would eventually come home. We were doddering across the Huts, the Eperjes-Tokaj range was magnificent full of flowers here-and-there.

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Remembering Dr. Vilma Széky-Fux by a former student

A volt tanítvány emlékezése Székyné Dr. Fux Vilmára

I first met Dr. Széky-Fux in June 1954 when I took my entrance examination in geology at the Loránd Eötvös University. Minka, as she was affectionately called by her friends and colleagues and, among ourselves, by the students, was a member of the faculty committee that decided who will be accepted. There were two hundred applicants that year for only twenty places in the class to start in the fall. In spite of having been valedictorian of my high school graduating class and achieving the second highest score among the two hundred applicants, I was denied entrance to the freshman geology class by the registrar and the omnipotent communist party because of my family background. In communist parlance I was pronounced a “class alien.”

Minka was among the first in the Department of Geology who stood by me and supported my appeal against the decision. In fact, other members of the faculty at the time, namely Drs. Kálmán Sztróckay, Elemér Vadász, Elemér Szádeczky-Kardoss, and my future husband Géza Kisvarsányi, also helped. When classes started in September, they tacitly allowed me to attend classes even though I was not officially a member of the class. For six months the party, the student council and officials of the State Department of Education investigated me, until finally, just before Christmas they informed me that I was admitted to the University. Thanks to the collusion by the faculty I passed my first semester examinations successfully.

During the uncertainty of the six months waiting for the decision Minka’s friendship and interest meant a lot to me. As I lived close to her apartment on Apály utca, we often travelled together to the university on the No. 3 or

No. 55 streetcar, still running on Váci utca, and changed at the Western Railroad Station to the No. 49 streetcar to travel to our destination on Múzeum Boulevard. Our conversations made a lasting impression on me about the woman who was an outstanding human being, geologist, wife and mother.

She taught the petrology laboratory to our sophomore class. Her excellent teaching method inspired in me a life-long love of the beauty and romance of igneous rocks. I learned the secrets of the use of the petrographic microscope from her that proved to be very useful in my later career.

The storm of the 1956 Hungarian Revolution and its aftermath swept me away from my beloved country. On October 23 1956 I participated in the students' march and was forced to escape to the West after the Soviet invasion and the defeat of the revolution. I completed my studies in the United States at the University of Missouri School of Mines and Metallurgy, the oldest mining school west of the Mississippi, in Rolla where I graduated in 1958 (Bachelor of Science in Geology) and in 1960 (Master of Science in Geology). I worked for the Missouri State Geological Survey for 34 years, from 1959 until my retirement in 1993, and progressed from research geologist through section chief to assistant director.

The Loránd Eötvös University gave me an excellent foundation in geology, particularly in mineralogy and petrology that proved to be indispensable in my American career. For 34 years I was the reigning "queen" of igneous petrography at the Survey and was given an exciting research topic. I studied the mineralogy, petrology and mineralization potential of the exposed and buried Precambrian (Proterozoic, 1.5 Ga) rocks of the St. Francois Mountains and surrounding regions. During the examination, description and organisation of thousands of thin sections I often thought of Minka and of the bygone petrography labs. She laid the petrographic foundation for the publications I wrote about my research. I dedicate the following research article, revised from a 1984 Missouri Geological Survey publication, to the memory of my teacher, Dr. Vilma Széky-Fux.

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Professor Emeritus Dr. Vilma Széky-Fux
as recalled by a former student

Székyné Dr. Fux Vilma professzor emeritus
az egykori tanítvány emlékezetében

Women have played a vital role in the sphere of what is called the stronger gender ever since man has been around.

Starting with the theological relationship between Adam and Eve through Cleopatra through the matriarchal rule of early society followed by authoritative empresses and queens outstanding members of the social elite as well

as historical figures have been directed and motivated by women.

Nor was it different among the general public, in the Christian family of Europe anyway, where the mother and the wife were the most likely members of the family to develop or ruin a young boy's or a mature man's life.

Women working as nursery school and school teachers, doctors and carers are indispensable to looking after an alarmingly increased global population of 6.3 billion. They were similarly essential for life during the disaster of World War II and the years that followed.

My personal life story has been framed by the landmark dates of WW II and a period of ordeals thereafter up to the change of regime and the recent turbulent years.

Following the logic of most Hungarian folk songs, let me first sing my mother's praises and then those of my spouse's. My mother, a peasant woman from the Felvidék, the Highlands in the north of former Hungary only finished three classes of church school. What I received from her was then complemented, the usual way by the attention from my grandmother, aunties and schoolmistresses to be completed by the woman I met at secondary school age, and who came to be my present wife.

Men are well advised to choose a male role model to guide their career. The unselfish support from women, however, tends to go unnoticed or hardly appreciated at the time when offered. You will only realize much later that the women who accompanied your life were just as powerful as the teacher with the cane or the father that would slap you.

Professor Dr. Vilma Széky-Fux has been such a dominant woman in my life. I first met her at my entrance examination for university and by a twist a fate perhaps, she always happened to be round at important turns in my career to lend a helping hand by offering good advice and womanly sympathy.

I first saw her in the year of 1950 in the entrance examination panel of ELTE University of Sciences, Budapest. Born in Slovakia to a peasant family in the Felvidék and deported to Hungary after the war, it was only my fourth visit to Budapest when the entrance examination took place.

My first time in the capital was in 1947, transported in a cattle truck through the city with my family, along with 200,000 other deportees. I had never seen buildings and bridges of that size before as in the post-war capital city.

My second visit to the city was a more peaceful occasion. Assisted and accompanied by our schoolmistress and her brother (Mrs Módos and Mr Módos) a group of us, schoolchildren from the primary school of Nagyszékely, a small village in the country paid a visit to Budapest on the invitation of the National Peasant Party and its leader, Péter Veres. It makes me proud even today to remember sitting on the Parliament seat that belonged to that writer Member of Parliament, whose reputation may have faded today but at the time was empowered to shape to the future of a fragile country.

My third visit to Budapest occurred while at secondary school. Following achievements at the county student tournament in Physical Education, we managed to win more prizes in the capital enhancing the image of the protestant Calvinist school at Gyöng, which took such

good care of us and which happened to be named after Gyula Alpári at the time. I wish to insert here the names of the director, Pellion Ervin and that of a remarkable teacher, Mrs Molnár who not only taught us natural sciences, which seemed to turn alive in her interpretation, but would also stroke our sturdy peasant heads or tell us off as necessary when we walked about in muddy shoes.

My passage to secondary school was also arranged by a woman teacher, Mrs Módos mentioned above who sent a letter to the grammar school asking them for assistance so that I could attend school rather than carry on as bricklayer apprentice in spite of the lack of financial resources in the family.

At secondary school I won second prize in geography in the national education contest, named after Mátyás Rákosi, the communist party leader, which gave me a chance to apply for university. Thus came the fourth time for me to see Budapest and meet a lecturer, Dr. Vilma Széky-Fux who turned out to be a key figure in my career showing empathy, offering assistance and advice and encouragement to do my fair share of professional work. But for my mother who sent me packages of home made food and clothes wrapped up in coarse paper and tied up with a string not only to school but long afterwards, but for my school teachers who taught me the three R's in Perbete, true patriotism in Nagyszékely and the need for honesty and a moral stance in Gyöngyös I would never have grown into a mature professional. Széky-Fux, who was in the entrance examination panel of ELTE University of Sciences, joined this group of educators.

There we were, candidates for university, standing in a window bay on the first floor corridor of ELTE still at Múzeum körút at that time. We were all waiting for our turn to be called in front of the panel. As I looked round I saw peasant boys like myself, one in white socks smeared with black shoe shine, revealing that the shoes had been polished on his feet. There were working class boys in oversized jackets, the loose end of their sleeves folded back, there were boys from the capital who some way managed to get white shirts and girls, in separate groups either in pleated skirts or fashionably tapering ones.

I kept staring at the floor of the corridor, my first memory of the Budapest University of Sciences. My trousers were tightened up with safety pins at the end, the way we used to take them in when riding a bicycle, because I had ridden an 8 kilometre stretch to the railway station in the morning. It was the pins that caught the attention of a lecturer and my first answer at the university was 'Because I had taken the bicycle'. Afterwards I heard my name called and there I was standing in front of the panel where Széky-Fux was asking me questions. Like all candidates, I was looked up and down before the first question: 'Where do you come from?' I gave an answer adding the information that I was born in the Felvidék. 'Really? Whereabouts?' 'Near Nové Zámky,' I said. I recall her answer: 'Nové Zámky is Érsekújvár.' I grew silent and then gave a cautious answer: 'But I learnt in a Slovak school.'

'Very well', they said and started asking the subject questions in maths, physics, and chemistry in the preset order. Finally, one of the panel asked: 'Why would you like to attend university?' 'Because I love books,' my reply came perhaps too fast. 'What major books have you read?' I

started listing the best known books of Hungarian poetry by Ady, Attila József and János Arany, all available in the secondary school library. 'Can you mention a book on natural sciences?' I mentioned a Reader's Digest type of publication (Calendar) and the book by a 19th century linguist cum discoverer, Ármin Vámbéry, one of the founders of the Hungarian Geographical Society about his travels in Asia. 'Right,' the panel said, the two bespectacled members pushing up their glasses.

'Very well, the exam is over then,' said Széky-Fux, in a voice I can recall to this day. Following which I did what I learned to do at home in my village when in adult company, I stepped in front of each member of the panel and offered a handshake saying that we would meet again in September. I remember them exchanging looks with each other and then accepting the hand offered. Little did I know at the time that you were not supposed to initiate a handshake if you were junior, it just was not done in Budapest. There were loads of things I was unaware of and was to pick up in the following years at university. With the same sort of ignorance I turned round in the door and took my leave saying: 'Have a nice day of work.' The reason I can recall these minor details is that the panel related the story several times. Even as a student I would hear people quote what I said during my first assessment at university.

I met again Széky-Fux, a lecturer in the first days of term. As she was delivering mineralogy we took notes dutifully. Even as a junior lecturer she managed to divide her attention between the subject matter and her audience. She would turn to me, remembering that I came from the Felvidék and ask whether I had seen granite in the Tatra Mountains. I murmured something to the effect that I had not been there yet. 'Never mind, you are gonna go there one day, but don't forget the granite,' she said encouragingly.

In her lectures she would always refer to points raised in earlier deliveries and test our memory. Talking about our classes in the corridor we always agreed that you had to keep learning the subjects taught by Nyilas, the lecturer of chemistry and Széky-Fux, otherwise you might reveal such depths of ignorance during term that you may never pass the exam. We kept on learning mineralogy. At ELTE University minerals were displayed in cabinets in the corridor. They were grouped according to their class, native elements, sulphides, oxides etc.

Some of us found it was easiest to recognize the ones already mentioned in the lectures if we took our notes and laid them on top of the cabinets. At that time in the early fifties we did not have a text book to rely on. The popular mineralogy book by Sztrókay – Koch had not been published yet, perhaps not even written yet, so we had to rely on our lecture notes. Anyway, we were students of geography and geology so we would have needed a special edition.

The mineralogy practice class was taught by Imre Kubovics. Incidentally, he also came from the Felvidék. I respected him a lot. I remember the major change in his appearance after his marriage. The man who used to wear a crumpled, stained white coat with unbuttoned sleeves suddenly put on freshly ironed shirts with a tie and a spotless white coat. Marriage also had a favourable impact on his teaching style. His manner of speech turned

smoother, clearer, more to the point. As a matter of fact, I myself went through a very similar transformation in the first stage of my married life and I tend to think that most men do.

Széky-Fux had a neat appearance. She did not follow fashion, though and there was a melancholy look on her face. We did not know much about her private life and only found out later that her husband, Feri, to whom I was later introduced, was taken POW in 1945 and still in captivity when I started my studies. The sorrow and worry in her look would only vanish when she smiled and later with his return.

My examination with her was a success. She asked a variety of questions covering practically all classes of minerals, going far beyond a routine check of data. There were things you were supposed to know such as Bowen's reaction series which she had explained to us herself underlining the right spelling with a 'w'. Many a time, my dormitory roommate, Jancsi Puskás and myself would go to sleep in our double room listing the minerals in Bowen's series from chromite to quartz, adding compositions and crystal structures. The knowledge we had gained from her regarding rules and series in crystal morphology and mineralogy proved most useful when, for some reason the lectures on minerals and rocks were taken over by Professor Sztrókay and Professor Szádeczky. It seemed at the time that it was her work that junior lecturers at ELTE University quoted rather than that of the top professors. She was working on her research on Telkibánya and would regularly go to the site. One morning she turned up very sleepy and exhausted for the lecture. She made an apology right away explaining that she had been sitting on the train all night only to get to the lecture in time. And she would tell us about Telkibánya, a tiny portion of the Felvidék that happened to stay with us, as she put it. She would show us substantial pieces of minerals she had taken with her from a shaft, with tiny bits of pyrite inside or outside. It was astonishing how they differed from the neatly polished samples displayed in the cabinet, an astonishment waiting for us later on in fieldwork.

Imre Kubovics would also confirm that geological and mining excavations revealed more than the crystals displayed in the cabinets along the corridor. We would remember his words as well. In a way, the practice room in the mineralogy department served as second home for us. Széky-Fux would open the door time and again and enquire how we were getting on. They were standard questions, basically, but there was something deep in the tone that reflected the type of care a mother would show to her children, a little idea, a gentle push in the appropriate direction. I would always get this impression and my fellow students would agree.

During the days of the 1956 revolution we had a brief but memorable encounter. I was standing guard at the entrance of ELTE University with a submachine gun hanging from my neck when she turned into the courtyard. 'Ernő, how come?' she asked. I explained that I was a member of the home guard, one of the numerous students who took arms to fight for the revolution. A sparkle came into her eyes. 'Take good care, it's not over yet.'

Unfortunately, she was right. It was not over yet. There were hard days and even harder months to come

during which there came another decisive episode in our relationship. As former member of both the home guard and the revolutionary committee of university I was under police surveillance, not allowed to leave my designated residence at the Szent Imre Dormitory in Ráday utca. One day I sneaked out via the doorman's official quarters, out of the view of the guard, trying to get into the university. We met on the pavement. She was just coming out. Behind her at the entrance there was a member of the workers' militia who would occasionally ask for documents so I decided against going in. I greeted her the way I had learnt to talk in Budapest: 'Kissing your hand, Mistress'.

'Ernő, how come?' she asked again. 'Well, here I am,' I said. 'And how are you doing?' I started telling her about the trials in my life, how I was being questioned at the dormitory, confined to my room, taken to the police again and again. I can see her keeping silent and finally saying: 'These are difficult times. But I am glad that you stayed and did not leave the country.' And she set about explaining how it was bound to turn better for all of us. I walked along the way she was going. At the corner she turned to me: 'And what about the young lady you mentioned at the exam?'

I could not remember the particular occasion but during an exam I mentioned to her that I was seeing a girl in the country who was not only a clever student but took my visits seriously. I was glad that she remembered her and answered proudly: 'Oh, she is fine and I hope we'll be fine together.' She gave a smile and took leave. As I watched her go towards the tram stop I felt really strange. Since my correspondence was checked I could not tell anyone, not even my parents that I was receiving no scholarship, not attending university, just staying in Pest. And that was why it lasted so long, up to half an hour to walk the short way from the university to the tram stop finally bringing someone up-to-date on my life.

My diet consisted of cheap soups eaten at a cafeteria in Boráros tér supplemented with home-made food from my mother's packages. Sneaking out from the guarded dormitory at night I also familiarised myself with the underworld in Budapest. An unshaven man that I often saw in the cafeteria in Boráros tér where we would both spoon our soups invited me one day to go and unload or clean carriages. 'I have seen you here a lot. Are you under surveillance?' When I nodded he asked me if I wanted to make some money. Thereafter I would get out from the dormitory through the caretaker's window at 11 pm and unload coal, potatoes or bricks at the station where my Boráros tér middleman would send me. I would get paid in the cafeteria and told on the first occasion to pass half of my payment to the man in high collar who was sitting at one of tables. When my pupils went wide he warned me: 'Just do as I told you if you want to carry on. I remember how I went up to the table and put down half of the money earned: 'Thank you for the chance to work.' 'All right, boy,' he said, 'you can come again'. That was my encounter with the underworld. Then in May things started to clear up. János Kádár, the Party Secretary gave some speech on 1st May, Labour Day while I was remanded in custody at relocation camp in Konti utca. As I was later told he basically declared that 'those not against us are with us'. As a consequence, people like myself, and I don't know how

many of us were released on parole and issued a card stating the fact of further police surveillance. Still, I could at least go back to university and take my exams. It was May, the examination period.

At one department I was turned away. "Get out of here! I won't have any counter revolutionaries." However, when the head later left for a conference and I edged in again a junior lecturer grabbed my index book and quickly entered a mark for excellent performance with an illegible signature. At another department, cartography I had to take an exam in visual cartography, which I found easy to learn and was bitterly disappointed to see that the head, Dr. Imrédy had given me a mark for satisfactory performance which he then changed to a 'good' mark. I stood in the window bay utterly desperate. Finally, after 10-15 minutes he reappeared and asked for my index book. He crossed out his previous entry and gave me a five for excellent performance. In the end, I managed to pass all my exams with excellent performance and complete the term in the last one month.

Professor Láng decided to put off my examination until September. He realised I needed a good mark but he also found out that I knew nothing. After all, I took my examination with him in September with flying colours. Having achieved my former level of excellence I was granted a scholarship again.

Then again I met Széky-Fux on the corridor of the Mineralogy Department. 'Congratulations, Ernő,' she greeted me. She had heard that there were just three of us still on the course to be geologists.

She urged me to keep studying hard so that I would know all about geology. 'And the young lady?' I reassured her that we were still planning our future together. I can still see her walking away and the swing door slamming. I felt proud of her encouragement. She was the only one to congratulate me on my exams, the term done in a month's time.

After my final exams I went to see her and give the news that I had been given a position to work in the Tokaj Mountains. 'That's really good news, Ernő, whereabouts?' 'In the south?' 'Don't worry, we are gonna meet in Telkibánya, anyway.' And we did. Both at Telkibánya and other areas of research in the mountain.

As regards myself, I was researching the usable substances in the Rátka-Mád Upper Sarmatian limnic basin. Some of these materials came into industrial use in the 1930s on the initiative of Barna József, an entrepreneur in Mád. I completed my first essays about the Rátka-Mád basin in the early 1960s and one of my consultants happened to be Vilma Széky-Fux. When my research or other business took me to Budapest I tried to find the time to see her at the department.

By then she had read my essay on a class of mineral raw materials, that of pure clays (which she jokingly or by a slip of the tongue referred to as pure mud,) from kaolinite to bentonite to illite and the limno-quartzite or hydro-quartzite in the top layer, written from a comprehensive geological, mining, economic geological and genetic aspect.

I gave a sigh of relief when I found out from the editing board of the journal *Földtani Közlöny* (Bulletin of

the Hungarian Geological Society) that Széky-Fux had assessed my writing as excellent and fit for publishing.

During one of our encounters I thanked her for her contribution. She refused my gesture: "No need to say thanks, you were educated here to be a professional."

On her way to Telkibánya she would stop to look at my explorations. She was on very good terms with Dr. Gyula Varjú and Dr. Ernő Nemezc, two key figures of Hungarian geology at that time. The former researched mineral raw materials, while the latter worked on their mineral composition.

One substantial period of research in the Tokaj Mountains lasted between 1958 and 1968. I was practically working day and night on geological survey reports, occasionally relying on my lecture notes from university and the recently published book by Székyné on Mineralization at Telkibánya, where she discussed the developments at Telkibánya and the northern part of the Tokaj Mountains by comparison with other Intra-Carpathian mineralization. Regarding exploration at Füzéradvány and Pálháza she was full of ideas and guidance which she passed on to Gyula Varjú or myself.

As regards my commitments I divided my time and attention between research and family. When we had time to talk she would enquire about "the young lady", on which I would proudly relate that she was a mother of two and an assistant engineer in analytical chemistry, carrying out routine measurements for the expanding mineral mining industry in Tokaj-Hegyalja.

Mineral mining turned into a nation-wide project and the meetings of the Clay Minerals Section gave a chance to meet 'Minka néni' ('auntie Minka'), the way we referred to our former lecturer.

Buried in local work I only found out about developments elsewhere at Section meetings. That was how I learnt about the possibility to go and work in Mongolia with a good chance to explore and add to the meagre salaries that we were earning at home.

Up I went to Budapest, arranged an appointment with headquarters and enquired whether I would be given permission to work on explorations in Mongolia. Dr. András Gagy Pálffy, one of the founding members of the dynamically developing ore and mineral mining industry at the time was not only aware of developments in Recsk but the new mineral raw materials in Tokaj-Hegyalja as well. He put the question directly to me: 'Do you want to go?' I gave a cautious answer explaining that I still had to settle the issue in the family.

'Very well,' he said, 'I will talk to your superior and if you get the right professional references you can go and spend a year in Mongolia.'

Needless to say, the next person I contacted about my plan was Széky-Fux. 'What do you think I should do? I have got young kids at home.'

I can see her frown. After a while she answered: 'I know what it is to bring up children on your own. I did that myself while my husband was away in the camps. But a year's trip will be beneficial both for you and your family. I really think you should go, Ernő.'

She always stayed a little formal in her manner with me, until the most recent years. On the way home, sitting on the train I considered the reasons pro and con from

youthful ambition to love of family to professional commitment, so profound in our generation.

At home my wife practically came to the point: 'What did Székyné say?'

'She thought I should go if you agreed.'

'Well, go then,' came her approval. 'Mother and I will look after the children.' There came a sparkle in her eye: 'But don't forget to come back to me.'

So off I went to Mongolia to work on tin and wolfram explorations which eventually lasted four years. Actually, not always a full year. The first year lasted from February to December when I was met at the railway station in Moscow by my wife and older son. I remember how I gave a lecture in the Hungarian Geological Society and was asked by Széky-Fux: 'What was your most relevant experience?' To which I gave a short and prompt answer: 'That my wife came to Moscow to meet me.'

After the lecture she came up to me and congratulated on my talk. Then she added: 'I knew you would not change.' Seeing my incomprehensible look she went on: 'I knew you would always do the right thing, whether here or in the desert.'

Later she would give me one more decisive push in my career. I did not follow the events in her professional life very closely and was pleasantly surprised when she revealed to me at the end of a Clay Minerals Section meeting that she would be the head of the Department of Mineralogy and Geology at the University of Debrecen from September on.

I had been planning for some time to sum up my research in the Tokaj Mountains in a paper. So I asked Széky-Fux to be my consultant, since Professor Földvári that I had first asked declined the invitation due to other commitments and recommended Széky-Fux instead.

So I started seeing her on a regular basis in Debrecen. She would leaf through my pages and comment. Once she made a mark on a page and just said: "I cannot allow you to include this."

My wife who had been present could hardly wait to ask me on the way home what it meant.

I had no idea myself. Later when I heard that Professor Nemezc was working on the issue I guessed that possibly findings from the grassroots might have contradicted his research.

Eventually, I completed my postgraduate degree paper and then my PhD level paper with Széky-Fux as my consultant. Beyond her professional guidance I always felt the womanly sympathy and assistance offered in her words and general attitude. She said she would always make herself available for me and she kept her promise.

During and following the change of regime I was too absorbed in my own problems to pay much attention to her. I had never expected the chaos that followed the collapse of the ore and mineral mining industry.

I had so much trust in my profession and the positive outcome of my industrial research work that I almost looked at the potential extraction sites of illite in Füzérradvány, perlite in Pálháza, pure clays in Sárospatak, diatomaceous earth in Erdőbénye, clay minerals around Mád and the treasures revealed in the "isle" of Szerencs as my personal assets, which needed all my attention and energy. Our lay-off among the first in the early 1980s,

when both my wife and I were made redundant made a mockery of my deep commitment.

Guiding their choice of career, we even brought up our children to serve this industry. One of my sons graduated at Komenský University in Bratislava (Pozsony) in chemistry, the other took his degree in the University of Miskolc as mining engineer and geologist. However, they both lost their industrial scholarships when we were turned out of work. So I was faced with the double challenge of finding a new area of work and making money.

After the change of regime I lived a different style of life and my formerly close intellectual relationship with Széky-Fux broke off. I would occasionally hear about her, mainly from a friend, Tibor Zelenka, who was on the same course with me at university and who would visit Széky-Fux even in her fragile state.

I myself was absorbed in the problems of daily routine work and family. I ventured into foreign countries from Morocco through Iraq to Cuba to raise the funds for the education of my sons and the bare costs of living. I contributed to research in neighbouring Slovakia and always kept the zeal for new explorations in the Tokaj Mountains, as inspired by Széky-Fux.

The former sites of extraction were all privatised. I met the representative of the American company that was to take over Erdőbénye as well as the forwarder that purchased the mine at Füzérradvány. I also met Dr. Géza Farkas, a former manager at the perlite mine at Pálháza who himself became a shareholder in the mine and works.

The company that controlled the mines around Mád kept transforming, the mines declined and the works turned into a wreck. It was at that point that a major number of Hungarians were offered financial compensation in the form of securities for deprivation of freedom or property after the war and in the fifties. This special type of securities served as means of exchange for land or other securities. Since I was not entitled to any compensation notes I joined the auctions with substantial cash in my pockets. As I expected, there was tremendous interest for arable land, orchards, vineyards but nobody was after bare mountain sides. Once I had the information that an area of this unpopular type was up for sale, I would go to the auction and join someone with compensation notes. I then persuaded them to bid for the area for me and paid them cash right away. This way I managed to purchase bare plots such as Nagyarok at Golop or Kaptár hill at Monok and a lot more for my business, Geoproduct.

What has the story got to do with Széky-Fux? It is all about a set of mind, hers and mine, which seemed to work similarly. Whenever we spoke, either by phone or face-to-face she would emphasize that any mineral could turn into relevant raw material, any time. You only needed to pay attention, she said. I tried to do so and use extensive experience to devise deep mining and mineral procession based on the minerals in the Tokaj Mountains.

The point was not to specify the particular location or mineral that was bound to be exploited, rather to comprehend and share my belief in the future and give encouragement. She was practically the only person willing to take the time to give a former student inspiration. For which I am ever grateful and would like to say thank you again.

In her last years she once paid a visit with her family to us in Mád. We looked around the new plant that I and my family had set up and a few sites near Rátka. Finally our photo was taken under a placard which we had used in a demonstration against the closure of our workplace in Miskolc, which we later attached to the wall of our plant. It said: 'Work cannot be laid off.'

It was work that Széky-Fux urged and encouraged me to do and her message stays with me, the former student as a never-ending inspiration.

As my lecturer she urged me to pass on knowledge and experience to the next generations. There were different ways to do that, she said but it was safest to write down what had accumulated. I am engaged in doing precisely that. In the past years I have summarised information on processing and using specific minerals, especially from the Tokaj Mountains.

Directly and indirectly, she gave me the urge to live. She taught me to love nature. At a mature age I can only thank fate, that next to my mother, my school mistresses, woman teachers, male colleagues and friends I was also given this additional source of inspiration, guidance and assistance to accompany me through the twists of life. She has been and remains a role model for thinking the right way and loving earth and the minerals.

Writing as a former student that gratefully recalls an outstanding personality, it is also my wish to demonstrate that our vital need in the world is not for money, so sought after these days, but rather respect and generosity to each other, as well as nature.

Dr. Ernő Mátyás
geologist
retired associate professor

Vilma Széky-Fux: the geochemist and volcanologist

Székyné Fux Vilma: a geokémikus és vulkanológus

Pioneer of exploration of K-metasomatic processes

Igneous mineralogy-petrology, ore mineralogy and volcanology represent essential parts of Vilma Széky-Fux's scientific oeuvre. Her scientific activity was quite far-reaching, both in space and time; however, the most lasting works were resulted by her studies concerning the Tokaj Mountains and the Trans Tisza (Tiszántúl) area. Exploration of the prospect of precious metal ore mining in the Tokaj Mountains was mainly led by her from 1950.

During the Miocene not only the environment of Telkibánya or the Tokaj Mountains but the whole Carpathian Basin was the scene of a volcanic activity lasting several million years. From basalt to rhyolite, rocks of the entire calc-alkaline series were formed. Due to the varying morphology and palaeo-geographical conditions partly formed by the volcanism itself, both subaerial and submarine volcanic activity was common. Subvolcanic (intrusive) bodies, which were exhumed later, were also formed. Volcanism was followed by post-volcanic activity

forming ore and non-ore mineralization and altering the original rocks.

In most of the similar volcanic area in the Earth the K-metasomatic process, i.e. migration of potassium from its original place and its accumulation in other rocks, is one of the most common of these alterations. Because other elements, such as gold, migrated with potassium, it is not surprising that petrology and ore mineralogy of this phenomenon has been studied in the Carpathian Basin since the formation of these disciplines. The German Richthofen, Wolf, and Doelter as well as the Hungarian József Szabó, Gyula Szádeczky-Kardoss, Inkey, Hoffer, Pálffy, Liffa, Lengyel, Bem, Scherf and Schréter have to be mentioned. All of them observed and mapped the rocks formed by the K-metasomatic process, and they studied its origin as much as, for example, the problem of the age of the volcanic rocks. From the beginning, the main point was the question: whether the high K-rock came from a primary magmatic source or it is a secondary product formed by post-volcanic activity.

K-metasomatic process and propylitisation (formation of greenstone) are in relation to each other just like K-metasomatic process and gold mineralization.

Vilma Széky-Fux dedicated a significant part of her scientific research work to understanding these processes. Amongst her papers on this topic, the first, entitled „Petrogenesis of the environment of Telkibánya-Felsőkéked”, was published in the Bulletin of the Hungarian Geological Society (Földtani Közlöny) (co-author Margit Hermann). Based on the mentioned authors' studies, they developed the former work by listing the mineralogical and chemical composition of rock types of the studied area. Beside the Upper Mediterranean (Badenian) pyroxene andesite and its variety that are highly altered (propylitised) along tectonic lines, they distinguished a younger rhyolite which, as they stated, forms sheet-like cover over the older rocks. According to their opinion “the rhyolite was penetrated by the alkali trachyte along a N-S tectonic line”, i.e., at that time they supposed trachyte as the product of alkali magma. This is surprising because they described this rock “to have an absolute amphibole andesite appearance, and to contain light pink feldspars and frequently altered into brown ironstone, columnar brown amphibole as macroporphyric constituents.” Similarly, they also identified that sanidine might form 60-70% of the rock therefore it is the most dominant mineral constituent. Based on the microscopic features, they performed chemical analyses; the results revealed major element compositions “totally uncommon in the calc-alkaline province.” Moreover, „numerous analyses proved that the whole mass of the Kánya Hill is of high K-content trachyte (9-10% K₂O as average).” Because of the high K-content, Scherf recommended it as a raw material for potassium artificial fertilizer to the Central Planning Board of that time.

On the basis of the available data, they stated that „the high K₂O content of the rock indicates if not an alkali at least a definite Mediterranean character.” They mentioned that “even the outlook of the rock described by Pálffy from the Morgó Ridge is quite similar to that of the rock of the Kánya Hill. At first, Pálffy classified this rock as rhyolite, and later as porphyritic trachyte. Gyula Szádeczky-

Kardoss described similar rocks from Verespatak in the Transylvanian Ore Mountains. As a consequence, they concluded “inside the young volcanic belt of the Carpathians such a high K_2O value can be found only at the localities that are hydrothermally altered and contain precious metal ores.”

Concerning the genesis of the rock, they suggest the eminent role of magmatic differentiation; the alkali trachyte of the Kánya Hill can be regarded as the crystallisation derivative of pyroxene andesite, i.e. as a residual lava.”

In another of her papers entitled „Study on propylitisation and K-metasomatic process in the Tokaj Mountains” she stated that „every eminent researcher who observed and studied the relationship of the Carpathian volcanic mountains and their ore mineralization, dealt with propylitisation even if in an unintended way.” She mentioned Richthofen – the first to use this name – József Szabó, Béla Inkey, Mór Pálffy. From a historical point of view it is interesting that, contrary to Richthofen, József Szabó did not regard propylite as a real rock type but he suggested it as a product of a simple post-volcanic process. According to Korshinsky this phenomenon had metasomatic origin in which he distinguished inert (i.e., hardly changeable) and mobile (changeable at any rate) elements. Final products of this process are albite, epidote, and chlorite; while in the presence of carbonate rocks epidote, chlorite, calcite containing rocks are formed as well as quartz and pyrite.

As it was mentioned above, recognition of the fact that gold ore mineralization is in connection with both propylitisation and potassium accumulation is – in cooperation with Margit Hermann and Emil Scherf – Széky-Fux’s achievement. That time, however, she regarded the rock of high K-content as a product of an independent magma differentiation, although Professor Mauritz, her mentor, assumed its metasomatic origin. In the meantime, the exploration of ore mineralization in the Telkibánya area succeeded and the results obviously proved that high degree of propylitisation, potassium metasomatism and concentration of precious metals are associated to the andesite. Propylitic andesite and andesitogene propylite are characterised by chlorite formed at the expense of mafic minerals. Apart from these, sanidine, quartz, pyrite, epidote and calcite can be found. Beside Széky-Fux, K. Varga-Máthé also proved that potassium metasomatic processes resulted in the formation of two types of feldspars. Her new statement was that K-trachyte decreases parallel to the decrease of altitude and to increasing distance from the centre of the mineralization. The borehole Telkibánya-2 obviously demonstrated that K-trachyte decreases and propylite increases from the surface toward the bottom. On the basis of her own observation, Vilma Széky-Fux precisely outlined the genetics of the process: metasomatic process was begun with chloritisation and then the formation of clay minerals (dominantly montmorillonite). By substitution of calcium, feldspars converted into albite-oligoclase plagioclase and sanidine also appeared. The process proceeds in a system closed on the top, in presence of vapour and under reductive conditions. On the other hand, however, oxidative circumstances could be formed along open tectonic fissures. Plagioclase can be entirely substituted by adular; the mafic constituents are opacitised.

Chemical composition changes correspond to the mineralogical alteration: CaO -, Na_2O -, MgO - and FeO -content decrease parallel to the increase of K_2O -content. Ferro-ferri condition also changed: Fe_2O_3 became to be dominant. Water content increases in propylite and decreases in potassium trachyte. She referred to tectonic conditions as well: „Potassium metasomatic processes of higher degree, however, are associated with propylitisation in the places only, where strong tectonic events formed significant fissure systems suitable for migration of potassium rich solutions. Her final conclusion: „In the Carpathian volcanic mountains propylite and the so-called K-trachyte are in the closest genetic relationship to each other.”

In 1970, finishing the exploration research, Vilma Széky-Fux published a monograph summarising her more than 20 years of study in the area of Telkibánya. In a subchapter of the chapter on syn- and post-metallogenetic processes she deals with potassium metasomatic process too. In spite of the increasing amount of data the problem of nomenclature was not solved as indicated by the keywords of the chapter:

„Potassium metasomatic process (‘adularisation’)

Genesis of the andesitogene K-metasomatite (pseudo-trachyte)

Petrogenetic series: ortho-andesite \Rightarrow chloro-andesite \Rightarrow propylite \Rightarrow K-metasomatite (pszeudo-K-trachyte)”

In the introducing part of this chapter, as she did in her two former papers, she self-critically reviews her own conceptual change, summarises the Hungarian and foreign trends concerning the mineralogy of potassium metasomatism and alkali feldspars. In this work she took into consideration such modern crystallographic features as degree of order, exsolution and quality of twinning. She used the word “pseudo” at the same time and in the same sense as Gábor Pantó and his mapping group of the Geological Institute of Hungary, i.e. referring to the secondary character of the process. Gábor Pantó summarised it as follows: „There is a continuous transition between andesite and pseudotrachyte depending on different degrees of the potassium metasomatic process. This series is arbitrarily cut off at 8% of K_2O content; rocks with lower and higher K_2O content are referred to as trachytic andesite and pseudotrachyte, respectively.” Gábor Pantó appreciated Vilma Széky-Fux’s achievement as follows: “ In Telkibánya, the most exposed and classic area of the potassium trachyte it was the explorer Széky-Fux (1951) that proved that K-content is highly varying depending on the possibilities of penetration and trachytic andesite, or even acidic andesite may survive amongst the highly trachytic zones (“rock dykes”) formed along the tectonic fissures.” „Concerning its genesis, pseudotrachyte can be generally regarded as a typical metavolcanic rock – potassium-metasomatite.”

Study on clay mineralization and petrometallogenesis

In 1957 she dealt with another interesting part of the Tokaj Mountains: genesis of bentonite near the village of

Komlóska. On the basis of her study, she concluded that bentonite might be formed by fissure-side hydrothermal alteration of both rhyolitic tuff and pyroxene andesite. She drew her main conclusions on the basis of detailed mineralogical-petrological studies of the samples collected in the 150m long Újtáró. She stated that the hydration state of silicic acid in the parent rock had important effects on colloidal features of the bentonite. High water content increased significantly the peptisation of montmorillonite. On the other hand, opal and finely scattered quartz formed by re-crystallisation of chalcedony or colloidal solutions might prevent dispersion of montmorillonite lamellae, i.e. decrease its peptisation. According to its colour, she distinguished more varieties such as white-green and pink-spotted ones. Beside illite and montmorillonite, she identified nontronite, too. She also indicated that Ca-bentonite could be peptised with soda admixture. In this respect, the plastic white-green type could be easily peptised; the other hard and quartzite-like variety could be hardly peptised. In her opinion, white bentonite was derived from rhyolite tuff, and the plastic yellowish green variety came from andesite.

She used the experiences obtained in Komlóska in the further research of the Telkibánya area; that time she studied the deep zones of clay mineralization associated to ore mineralization. On these studies she published two papers in 1964 and one in 1965 and 1966. She revealed that clay mineral zonation corresponding to depth was formed by ascending and descending impacts. Near the surface a relatively thin but extensive kaolinisation accompanied with low precious metal content. It was followed by the domination of montmorillonite down to a depth of 400-500m and this zone contained the highest precious metal content. Below this zone the dykes containing non-ferrous metal-sulphide were accompanied by andesitogene propylite, which downward turned into epidote facies of higher temperature.

In 1964 she reported her results in two papers on studying the relationship between ore mineralization and high K igneous rocks well known in the international geological literature. She stated that in the case of the Telkibánya ore mineralization – similarly to the other hydrothermal ones in the Carpathians – the members of the rock series from fresh pyroxene andesite through chloro-andesite and propylite to alkali trachyte were in close petrogenetic connection. She suggested a regularity of vertical occurrence of the rocks: chloro-andesite and K-trachyte could be found in shallow depth and in the summit region, respectively. On the other hand, however, this statement was not entirely supported by the results coming from drainage sub-adit and the borehole Telkibánya 2.

Vilma Széky-Fux summarised her versatile research work in the Telkibánya area in the monograph entitled “Ore mineralization in Telkibánya and its Carpathian connections” published in 1970 by the Akadémia Publisher. She analysed features of the ore mineralization in the Telkibánya area and its position in the Alp-Carpathian metallogenetic province. She reviewed the history of mining and exploration, too. She distinguished pre-, syn- and post-metallogenetic processes. On the basis of mapping of dykes in the Gyepü and Kánya Hills, she

determined the extension of the ore mineralization. Based on detailed geochemical studies, she determined concentrations of mineral-forming elements with the help of which the general features of the ore mineralization could have been outlined. Unfortunately, weighted mean values for the dykes rarely exceed the value of 1g/t; and the Au/Ag ratio ranges from 1/23g/t to 1/130g/t. Besides the precious metals, lead, zinc, copper and sulphur are the dominant ore mineral forming elements. Weighted mean values for both Pb and Zn are much less than 1%, and Cu could be determined in a quantity of weighted mean as low as 0.1–0.01%, either. To determine the temperature of the ore mineralization she used Stringham’s method published in 1952, and considering the non-ore minerals occurred in the area (kaolinite, illite, sericite, montmorillonite, chlorite, carbonates, adularia, apatite), she concluded pH changes of the processes.

Based on the evaluation of borehole Tb-2, she described the deep-level (from 935 to 949m below the surface) ore mineralization of quartz-sulphide type formed in K-trachyte, which totally differs from the other well known type on the surface. The characteristic minerals are sphalerite, galenite, pyrite, quartz. The cover is of illite bearing heavy dark-grey clay-marl; and she regarded chloro-andesite as the most characteristic hypo-volcanic of the ore mineralization. Between 938-939m 1.26% Pb, 8.50% Zn and 0.386% Cu was detected in this rock. Potassium metasomatised rock was found in an interval as deep as 1069-1073m and this fact obviously proved that K-trachyte connected not only to the morphological summit area.

As far as it was available at that time, she also attempted to determine the age of the ore mineralization. She distinguished two ore forming phases: the well-known younger mineralization characterised by lower radiogene anomaly and the deep-level one with higher radiogene anomaly. On the basis of trace element spectra, she supposed that the deep-level ore mineralization had come from remobilisation of the material of an ancient (possibly Caledonian) ore mineralization. In the final part of the monograph she compared petro-metallogenesis of ore mineralization localities in the Carpathian Neogene ore province.

In 1978 she published a paper with René Maury in the *Földtani Közlöny* on carbonified and silicified tree trunks of the late forests buried by pyroclastic flows that are quite common in the Tokaj Mountains. Based on comparative studies of infrared spectra of organic matter from the tree trunks, the temperature of the covering pyroclastic flow was proved to be 300-400°C. For a tree trunk enclosed by propylitic andesite lava temperature less than 500°C was obtained.

Between 1980 and 1987, with Kadosa Balogh, Sándor Szakáll, Zoltán Pécskay and Pál Gyarmati, she published five papers on K/Ar radiometric dating on volcanic rocks of the Tokaj Mountains, which were published in *Földtani Közlöny*, *Geologicky Zbornik*, *ATOMKI Közlemények* and in the proceedings of the congress of the Carpathian-Balkan Geological Association. These data coming mainly from the Telkibánya area are in accordance with the geological chronology. The data indicate that volcanic activity began in the Upper Badenian and terminated in the Pannonian, i.e. it lasted 4-5 million years. The youngest

formation is the olivine basalt explored at Apróhomok near the town of Sárospatak by the borehole Sp-10; its age is 9.2 ± 0.5 million years. One of her important conclusions is that in Telkibánya there is no significant difference between the age of the volcanic activity and that of the propylitisation and K-metasomatic processes. The radiometric age of the pyroxene-amphibole dacite of the Sátorajújhely-Vágáshuta area proved to be younger than Badenian obtained by geological chronology; they explained it as a result of opacitisation of the amphibole crystals.

Research in the Trans Tisza region

Vilma Széky-Fux and Miklós Kozák published a paper in the Bulletin of the Hungarian Geological Society (Földtani Közlöny) in 1984, in which they presented a detailed study on volcanism of the Trans Tisza region, in general, and the of the Nyírség area, in particular. Only three of the eleven deep boreholes (Nyíl-1 near Nyírlugos; Komoró-I near Komoró; and Nyáb-1 near Nyírbrány) exposed the whole section of the Miocene formations. They introduced the Palaeozoic and Mesozoic rocks of the basement, and described the Miocene volcanic rocks in details. Sketch maps demonstrated the thickness of the Miocene formations and the tectonic and volcanological conditions of the area. They summarised the results of petrological and geochemical studies of the borehole cores, and stated that types of the covered volcanic rocks were quite similar to the rocks of the volcanic mountains. According to the radiometric data, the volcanic activity lasted from 16 to 11 million years BP. In the Nagyecsed Trench, along the Szamos Lineament, they detected covered volcanic mountains as big as the Tokaj Mountains. Thickness of rhyolite pyroclasts reaches its maximum below the Nyíregyháza-Gelénés area. The explosion centres were identified on the basis of the frequency of lava rocks and of the degree of weld of pyroclasts. In some cases, similarly to some formations in the Tokaj Mountains, radiometric ages were younger than the geological ones because of alteration processes (e.g. propylitisation). For example, in the borehole Necs-1 (near Nagyecsed) the fossils in the interbedded sediments are Badenian, however, radiometric age of volcanic rocks is 10.2 million years.

In 2004 she published a paper with T. Zelenka, E. Balázs, K. Balogh, J. Kiss, M. Kozák, L. Nemesi, Z. Pécskay, Z. Püspöki, Cs. Ravasz, A. Újfalussy in the Acta Geologica Hungarica. This paper summarised all the geological, geochemical, and mineralogical knowledge, as well as gravimetric, electromagnetic, and radiometric data concerning covered Miocene volcanism in Hungary, which accumulated by the research work of some decades.

Spatial distribution of the Miocene volcanic centres introduced in a sketch map was fixed to the micro-plate boundaries forming the Carpathian Basin. They estimated that vertical and horizontal extension of the covered Neogene volcanic formations is several times greater than that of the rocks found in Hungarian volcanic mountains. During the Early Miocene, in the Eggenburgian and the Ottnangian stages, extensive calc-alkaline volcanic activity dominated by rhyolitic composition was characteristic from S-Transdanubia to Salgótarján and to the southern part of

the Bükk Mountains as well as in the Great Hungarian Plain. Volcanic rocks of the Karpatian stage located dominantly in Transdanubia connect to dacite and rhyolite volcanic centres. Buried Badenian andesitic stratovolcanoes have been found in S-Transdanubia, the Danube-Tisza Interfluvium area and the Trans Tisza region, as well. The rhyolitic, subordinately dacitic-andesitic volcanism involving large amounts of pyroclasts and many lava domes and the activity of which was prolonged into the Pannonian stage is most extensive in the Nyírség. During the final stage of the volcanic activity, in the Little Plain area alkali trachyte, in the Middle-Transdanubian area and in the Danube-Tisza Interfluvium area alkali basalt lava domes and tuff craters were formed.

After critical evaluation, Vilma Széky-Fux excellently used the valuable conclusions of the former researchers and her versatile research work produced fundamental results concerning both detailed studies and summarising reviews. Her scientific oeuvre made her to be one of the most prominent representatives of Hungarian clay mineralogy, petrology, petro-metallogenesis, and volcanology.

Pál Gyarmati
geologist

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Memoir of Professor Vilma Széky-Fux and her activities in the history of science

Emlékezés Székyné Fux Vilma professzorra és tudománytörténeti munkásságára

Personal recollections

She was a most respected senior lecturer with a reputation for great teaching skills at the Department of Mineralogy and Petrology, ELTE University when I first met her as a first year student of geology in 1953. Realising in my second year that my favourite subject was petrology I joined a special interest group for students where I soon delivered my lecture on pegmatitic and pneumatolytic ore formation and contact metasomatic processes. Széky-Fux attended my lecture and encouraged me to carry on research reading. She even nominated me to Professor Elemér Szádeczky-Kardoss for a financial award in recognition of my SIG work.

Next year I became an assistant at the department which gave me a chance to consult her on several occasions. I asked her to be my consultant for the final thesis. She even gave me assistance in field work in the North Mátra Mountains and asked her friend Lajos Bartkó, senior geologist in Salgótarján to give me access to the mining explorations in the area. To sum up, her teaching qualities and her ubiquitous willingness to help and orient young talents gave a decisive direction to my career.

Upon graduation in February 1958 I became her colleague for a long period until 1974 when she returned to the University of Debrecen, the cradle of her career. She offered the same sympathy and assistance whether a

teacher or a colleague. Running the seminar practice in mineralogy and crystallography for her chemistry students I saw direct evidence of her work. Those chemistry students not only grasped the basics of a subject that initially seemed very far from their field but gradually developed a liking for it.

We both had the habit of working late at the department and would leave together at 10pm when the gates were closed. Since we lived in the same direction from the university we would take the tram together and discuss our private lives and families on the way home. That was when I found out about the difficulties and joys of her life and formed my respect for her honesty, faith and loyalty which gave her moral strength to face and endure the trials of fate.

Our friendship grew closer when her son, Péter started working for me as a field assistant in summers. He was an arts student, kind and sensitive, with an obvious talent for literature. It was from him that I found out about the literary merits of László Németh, a major 20th century writer with a social conscience. Péter was writing his thesis on him and took every chance to discuss his novels and essays.

Even for me it was a real blow when 15 years later he suddenly left us, a well-known and acknowledged journalist by then.

How could Minka survive this loss? My admiration grew as I saw her get over the grievance with the help of her commitment and love for her family. She gained strength from her passion for those still around her, her 'children' including the in-laws and grandchildren. And her legendary devotion to her husband has confirmed my belief that love can last forever.

Brief account of her activities in the history of science

We shared an interest in the history of science. She revealed a lot to me about the generation before us and specially her two beloved and respected professors Károly Telegdi Roth and Béla Mauritz.

She was a founding member of the Section of History of Geology of the Hungarian Geological Society starting 1970. I worked along her in the Section Committee starting 1975. Her elevated talks were all the more enjoyable since she introduced scientific personalities with whom she had direct (sometimes work) contact so the audience gained information from a close source.

She was elected Honorary Head of Section in 2002 following the passing of Gábor Csíky. She attended the committee meetings and the lecture sessions while in good health and left a void when she stopped coming in her fragile state in 2003.

She produced almost thirty publications related to the history of geology covering issues from the lives and careers of outstanding scientists (within and beyond the borders) to the history of national geological institutions (including societies, universities, museums) to the history of mining.

The volume titled 'The third half century of the Hungarian Geological Society' compiled by the trio of Endre Dudich, Irma Dobos and Széky-Fux and published in 1998 is of outstanding relevance. She was also co-author

of the publication of conference papers on the history of applied research in geology in Hungary in the 20th century. She has contributed to several Biographical Lexicons. Following the issue of the album about famous Hungarian women scientists which she co-authored with Maria Vendl she was interviewed by several journalists and radio reporters.

She focused on the work of 20th century scientists but also dealt with some others who did the majority of their research work in the 19th century, such as

Béla Inkey, Antal Koch and A.N. Zavarickij, the world famous Russian petrologist.

She discussed the work of her mates, Emil Scherf, Gábor Pantó and János Treiber (from Kolozsvár) from several aspects. Her closest friend, however, was Professor Kálmán Balogh who revealed to her at the start of her career the real sense of a geologist's profession while doing field work in Erdély, Transylvania and the Felvidék, the Slovak Highlands.

She also published on the work of Margit Hermann, Zoltán Török, Lajos Jugovics, Gyula Szádeczky-Kardoss. She delivered her last lecture in the history of geology on Professor Béla Mauritz at a session of the Hungarian Academy of Sciences in spring 2002. As a former junior colleague, she was able to share with us details about her respected mentor that you would never know unless you worked alongside the person. We regret that it was beyond her capacity at the time to produce a version of the talk to be printed.

We should also make mention of a series of publication on the rules of spelling in chemistry and related areas, prepared by several years' committee work at the Hungarian Academy of Sciences, headed by Tibor Erdey-Grúz, the General Secretary in the late sixties and early seventies. Mineralogy was represented by Széky-Fux in the project which resulted, among others in the publication of the right spelling of a list of major minerals and rocks.

Summary

The work in the history of geology done by Vilma Széky-Fux was inspired by two sources: firstly, her respect for those whose work and teaching has helped us discover the Earth and nature and secondly, her love of the Hungarian culture there to be discovered and presented to others by the scientist. This may not be a rewarding task. However, there is some moral award in gaining an overview of the development of a branch of science, which helps us assess our own contribution and realise the process whereby each epoch and generation adds to the expansion of human knowledge. I believe that for Professor Széky-Fux research of the history of geology meant personal experience and had an effect on the development of her professional character.

Postscript

The Hungarian Geological Society, the Section of History of Geology and that of Mineralogy and Petrology arranged a lecture session in memory of Professor Vilma Széky-Fux on 26 March 2007, the first anniversary of her death. The session will take place in the Assembly Hall of

MÁFI, the Geological Institute of Hungary including ten quality lectures by his former students and supportive colleagues who at some point had all taken inspiration from her. The lectures covering different areas and aspects of her work will be made available by the society in a memorial publication.

Following the memorial session the heads of the Society and those of the Sections concerned as well as the delegates of the University of Debrecen and ELTE

(Budapest) expressed their respect in short speeches and layed wreaths on her tomb.

We will take good care of her heritage.

Póka Teréz
geologist

retired senior research fellow

Institute for Geochemical Research Hungarian Academy of Sciences

Ten years since László Kulcsár the colleague and former student died

Tíz éve hunyt el Kulcsár László a kolléga és volt tanítvány



19 March 1918 – 27 May 1996

There are interesting family histories, personal fates or professional careers that cannot be separated from the historical background where they started or where they were incorporated by the enforcing circumstances during the storms of history. The northeastern part of the historical territory of Hungary, the first to be captured by the Hungarian conquerors, despite its colourful ethnic composition was the most enduring and rebelling region of national resistance, self-organisation and the preservation of cultural heritage in the Hajdú and Kuruc times. Starting with the Turkish invasion and even more with the spreading of the Reformation movement it developed its own character and resisted the germanising and re-catholisation measures of the Hapsburgs and, as far as possible, the Russian and Panslavic impact. The events of the 20th century, however, caused irreparable damage to this region.

The first documents of the Kulcsár family, which were relatively easy to detect, originate from the Upper Tisza region where a certificate of the Reformed Church in the 18th century records István Kóltár, the great great grandfather of László Kulcsár in this archaic piece of writing in Tiszabездéd. Ferenc Kulcsár the great grandfather was also recorded to be born here in 1809,

however, in the modern spelling. After this the certificates show the immediate ascending line in Transcarpathia as people who partly served the church.

The history of the Kulcsár family is a typical example of those Hungarian families that remained in the areas that were torn from the country by the fundamentally imprudent and undeserved Trianon Treaty following the collapse of the Austro-Hungarian Monarchy in the First World War. The Hungarian families that were left outside the new border and drifted into minority through no fault of their own had to integrate into a different and less than friendly public administration, cultural and language environment in order to survive and to endure with relatives living in several successor states in many cases.

These events fundamentally influenced the lives of families and their members tearing frequently their roots, connections; setting fates on forced track and causing financial loss and mental traumas.

The Kulcsár family can be considered mostly as originating from Transcarpathia, the area of which first turned part of Czechoslovakia, a state formed in 1920-23. After a short period of Hungarian administration in 1945 it became a marginal region of the Soviet Union until it collapsed and gave way to the Ukraine so that by now it

has become the eastern border-side region of the European Union as part of Ukraine. Other parts of the family – primarily on the mother side – originate from Transylvania, and thus they were under Romanian authority except for the few years of re-annexation. A third part of the family became citizens of the parent state through migration and resettlement.

The walk of life, the professional and personal career of the outstandingly skilled László Kulcsár with a rugged fate cannot be separated from this age and its events that overloaded the generation suffering from two world wars and many drastic changes. This is especially true for those originating from the border-side regions where politic distrust and ethnic discrimination with inner and outer “iron curtains” made the life of the parted families further difficult.

János Kulcsár, the grandfather of László Kulcsár was born in 1844 and he was a reformed priest in Bótrágy (Bereg County in Transcarpathia). This settlement is found in Beregszász district in the immediate vicinity of the border (presently on the Ukrainian side) between Záhony and Barabás. János Kulcsár was married here in 1873 to the then 20 years old Erzsébet Szarka who came from Debrecen. Their son, János (12 05 1888 – 05 01 1972) became the father of László Kulcsár.

The father, following graduation from the grammar school in Munkács, gained his diploma in the elementary public school teacher training college in Sárospatak. In the meantime he has taken a temporary junior clerk’s job in the royal district court of Ilosva and another junior clerk’s job in the district court of Munkács in order to sustain himself.

After graduation János Kulcsár was named assistant master in the elementary public school of Salánk village in Bereg-Ugocsa counties, Transcarpathia to a position that had turned vacant due to retirement, according to the decree of the Minister of Religion and Public Education to the Hungarian Royal Excise Office in Nagyszőlős. Gaining employment in that special era of oversupply of labour force was not easily available, despite the increasing demand for public servants due to the development of a modernizing state. The vacancy was published in the Masters’ Paper and applied for by seven candidates, exclusively men. Following the interview of the candidates, the School Chair awarded him the job, a promise of rank and means of living, with 11 unanimous votes. His initial salary, with the local benefits was increased from 720 korona to 1200 per year by the Minister when he received his master appointment following one year service. His salary was granted monthly by the signature of the Hungarian Royal Master Supervisor from 1912.

According to a certificate dated 16. 02. 1915 in Nagyszőlős, János Kulcsár was exempted from military service by the Minister of Religion and Public Education due to his job. The exemption had to be renewed in the Cadre of Kassa in 1918 due to the adverse events of war. The reason for exemption besides occupation was his deteriorating health (apicitis).

The then well appreciated master occupation enabled a respectful living thus the beginner master János Kulcsár was able to think about founding a family. He married the also reformed Erzsébet Bihari (23. 09. 1897 – 05. 11. 1979) in 1915 who originated from a yeoman family from

Bunyaszekszárd Krassó-Szörény County and moved into Salánk. She was raised by her childless nephew, Lajos Bihari, a reformed priest and his wife, Erzsébet Szegedi. Four children were born in this marriage, László in 1918, Sándor one year later, Gyula in 1921 and finally Gábor in 1929.

The other part of the Bihari family left the small reformed village, established by settlers from Szekszárd in 1906, around the time when the reformed priest, Gábor Bihari, the grandfather of Erzsébet died. His son, also named Gábor, left his land and moved into Debrecen with his family where he became the head of the Dean’s office in the Faculty of Theology of the Reformed College. He built a house on a large estate in the so called Bihari estate in the eastern edge of the city at 45 Onosai utca (43’a’ and ‘b’ Hétvezér utca from the 1930s). This was replaced by a nice, modern semi-detached building in 1933. This place was later a refuge for László Kulcsár when he was a pupil.

The Kulcsár family lived in Salánk until 31st August 1927 due to the master and director master occupation of the father. They lived in the official residence of the school thus their first three children, with the firstborn László among them spent their childhood there. After this, their father became a master in the Hungarian school of Mezőkaszonny with the approval of the masters’ inspectorate in Beregszász. This presented financial safety to raise their children. In the meantime, Czech language courses were organised for the masters on several occasions to improve their skills in the official language of public administration and to start the gradual transformation of the teaching towards the Czech language. The new appointment was issued (No. 2043/27) in Czech and Ruthenian languages following the oath of allegiance to the new state in front of the masters’ inspectorate in Beregszász. The certificate was signed by the proconsul of the Beskid province and the vice-proconsul Rossypal. The family lived at 15 Arany J. utca in Beregszász at the time, therefore the father was commuting to do his job.

Following the re-annexation of the border-side area of Transcarpathia by the Vienna decision, the appointment of János Kulcsár, due to his faithfulness to the Hungarian Nation was finalised in the decree No 3577/1939 of Dr. Lajos Kacsó, the royal masters’ supervisor of Bereg and Ugocsa counties dated 19th August 1939 and he was recommended for promotion.

As a result of the family’s comings and goings, László Kulcsár preserved as a lifelong memory the landscape around Salánk, the childhood memories of Munkács, Ungvár and Beregszász, the hills of Nagyszőlős and the volcanic domes which he was never able to visit again, not even with the help of official and international connections. In 1970 there was no possibility for him to visit his birthplace while he took part in a meeting of the Scientific Academy of the Soviet Union organised in the region.

László Kulcsár completed the four classes of elementary school in Salánk. The first four classes of grammar school took him illegally – with the help of his relatives in Debrecen – into the Reformed College of Debrecen visiting home to Transcarpathia on the weekends. He had to finish the four upper classes in the Hungarian grammar school of Beregszász, where the GCE was in the Czech language.

In the year of the re-annexation of the eastern part of the country, 1939 he was admitted to the Hungarian Royal Tisza István Science University (Kossuth Lajos Science University from 1952, University of Debrecen from 2000) as a science – chemistry teacher. He chose geology for his research area already as a student thus he joined the work of the Institute of Mineralogy and Geology (later Department) early. He was still very young when became a feeless apprentice from 1st September 1940. There he met Vilma Fux and Kálmán Balogh, later professors, who conducted seminars for him. He also made friendship with László Dudás, the later ore researcher and mineral-rock collector geologist who moved to North America. This connection did not cease even later. As a result, László Dudás sent nice and valuable mineral rarities from the USA for the collection of the Department. Even his will gifted the Department with numerous valuable minerals and rocks.

The Kulcsár children were raised in a loving and caring family, but fate tore the brothers from each other. Sándor Kulcsár also studied in Debrecen in the Faculty of Law, however, his education was not completed due to the war and other tragic events. Their younger brother, Gyula graduated with honoured diploma in the Faculty of Law and got a job in the State Prosecutor's Office in Beregszász. Sándor went to find him but he was not in his office any more, as the office had moved on towards the west. Gyula was taken to an unnamed Soviet labour camp where he died in tuberculosis. The events of the last stages of his life are still unclear and uncertain. Sándor, seeking his brother in vain, was caught by the rapidly advancing front in Transcarpathia and although he had never served as a soldier was captured by the Soviets and taken to "malenkij robot" (free labour) into a labour camp. He escaped after long years but then authorities only let him move into his former home village of Salánk, torn from Hungary and attached to the Soviet Union, where he became a teacher. There he got married and after a decade of hard work he was able to move back to Hungary with his wife and two sons.

The youngest brother, Gábor was also an undergraduate student of the University of Debrecen specialising in Science and chemistry. Before his carrier as a secondary school teacher he was a junior researcher in the Institution of the famous biology professor, Dr. berei Rezső Soó. Then after a few years of teaching practice he became a successful biochemist of the Chinoin Pharmaceutical Company inventing numerous new drugs and chemicals.

The Kulcsár family is a specific example of the ambitious and skilful Hungarian white-collar and public servant class where 4 sons were raised to receive a degree living in a modest way but at high cultural and educational standards on the salary of a teacher with the mother not forced to take a job. Her task was to ensure the family background, look after the boys and manage the household, with the occasional assistance of a charwoman.

After the Vienna decision some of the university teachers in Szeged went back to Transylvania. István Ferenczi, the geology professor who had come to Debrecen from Szeged, returned to Szeged in 1941. Later, after the war he emigrated to America. The feeless

apprentice, László Kulcsár went along to become an apprentice in the Geological Institute in Szeged for two years. He also became member of the Eötvös College, which provided additional training for the best young scientists, among them Gyula Grasselly who later became a geochemistry researcher of international reputation and member of the Academy. László Kulcsár took part in the summer field works of both the Debrecen and Szeged Geological Institutes (Zemplén part of the Tokaj Mountains in 1940, surroundings of Zsibó in 1941). Thus, due to these events he received his teacher's degree in Szeged in 1943 (No: 3-984). From 1st August the same year he was appointed a grammar school deputy teacher and from June 1944 a teacher in Szilágysomlyó in the re-annexed part (Szilágy county) of Transylvania. At the same time he served in the army. At the time László Kulcsár already had a relationship, looking to be long-term with the beautiful and skilful Mária Marton, coming from an upper middle class family. She also graduated as a science – chemistry teacher, received her doctorate at a young age and became assistant professor at the Institute of Mineralogy and Geology from 1944 until 1952, after Dr. Vilma Széky-Fux had gone to Budapest.

László Kulcsár wished to complete his research topic before joining the army therefore he took a successful doctorate exam defending his thesis of "The geology of the environment of Salánk" in 1943. He sat for the doctorate exam in mineralogy-petrology as the main subject and geology and vegetation studies as additional subjects (No. 275/1943-44). It was painful for him that he could not carry out the scientific study of the area due to its closed political status for Hungarians. Therefore for the geological, volcanological, geochemical and metallogenetic study of the area the samples taken earlier, when he mapped the Nagyszőlős mountains and the material of localities and deep boreholes (e.g. Gelénes, Barabás, Tisztaberek, Tarpa) within the new borders were used. His professionally collected, signed and analysed samples were the only available samples in the country from the Soviet border-side regions of Transcarpathia where clay, hydrothermal sulphide ore and alunite occurrences were known and thus the area was also closed due to its industrial importance.

After receiving his doctorate degree he joined the army for real service on 4th October 1943. He was stationed in several districts (Tasnád, Dorog, Tasnád, Piliscsaba, Kőszeg-Szentgotthárd, Zsida) as soldier of the chemical force battalion No. 102. In the meantime from January to May 1944 he received training to become reserved officer. At his station in Tasnád his relatives and his girlfriend visited him but then the intensifying war events took a tragic turn.

Although he was not member of fighting corps and did not serve in the front he was captured by the Soviets as buck sergeant at Magasfok village near Szentgotthárd when their unit was retreating towards the Muraköz during the spring of 1945. He spent almost three years in Georgia in the camps established in the valley of the Kura stream between the former and the new capital of Georgia (camp 181/2 in Rustavi, camp 7181/4 in Bulachauri). From his accounts later it seemed that those years left life-long impact on him. He took part in constructing the water

system of Tbilisi. For the captives weakened by poor supply and hard work some cheer and survival opportunity was presented by employment, the relatively bearable climate, illegal trading with local people and occasionally with people from the capital. They cherished the sugar free cornel jam desiccated on tarpaulin together with the dried tortoise meat prepared in secret by themselves using simple instruments for adding to their diet.

In the meantime his relatives believed that he was lost and his girlfriend, giving up hopes was married.

He managed to avoid the sufferings of domestic brainwashing camps when he came home weak following his escape from the camp on 26th August 1948. Fortunately, he was able to come to Debrecen and found shelter at 18 Dalmi Tibor utca where his father and some of his family had moved in 1940 due to the unsafe conditions in Transcarpathia. From this point on his father was commuting to continue teaching in Mezőkaszony. After 1945, when Transcarpathia was connected to the Soviet Union, the father taught in the Köntösgát elementary school until his retirement.

László Kulcsár was given a job as a chemistry teacher in the Fazekas Mihály Grammar school in Debrecen from March 1949. In September 1951 he was appointed to the professional high school graduation class as independent form master. He married on 7th February 1950 to Zsófia Szathmáry (1923-2003), the daughter of Ákos Szathmáry, a refugee from Transylvania and mathematics teacher of the Dóczy Grammar School. She was born in Szatmárnémeti (today Romania), she was a descendant of the famous Hungarian poet János Arany and became a history-geography grammar school teacher as well as town and county professional supervisor. The childless couple lived in mutual respect in a tenement flat at 26 Honvéd utca and later in a flat purchased in one of the blocks in Domokos Lajos utca.

When Aladár Földvári, the professor who received Kossuth Award, was nominated the head of the Department of Mineralogy and Geology he looked for colleagues who had some sort of scientific connection with the Department in order to re-develop it after the damage of the war. Thus he chose László Kulcsár first, who, with his doctorate degree became assistant professor in the Department from August, following the departure of Dr. Mária Szabó-Marton. He had a major role in the establishment of the educational and comparative research collection and the map and microfilm store as well as the organisation of the inheritance materials and the library of the Department. Especially hard work was presented by the professional systematic arrangement of the exhibition cases and containers taken from the former museum of the Geological Institute of Hungary together with the separation and partial identification and signing of the mineral and rock collection. Due to the stepped-up working pace he frequently conflicted with professor Földvári over the wide range of tasks and the precise work of preparation and display made with poor technical instruments. This made their relationship somewhat stressful despite their mutual respect. In the meantime they established one of the most specific antique styled but modern collections of the country that is composed of ten different parts. Based on this the training of geology-

geography teachers was started here as well, however, it was stopped in the whole country after a few years.

With the joining of István Barta, Zoltán Rakovits and Gyula Szöör the tasks were shared, however, still many problems were presented by the increasing number of students, the modernising of the education, the operation of the laboratories and the starting of the multi directional research. Although László Kulcsár loved teaching and performed it at a high level it was an enormous load to teach crystallography, mineralogy, petrology, mineral identification, microscopy together with geochemistry and palaeontology in the form of seminars initially and then lectures, frequently up to twenty classes a week. Besides these, he organised and led the summer field trips and fulfilled the post of vice head of Department giving much operational work through a long time.

These all hindered his individual research in some respect and this influenced his total career. As he was overwrought he applied for individual candidate aspiration in 1962 but regarding his age, educational tasks and policy his application was rejected.

His candidate research plan involved the petrogenetic analysis of the environment of Sárospatak and Rudabányácska, the research of the traces of potassium metasomatism, silicification and alunitization, the study of the mercury, precious metal and polymetallic ore formation and the determination of its industrial significance, the summarisation of the border-side hydrothermal mineral accumulations in Transcarpathia and their comparison to the Hegyalja region together with studying the deep boreholes reaching volcanic rocks in the Trans Tisza region.

He had the opportunity to study the Zemplén area connected to Czechoslovakia in 1958 and he participated in the International Geological Congress in Prague 1968 due to his knowledge of the Czech language.

Besides all these he helped in establishing and identifying the collections of several grammar schools. Thus, among others, he has a good relationship with Endre Agni, the chemistry teacher of the Tóth Árpád Grammar School, from whose enormous mineral collection the Department received the opportunity to buy valuable samples in return for the help in the organisation and identification of the minerals. He also helped the systematisation of the crystal-mineral collection of the Reformed College of Debrecen created by Pál Szőnyi, maintaining also excellent relationship with his former student Mihály Nagy, the chemistry-physics teacher and writer of mineralogy, who later became the director of the school.



Photo 2 Evening rest of the students mapping in the course of the summer field trip lead by László Kulcsár (left) in Vágáshuta in 1960.

2. kép Kulcsár László (bal szélén) vezetésével a nyári terepgyakorlaton térképező diákcsoport esti pihenője Vágáshután 1960-ban

László Kulcsár, with his characteristically sharp personality, excellent presenting and composing skills, intellectual capacity and frequently humorous and sometimes sarcastic style was a memorable, loved and highly respected teacher for many generations of different research and teacher training students. As an assistant lecturer I had the opportunity to visit my colleague's mineralogy-petrology lectures, seminars and microscope presentations and take part in the high standard field trips lead by him in different regions of Northern Hungary. In field trips and conferences I also had the opportunity to see and admire his extremely exigent, precise, ambitious and pragmatic research style and judgement abilities, profiting enormously from his compact phrasings. In truth, only his direct colleagues were able to experience and appreciate his virtuoso application of mineral and rock identification techniques from micro-reactions to microscopic analysis.

Personal reminiscence, professional and friendly discussions revealed his wide literacy (e.g. literature, history, arts and cultures), language abilities in the Czech, Russian, German and French languages adequate for reading professional texts and occasionally for discussions, excellent memory, library and literature knowledge. In the meantime, it became clear how much he was irritated by the scale of values turned inside-out and the political alliance of the country, which he could not accept until his death. However, many people asked for his professional and personal advice and respected his abilities thanks to his excellent skills and brave reflections cutting to the quick, therefore he held many faculty and university functions. He became member of several faculty committees (Disciplinary, Education, Syllabus). He was secretary of the Earth Science Department Group for six years (between 1967 and 1973). After 1970 he was elected to be a member of the University Council and following his first mandate he was re-elected for another three years.

When Professor Aladár Földvári moved to the University of Miskolc, Gábor Pantó, member of the Hungarian Academy took the chair of the Department (1967-1972). He especially respected and acknowledged the professional skills of László Kulcsár thus he was nominated

associate professor from 1st July 1970. Following the death of Gábor Pantó, (28 10 1972) László Kulcsár became deputy head of the Department in 1972-1973. In 1973 he received the honour of "Excellent Worker of Education" and in 1976 he received financial reward from the university.

In the very same year he received an offer from his former boss, Aladár Földvári who had become head of department in the University of Miskolc to take part as an accompanying teacher, who speaks the language excellently and knows the destination well in the second joint exchange field trip organised with the fellow institution of Moscow. The field trip was planned to last for three weeks, of which one week was assigned for visiting the professional institutions and museums of Kiev and mainly Moscow and two weeks to be spent in the Caucasus, from Ossetia to Tbilisi crossing the ranges of the Caucasus along the Georgian military route, passing by the place of his former captivity. However, László Kulcsár took no advantage of this opportunity due to his unsettling and strongly negative memories and feelings.

Even the university connections with the Geology-Geophysics Institution of the Taras Schevchenko University of Kiev failed to open the doors for him to visit the closed Transcarpathia region while his guests from that area could certainly wander around the entire area of Hungary. This one-sidedness and the exclusion from his native land made him angry and sad frequently and stopped him from exploiting the opportunities in the co-operations for his personal advantage. In 1971 he represented Hungary in the metallogenic map constructing meeting of the Carpathian Balkan Geological Association (CBGA) held in Kiev.

As a man who never really cared for titles and ranks, he was ready to step down in favour of a person better known by domestic and international professionals, whom he considered more suitable for leading the Department and representing its interests than himself. This was possible when his former teacher and colleague Vilma Széky-Fux, who he highly respected, gained her academic doctorate. Furthermore, the work of Széky-Fux in the Tokaj Mountains, particularly in the vicinity of Telkibánya and Komlóska coincided with the aims and main research areas of the Department. Thus he had an active role in the change whereby Széky-Fux, although as commuting professor, came back to the place where her career had started and became Head of the Department. She also respected the explicit discussion partner, the excellent observer and researcher, the popular and successful teacher and the colleague in László Kulcsár, who had kindly invited and welcomed her.

Probably the most outstanding achievements of the professional work of László Kulcsár were his excellent teaching, educating, collection building and maintaining works that helped greatly the operation of the Department. The museological and education organisation activity carried out for 14 years together with Aladár Földvári laid the foundations for the present reputation of the Department.

His research abilities were also excellent, his scientific publications detailed, suppletory, exigent and of a high standard, his statements are still valid today. Following his

admittance to the Department he joined the Hungarian Geological Society, he was an active member of the committee of its Great Plain Regional Organisation for a long period and he held numerous presentations in the meetings of the Society.



Photo 3 László Kulcsár (right) in the field trip of the CBGA XI. Congress (Kiev, northeastern Carpathians) on 3-8 September 1977 between Lvov and Kiev together with Teréz Póka and György Pantó (Geochemical Research Laboratory of the Hungarian Academy of Sciences)

3. kép Kulcsár László (jobbra) a KBGA XI. (Kijev-ÉK-i Kárpátok) Kongresszus 1977. szeptember 3-8-án tett kirándulásán Lvov és Kijev között Póka Teréz és Pantó György (MTA Geokémiai Kutató Labor) társaságában

In 1941 he took part in the geological mapping of the Nagyszőlős Mountains, which meant birthplace for him, lying in the re-annexed area with the leadership of András Hoffer Head of the Department of Mineralogy and Geology, University of Debrecen and together with young colleagues.

Following this, more than ten years were lost for his research work due to the war, captivity and the hard starting of his career. The 1950s was the time of re-studying, then renewing and equipping of the Department of Mineralogy and Geology, therefore due to the difficult conditions and many engagements the continuation of his research required extremely hard work.

At this time the main research field of László Kulcsár and the Department was the Tokaj Mountains. He carried out mapping, raw material exploring and volcanological investigations in the regions of Komlóska, Erdőhorváti, Háromhuta (Újhuta) between 1953 and 1959. He paid special attention to the hydrothermal phenomena in the

vicinity of Erdőhorváti (e.g. Vég-hegy) and the Bolhás-hegy near the western borders of Komlóska, the weathered, clayey, iron containing siliceous zones, chalcedony, jasper and agate veins, the ligamentous aragonite and geysirite now declared as a protected value at Komlóska together with the bentonite that he regarded to be tuffogenic and which was studied by a research adit from the industrial point of view. His works were integrated into the maps and explanations of the geological mapping with a scale of 1:25000 of the Geological Institute of Hungary carried out at this time. Considering the genetics of the bentonite a buoyant dispute developed during his presentation in the meeting of the Hungarian Geological Society in Budapest between him and Vilma Széky-Fux who considered the bentonite as of andesite origin. They closed the dispute with the assumption that both formation methods are present in the contact zone of the rhyolite tuff situated at the marginal zone of the subvolcanic andesite body as the parent rock and where the traces of strong hydrothermal activity are present.

Relying on the notes of Professor István Ferenczi in 1957 László Kulcsár surveyed, mapped geologically and volcanically and sampled the 289 metres high Sághegy exposed by mining carried out in several levels. Building stone production took place since 1911 and this factory once employing 800 workers was the largest rock mine in the country, however, by the time of modern automation and proper industrial geological research in the early 1950s the excavation was stopped thus the completed research is supplementary. The first example of the national "study trail programme" started in 1989 was the Sághegy. The survey of Kulcsár, published only in 1962 added numerous new information to the image formed on basaltic volcanism until that time. He recognised the general characteristics of the multi phased basalt volcanic activity that happened 5 million years ago, its multi central and multi generation character and that the truncated cone shaped buttes are eroded outliers, vent fillings. Unfortunately this was not mentioned at the opening of the study trail.

He carried out sampling and field observations in the area of the basalts in the vicinity of Salgótarján and the quarry outcrops of the garnet bearing andesite of the Karancs but he had no time for their deeper professional research.

He continuously read, translated and analysed critically the Soviet literature on Transcarpathia that could only be gained through great difficulties. In the meantime he analysed the industrial and mapping research of the neighbouring domestic areas as well. His concluding work, published in 1968, besides his own observations gives the most complete summary on the geology of northeastern Trans Tisza and Transcarpathia at that time considering especially the study of the Miocene volcanism and the associated raw materials. He recognised the genetic relations towards the Tokaj Mountains that were proved by the deep boreholes in the Trans Tisza area.

Regarding his knowledge on the place and theme he was involved as an expert in researching the ore indications near Sátoraljaújhely and the geological conditions in the surroundings of Sárospatak. In the course of these he took part in researching the surface samples and the raw material exploring boreholes of the kaolinitic and alunitic deposits

sprinkled Király hill. The results were published in 1970 obtaining significant professional interest.

It was revealed by his personal communication that he could identify native gold in one of the exploring shafts of Rudabányácska. He was the first to recognise the presence of cinnabar in the millstone quartzite quarry of Botkó near Sárospatak. However, these results were never published in individual mineralogical publications.

In 1971 he published his modern petrological-volcanological survey on the subvolcanic laccolith of the Mulatóhegy-Barnamáj in Erdőbénye especially rich in cavity filling carbonate, quartz and other minerals (>30 species of minerals). For this work his colleague István Barta provided the chemical analyses as co-author (10 pcs.). This olivine, apatite, ilmenite, titanomagnetite containing, fenopyroxene andesite like strange subvolcanic rock mined since 1925 and well known due to its minerals has a hybrid genesis and classified as pyroxene dacite based on its silica content. The rock is rich in striking and unique phenomena of crustal contamination. This was the first detailed petrological-geochemical and volcanological analysis on the rock involving the contact phenomena as well on the basis of on site, microscopic and geochemical investigations.

At the time of the appointment of Vilma Székely-Fux as chair to the Department of Mineralogy and Geology in the University of Debrecen in 1974 László Kulcsár received a commission to carry out geological expert work near the town of Troulli in Cyprus as the delegate of the GEOMINCO Hungarian Geological Company with the permission of the Ministry of Culture. His tasks involved the studying of the minerals, their genesis and geological setting together with their availability for industrial exploitation in the primary and secondary mineral accumulations of that part of the copper ore containing ophiolite complex that belonged to Hungarian interest. The collected ore bearing samples were analysed mostly at home. The elliptic Cretaceous ophiolite Trodos complex between Nicosia-Limassol and Polis consists of three rock groups and associated ore formation on the upper plate of an active subduction zone elevated in the Late Pleistocene. The intrusive mass the deeper member of which is chromium containing dunite serpentinite is exposed in its centre and in its southern margin. On the top of this peridotite-pyroxenite-picrite is found with trondhjemite and granophyre differentiation bodies and with Ni-pyrrhotite-pentlandite ores. The margin of the structure is covered by a dolerite-pillow lava series which is associated with 15 million tons of 4% volcanic exhalational yellow ore (pyrite, chalcopyrite, pyrrhotite, markasite) at places with secondary (cementation) enrichments.

In the last phase of his active career he preferred visiting outcrops in the field and there he revealed interesting observations. In the course of a trip like that he recognised tiny blue crystals in the hydrothermally weathered clayey material in the upper level of the abandoned mine in the dacite body of the Nagy hill in Tarpa. The special group of crystals was determined by careful chemical analytical and traditional crystal optical methods as the first osmium occurrence in the Pannonian Basin. However, he did not publish his results despite the incitement of his colleagues. The found crystals are

exhibited in the collection of the Department of Mineralogy and Geology University of Debrecen.



Photo 4 László Kulcsár is congratulated by Vilma Székely-Fux in the Department of Mineralogy and Geology on the occasion of his birthday (end of March 1974) before his travel to Cyprus
4. kép Székelyné Fux Vilma tanszéki körben köszönti születésnapja alkalmából (1974. március vége) Kulcsár Lászlót, ciprusi kiutazása előtt

Following his retirement on 31st December 1978 he rarely visited his former workplace and he did not complete his numerous unfinished researches. Although he himself felt his lifework as maimed he thought with disappointed bitterness that it was not worth making any efforts for goals that would have been sensible to reach 10-20 years before.

László Kulcsár died unexpected on 17th May 1996 and his loving wife followed him seven years later. On their memorial plaque on the same urn wall the quotation from János Arany indicates their togetherness:

*"The soul lives!
we will meet"*

Acknowledgements

For providing essential help to collect the data on the history of the family thanks are due to the relatives of László Kulcsár, László Bihari the meteorologist and local historian who collected and organised the writings and his aunt Mrs. Lajos Kemecsei (maiden name: Ilona Bihari) who loved him as a brother in their younger years.

Important publications and manuscripts of László Kulcsár

- KULCSÁR L. (1943): Volcanoes like islands near Mezőkaszony – TISIA Vol. VI. No. 23. Publications of the Institute of Mineralogy and Geology, Tisza István Science University, Debrecen. In Hungarian with German abstract 23. p.
- KULCSÁR L. (1955): Report on the geological mapping in the surroundings of Komlóska (with maps). – manuscript in Hungarian, National Geological Archives
- KULCSÁR L. (1956): Geological conditions of the surroundings of Komlóska – Publications of the

- Institute of Mineralogy-Geology, Kossuth Lajos Science University, Debrecen 26. in Hungarian p 22.
- KULCSÁR L. (1957): Geology of the bentonite at Komlóska – Bulletin of the Hungarian Geological Society, in Hungarian 87. pp. 147-153.
- KULCSÁR L. (1959): Report on the geological mapping in the vicinity of Háromhuta (Újhuta) – Annual Report of the Geological Institute of Hungary on the years of 1955-1956-ról, in Hungarian pp. 191-195.
- KULCSÁR L. – GUZYNÉ SOMOGYI A. (1962): Volcanoe of the Sághegy at Celldömölk – Acta Geographica ac Geologica et Meteorologica Debrecina Vol. VIII/1. in Hungarian pp. 33-83.
- KULCSÁR L. (1964): Excursion guide for the meeting of the Geological Society of Hungary in western Hungary. – manuscript in Hungarian.
- KULCSÁR L. (1968): Paragenesis and petrological investigations in the surroundings of Sárospatak-Rudabányáscka and Telkibánya. – manuscript in Hungarian p. 57. National Geological Datastore.
- KULCSÁR L. (1968): Hungarian-Soviet border-side volcanism reflecting the newest Soviet and Hungarian research – Acta Geographica ac Geologica et Meteorologica Debrecina, in Hungarian pp. 143-160.
- KULCSÁR L. (1968): Excursion guide Celldömölk-Sághegy. In. Pantó G. – Morvai G.: Cenozoic volcanism of Hungary Magyarország kainozóos vulkánossága. XXII. International Geological Congress, C-40 excursion guide in Hungarian pp. 29-32.
- PANTÓ G. - KULCSÁR L. – RAKOVITS Z. – BARTA I. (1968): Complex mineralogical study of artificial corundum products. – manuscript in Hungarian, Datastore of the Metal Industrial Research Institute.
- KULCSÁR L. (1969): Recommending the research of the Királyhegy at Sárospatak. Appendix: Geological-lithological map with a scale of 1:5000 of the vicinity of Királyhegy. Manuscript in Hungarian National Geological Archives.
- KULCSÁR L. – BARTA I. (1969): Petrological and geochemical analyses associated with mercury ore research in the surroundings of Sárospatak. – manuscript in Hungarian p. 96. National Geological Archives.
- KULCSÁR L. (1970): Goldführende und polymetallische Erzindikationen am Ostrand des Tokaj-Gebirges – Acta Geologica Acad. Sci. Hung. Tom 14. pp. 179-192.
- KULCSÁR L. – BARTA I. (1971): Petrological investigations on the laccolith of the Mulatóhegy-Barnamáj at Erdőbénye – Acta Geographica ac Geologica et Meteorologica Debrecina pp. 39-72. (in Hungarian)
- КУЛЧАР, Л. – ПАНТО, Г. (1973): Выступления при обещаний макета карты. – Международные Геол. Конгр. КБГА. – Материалы Мин. и Геол. № 2. Киев.
- KULCSÁR L. (1974): Report on the work carried out in the mine near the village of Troulli (Cyprus) between 14. IV. and 28. IV. 1974. – manuscript in Hungarian, p. 7. GEOMINCO Archives (later National Geological Archives).
- KULCSÁR L. (1975): Expert opinion on the copper ore near the village of Troulli (Cyprus) (with XVI. photo tables). – manuscript in Hungarian p. 66. GEOMINCO Archives (later National Geological Datastore).
- KULCSÁR L. (1975): Assessment of the surface igneous rocks near Tarpa-Barabás and the results of the analyses of the Barabás-1. drilling. – manuscript in Hungarian, (K-6/1965) Archives of the Department of Mineralogy and Geology, University of Debrecen p. 151.
- SZÉKY-FUX V. – KULCSÁR L. (1975): The Department of Mineralogy and Geology – in: The Faculty of Science in the Kossuth Lajos Science University is 25 years old (1949-1974). – Kossuth University Press. Debrecen pp. 131-138. (in Hungarian)

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Ninety years since the birth and thirty five years since the death of Gábor Pantó

90 éve született és 35 éve hunyt el Pantó Gábor



24 October 1917 – 28 October 1972

The internationally known scientist received his love of geology and mining research from his family that also established his widespread knowledge and interest in foreign languages. His father, Dezső Pantó (1884-1975) the mining engineer graduated from the Mining Academy of Selmec was himself a well-known, prestigious person.

Gábor Pantó attended grammar school in Újpest and graduated from the university of Budapest as a nature science – chemistry teacher. He received his doctoral degree on the basis of his thesis on studying the ore formations of Csucsom in 1940 under the supervision of Professor Béla Mauritz.

He received a job in the Geological Institute of Hungary in 1941 and he carried out surveying and mining geological investigations in different parts of Transylvania (Radnai-Havasok, Ditró, Balánbánya, Aranyos-Beszterce valley, Gyergyótölgyes, Borsabánya, etc.) under the leadership of Aladár Földvári in the years of the War. The results were published following his military service and captivity.

As an outstanding expert of ore mineralization he was involved in raw material exploration of many Hungarian regions (Nagybörzsöny, Mád, Rudabánya, Gyöngyösoroszi, Recsk, Parád, Zengővárkony) while he was at the Geological Institute. Meanwhile, he was named at the head of national and ministry organisations twice, however, in both cases he asked for his replacement himself to research work. He played a significant role in clearing the genetic questions of hydrothermal ore formations and he used excellently his tectonic, stratigraphic and volcanological knowledge. He took part in exploring the anhydrite veins at Perkupa. Associated to this he started to study the ophiolites of the Bódva valley and then the Mesozoic magmatites of the Bükk Mts.

He was the co-author of the metallogenetic map of the country and then of the fundamental papers on Hungarian ophiolites, neovolcanics and their nomenclature and of summarising the ore mineralization of Hungarian regions (Rudabánya, Recsk, Nagybörzsöny, etc.).

He led the mapping and raw-material exploration of the Tokaj Mts. as a key element of his research from the

end of the 1950s. Related to this he investigated the nomenclature of igneous rocks, separation of sub-volcanic and volcanic rocks, pyroclast flows and acid foamy lava formations in more detail. He gives the first modern interpretation of the volcano-tectonic relationship of the Tokaj Mts. and its foregrounds and the characteristics of the different volcanic activity closer to the inner areas of the basin and that of the marginal areas.

He became the doctor of Earth and Mineralogical Sciences in 1956 based on his study of the iron ore bearing formations in Rudabánya, then he was elected as correspondent member of the Hungarian Academy of Sciences in 1965.

He was active member of numerous organisations and leader and expert of national and international committees. He was characterised by outstanding love of profession, working strength, talent, relationship developing and organisation skills, creativity. Thanks to his language skills in German, English, French, Italian and Russian he was participant of numerous national and international scientific events and well-known representative of Hungarian geology together with Vilma Széky-Fux. Thus he travelled to many places: London, Mexico, New-Delhi, Himalayas, Prague, China, Kijev, Lvov, Sofia, Freiberg, Halle, Mainz, Jereván, Ungvár, Massif Central, Slovakia having active international connections.

Towards the end of his carrier he became the head of the Department of Mineralogy and Geology, University of Debrecen (1965-1972), influencing its research and education activity.

The number of his publications exceeds 120 including papers and reports. His analyses and interpretations influenced the thinking of both his fellow colleagues and future generations as well.

Those who knew him respected his knowledge, commitment and skills. He had many friends, colleagues and students who remember him with great honour.

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