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## In Memory of Anna Langer-Kuźniar (1931 – 2016)



Polish mineralogy suffered a grievous loss on the 30<sup>th</sup> of August 2016 with the death of Professor Anna Langer-Kuźniar, an outstanding specialist in sedimentary petrography, clay minerals and thermal analysis. Born on the 7<sup>th</sup> of July 1931 in Cracow, she spent her adult life in Warsaw where, in 1949, she graduated from the Juliusz Słowacki secondary school and joined the Mathematics & Natural Science Faculty of the Warsaw University to study geology. Already, as a student, she took particular interest in clay minerals and techniques used in their study.

In 1952 she defended her M.Sc. dissertation entitled “Petrographic analysis of the Miocene clays from the salt-bearing formation of the Fore-Carpathian Graben” supervised by prof. Antoni Gawęł of the Mineralogy and Petrography Department, Jagiellonian University, Cracow. Prof. Antoni Gawęł was also the supervisor of her Ph.D. thesis “The influence of typical chemical stabilizers on clay minerals in grain distribution, as determined by pipette analysis” presented at the Jagiellonian University in 1960.

Her professional work began in 1951 in the Department of Engineering Geology, Technical University, Warsaw, where, for eight years, she held classes for students in general geology and petrography. In 1951, she joined the Department of Mineralogy and Geochemistry of the Polish Geological Institute in Warsaw, then headed by prof. Antoni Łaszkiewicz.

Her main field of interest for over 40 years were Ordovician and Silurian sediments from several tens deep boreholes from the Polish Lowlands. Some of the results provided material for her D.Sc. thesis entitled “Petrology of the Ordovician and Silurian from the Polish Lowlands” defended in 1967. This was the first synthetic discussion of the various Ordovician and Silurian complexes, including depositional environment, diagenetic processes and a thorough description of dark claystones and clayey shales that are now an

exploration target for gas. Her attention was focused on the occurrence of tuffite and bentonite layers commonly regarded as evidence of Early Palaeozoic volcanic activity. The results obtained were also used in a long-term project concerning deep structural studies of the Polish Platform, carried out by the Geological Institute and reported in the Institute's publications. Additionally, Professor Langer-Kuźniar was involved in research into various clay sediments of the Fore-Carpathian area, Eocene conglomerates of the Tatra Mts and clay minerals of the Zechstein salt formations and soils. Frequently she provided also archaeological expertise.

In the 1970s, she completed an advanced study on the mineralogy and petrography of industrial minerals organized by the Technical University, Cracow. In 1978, she was awarded the title of Professor in Natural Science.

Throughout her professional career, she continued to take an active interest in methodological problems, including Thermal Analysis and X-Ray techniques. On her initiative, the first F. Paulik, J. Paulik & L. Erdey derivatograph manufactured in Hungary was purchased by the Polish Geological Institute. This new tool permitted more detailed examinations of clay minerals, the results of which were compiled in the book – Anna Langer-Kuźniar “Thermographs of clay minerals” (1967, Wyd. Geol., Warsaw) and presented in numerous articles on the methodology, nomenclature and standardization of thermal analysis published in *Lecture Notes in Earth Sciences*, *Journal of Thermal Analysis and Calorimetry* and in other post-conference publications under the name “Anna Langier-Kuźniarowa”.

During the 1990s, in association with dr Stefan Cebulak of the Silesian University, Sosnowiec, she was involved in a long-term project dealing with the application of thermal analysis to the examination of organic matter dispersed in rocks. A detailed description of this new method, named “oxyreactive analysis” (OTA) by both authors can be found in the materials of the 11<sup>th</sup> International Congress of Thermal Analysis and Calorimetry (ICTAC) in Philadelphia (USA, 1996) and in other scientific publications. During the 12<sup>th</sup> International Congress of Thermal Analysis and Calorimetry (ICTAC) in Copenhagen (Denmark, 1998) Professor Langer-Kuźniar delivered a significant contribution (co-authored by Stefan Cebulak) entitled “Usefulness of Oxyreactive Thermal Analysis for the Diversification of Kerogen as the Bitumen Precursor”.

In 2002, an extensive monograph under the title “Organo-Clay Complexes and Interaction (Ed. Marcel Dekker, Inc., New York) was published with the chapter “Thermal Analysis of Organo-Clay Complexes” written by Anna Langer-Kuźniar.

She was an active member of many scientific associations. A founding- and Honorary Member of the Polish Mineralogical Society, she also served as chairperson of its Thermal Methods Section. For many years, she collaborated closely with the soil scientists of the Polish Soil Science Society. A long-standing member of the Polish Geological Society she was also a founding- and honorary member of the Polish Society for Thermal Analysis and Calorimetry. From 1969-1982, she took part in the activities of the Thermal Analysis Section of the Committee for Analytical Chemistry, Polish Academy of Science.

Professor Langer- Kuźniar served as liaison officer for the Association International pour l' Étude des Argiles from 1968 and, from 1972-1978, as councilor. From 1963, she was a member of the International Confederation for Thermal Analysis and Calorimetry

(ICTAC), acting as a Polish representative and chairperson of the Section of Earth Science and as councilor from 2000 onwards.

In 2004, in recognition of her long-term activity and valuable contribution to the international development of thermal analysis she was granted by ICTAC the Robert Mackenzie Award. As a member of the European Society of Thermal Analysis and Calorimetry since 1989, she represented Poland in the ESTAC council.

Author and co-author of about 120 publications, Professor Langer-Kuźniar attended many domestic and international scientific meetings and established broad contacts within the mineralogical community. As an acknowledged expert in clay mineralogy and thermal analysis, she refereed numerous PhD and ScD dissertations.

She took her civic duties very seriously and, from 1987-2003, acted as juror in the District Employment Court for the city of Warsaw. She was a doting wife, mother and grandmother. and also an ardent tourist, nature lover and bird watcher; she fed birds all year round, even from her sick-bed. In the autumn of 2003, she met with a very serious car accident from which she never fully recovered. In 2005, she formally retired from the Polish Geological Institute where she had spent 49 years (out of 54) of her professional life. Even when bed-ridden, Professor Langer-Kuźniar continued to be professionally active, writing short articles, editorial reviews and, for many years, following and contributing to the ICTAC and ESTAC activities.

Anna Langer- Kuźniar is mourned by her son, daughter-in-law, grand children and two great grand-daughters. An old friend and close associate in ICTAC activities prof. Shmuel Yariv of the Hebrew University of Jerusalem remembers her warmly as a friend and scientist: "Anna was a good friend of mine. Even more than a friend. I thought very high of her as a brilliant scientist and as a colleague. Her interest in science was very similar to mine, clay minerals, thermal analysis and the love to human people. My memory became weak and I do not remember the exact year when we met for the first time. I think that it was in 1965 in Aberdeen Scotland. At that year, I stayed with Dr. Farmer at the Macaulay Institute for Soil Research. She was a good friend of Dr. Mackenzie who collaborated with us, and at the same period organized the Meeting of the International Confederation of Thermal Analysis. At that year, most of the presentations were about clay minerals. I mentioned this because with the years the percentage of the presentations about clay minerals in the congresses of thermal analysis became smaller and smaller, and we were thinking together how we could increase this number. Based on Anna's suggestion in 1988 the Scientific Committee for Thermal Analysis was founded. I wanted that Anna will be the Chairperson on the committee, but the ICTAC Council were afraid that the Chairperson will be from a country behind the Iron Curtain. About ten years later she became the Chairperson and to be honest she brought new ideas and new spirit to the committee. I had the feeling that she considered the being the Chairperson of this Committee as the peak in her scientific career. Unfortunately few year after this appointment there was the tragic accident. For about ten years I tried to organize in each conference the workshops of the Geoscience. I always tried to keep contact with her, and she always prepared the introductory talk of the workshop."

On the 3<sup>rd</sup> of September 2016, her family, friends and co-workers paid their last tribute to Anna Langer-Kuźniar and escorted her at the cemetery in Warszawa-Gołąbki to the family grave where she rests alongside her husband. She will be greatly missed.

*Anna Maliszewska, Grażyna Niemczynow-Burchart*