

OBITUARY
OF PROFESSOR ANTONIO ARRIBAS MORENO
(1923–2018)
HONORARY MEMBER
OF THE POLISH GEOLOGICAL SOCIETY

With some delay, we received the sad news that on March 27, 2018, Professor Antonio Arribas Moreno, an outstanding ore geologist and honorary member of the Polish Geological Society, died in Salamanca, Spain. Despite his age (born on September 13, 1923, in Madrid), 6 years earlier, he had radiated inexhaustible energy during field conferences, demonstrating deep knowledge, versatile interests and kindness towards the debaters. This is how he is remembered by geologists.

Unfortunately, in April 2012 he was seriously injured during daily activities in his apartment. He was hospitalized for more than a year, subjected to complicated rehabilitation, and had to give up scientific research. The last publication thanking him for a review was published in 2014 in China. In 2016, he was a co-author of two papers on the Western Sahara, presented in South Africa at the 35th International Geological Congress. As late as January 2018, one of the authors (G. García) of the many farewell memoirs in his honour claimed that Antonio talked with enthusiasm about a planned joint trip to a newly discovered uranium ore deposit in the Salamanca district.

How did his family feel about the boundless dedication to work of a father?

He probably was a model for young people, since his three children chose careers as ore geologists and two of his grandchildren are mining engineers, dealing with economic geology.

UNIVERSITY CAREER

Throughout his professional life, Antonio was associated with the universities of Salamanca and Madrid, holding important positions in them. Although he obtained an engineering degree after studying forestry in 1945, he soon discovered his vocation for studying inanimate nature as a mineralogist and geologist of ore deposits. In 1961, he obtained a PhD degree in Economic Geology of the prestigious Complutense University of Madrid. His dissertation was devoted to the study of minerals, geological structure and the economic significance of Spanish uranium ore deposits. In this and other works, he was a pioneer of modern methods of mineralogical and geochemical research in Spain; he



Antonio Arribas in his University Office (photo from the family archive).

provided new documentation on the composition of the ores in many deposits.

He was extremely hardworking and curious about the world. Before taking up a career as a university professor and researcher, he studied the mineral deposits in Morocco and the Spanish colonies at that time in NW Africa (1950–1957). He carefully determined the composition of ores as the Director of the Mineralogical Laboratory of the Spanish Nuclear Energy Board (1957–1965). In 1965, he joined the University of Salamanca, one of the oldest in Europe, to create a thriving centre of geological sciences there. He headed the Department of Geology and Mineralogy until his retirement in 1988. He was the Dean of the Faculty of Sciences between 1972 and 1976 and founded and became the Director of the Institute of Applied Geology between 1975 and 1988. Upon his retirement from the University of Salamanca, he joined the Department of Geological Engineering at the Madrid School of Mines. In 1992, he was awarded the title of Honorary Professor of this university and formally retired. As a dedicated educator during his academic career, he supervised 35 doctoral dissertations and 136 MSc theses.

PROFESSIONAL CV AND PERSONALITY

Like other representatives of the applied sciences, he was engaged as an expert /consultant to international institutions, e.g., at the end of the 1960s and in 1980s by the UN, in 1980–1982 by the Atomic Agency in Vienna (AIEA), and in 1987–2001 by the European Union. He completed many months of research and teaching contracts as visiting professor with foreign institutions in the USA (1962, 1974), Germany (1968), Mexico (1980), Chile (1983), Argentina (1984), Brazil (1985), Japan (1986) and Australia (1987). He was also a valued advisor to leading exploration and mining companies, including Placer Dome, Newmont, Vismand, ENUSA, Enadimsa, Aurensa, Iberges, CGS, and Minerconsult.

Antonio Arribas participated, most often as an initiator and manager, in many research grants and international projects. This in turn opened the way for him to many countries and facilities that were difficult to access and he stayed in them for many months. He gained the reputation of being an expert, who knew the culture, the state of geological reconnaissance and mining technology as well as the investment climate in countries almost all over the world. The majority of his professional visits were to Europe, Latin America and SE Asia, together with the nearby islands of Oceania. They focused on the assessment of uranium, tungsten, tin, zinc, lead, silver and gold ore deposits.

He is widely regarded as the perfect field geologist, ready to work in difficult conditions of the natural and cultural environment and selecting optimal techniques for the collection of samples for laboratory research. He was perceptive, very communicative, open and joyful; his enthusiasm facilitated the formation of research teams. In everyday life, he proved to be a caring guardian and guide for foreigners and an undemanding guest, a natural friend. In the 1980s, I remember him praising Polish tomatoes and cream, Spanish ham and certain wines, while warning against others. In conversations on non-professional topics, he turned out to be an expert on European history and the development of radiology. He surprised us with his knowledge about the scientific achievements of the centres he visited. For example, during a joint visit to Warsaw, to the Polish Geological Institute and the Museum of the Earth of the Polish Academy of Sciences, he asked for contact with Prof. B. Kosmowska-Ceranowicz on consultation and joint Spanish-Polish research on the amber, recently discovered in the Basque Country and Cantabria by his associates. Another request concerned a visit to the Maria Skłodowska-Curie Museum. During the tour and the conversation with the curator, Prof. Arribas showed that knew many details about her life and applied research techniques that a museum specialist did not know.

Dr. Arribas closely followed new developments in the geology of mineral deposits of the world and contributed to this sector. He was a member of the following scientific societies: the Society of Economic Geologists (SEG), Society of Geology Applied to Mineral Deposits (SGA), Mineralogical Society of America, European Society of Mineralogy, Sociedad Española de Mineralogía, Sociedad

Española de Geología, Geological Society of America, Geological Society of South Africa, American Association of Petroleum Geologists (AAPG), and Institution of Mining and Metallurgy (IMM). He took an active role in dozens of symposia and specialist conferences of SEG, SGA and the International Association on the Genesis of Ore Deposits (IAGOD). All of them were related to the geological structure, mineralogy, geochemistry, metallogeny as well as the methodology of exploration for and assessment of ore deposits as well as chemical and industrial minerals. As an active member of the SEG, SGA and IAGOD, he organized 5 symposia in 1977-89 with thematic field trips to the deposits of northern and central Spain. I remember his co-authored paper on the specificity of gold deposits in volcanic calderas and an individual paper on the migration mechanism of solutions of any origin through seismic/tectonic pumping, illustrated by a visit to the Mina Fe uranium deposit.

The published scientific achievements of Prof. Antonio Arribas are significant. He was the author and co-author of at least 163 articles and technical reports in renowned geological journals around the world.

HONORABLE POSITIONS AND AWARDS

From 1960, Dr. Arribas represented Spain in the International Union of Geological Sciences (IUGS), working in 7 IGCP working groups. He founded at his home university the annual *Studia Geologica Salmanticensia*, devoted to the earth sciences, palaeontology and the environment. He was its publisher in the period 1970–2013. He was also a member of the editorial boards of the international magazines, *Mineralium Deposita* and *La Chronique des Mines*.

In recognition of his scientific status, initiative and efficiency in management, he held some important managerial positions: Chairman of the Spanish chapter of the IAGOD Association (1972–2012), Counsellor of the State Geology Commission in the Ministry of Industry (1980–1986), Vice-President of the SGA (1983–1988) and Regional Vice-President of SEG (1996–2002). He did not seek awards. Nevertheless, he was a laureate of the state scientific award in the field of natural sciences, named after Alonso de Herrera (1968), and an awardee of the international environmental engineering firm, Wardell Armstrong (2001). In 2005, he was awarded honorary membership of the Geological Society of Poland.

RELATIONSHIPS WITH POLISH GEOLOGISTS

Lively contacts with Polish geologists and frequent professional visits by Prof. Antonio Arribas and his pupils took place in Poland since 1968. They began during a trip to the Zn-Pb ore mine at Trzebieńka in schedule of the Geological Congress in Prague. Its programme was operated by mine geologists and a team of Prof. H. Gruszczuk from the AGH University. Taking advantage of this contact and repeated

invitations in the following years, Prof. Arribas repeatedly visited other ore mines, e.g., in the area of Olkusz, Legnica-Głogów Copper Ore District (LGOM), salt mines at Wieliczka and Łęzkowice, sulfur mine at Machów, coal mines at Bełchatów and in Upper Silesia, natural aggregate mines in Pomerania, as well as scientific institutions dealing with deposit research. He was interested in determining the geological structure in the landscape and the cartographic mapping of it. He included issues of Polish deposits in his lectures for students in Spain. He visited museums and cultural monuments, and mineral industry facilities. He also polled our opinions about the backgrounds to historical events.

The organization of his visits and in time those of the scientists he recommended was based on the scientific exchange module between the AGH University of Science and Technology and Spanish universities in Madrid, Salamanca

and Oviedo. Initially, it was based on private initiatives and later used the Tempus and Socrates-Erasmus programmes.

Many geologists from Poland, thanks to the help of Prof. Arribas, participated in 1987, 1990, 1999, 2001, 2003 and 2005 in geological tours around Spain in the company of recommended guides, thus learning about the geology, interesting deposits, teaching techniques, history, culture and other charms of that country. Several Polish students completed their diploma theses on the basis of field research in Asturias under the supervision of local independent scientists, promoted by Prof. Arribas. Several employees of the University of Oviedo completed research internships in the Faculty of Geology, Geophysics and Environmental Protection of AGH University of Science and Technology.

Professor Antonio Arribas created a foundation for the development of mutual cooperation. He left behind many fond memories and constructive ideas.

Requiescat in Pace, dear Friend.

Andrzej Paulo

