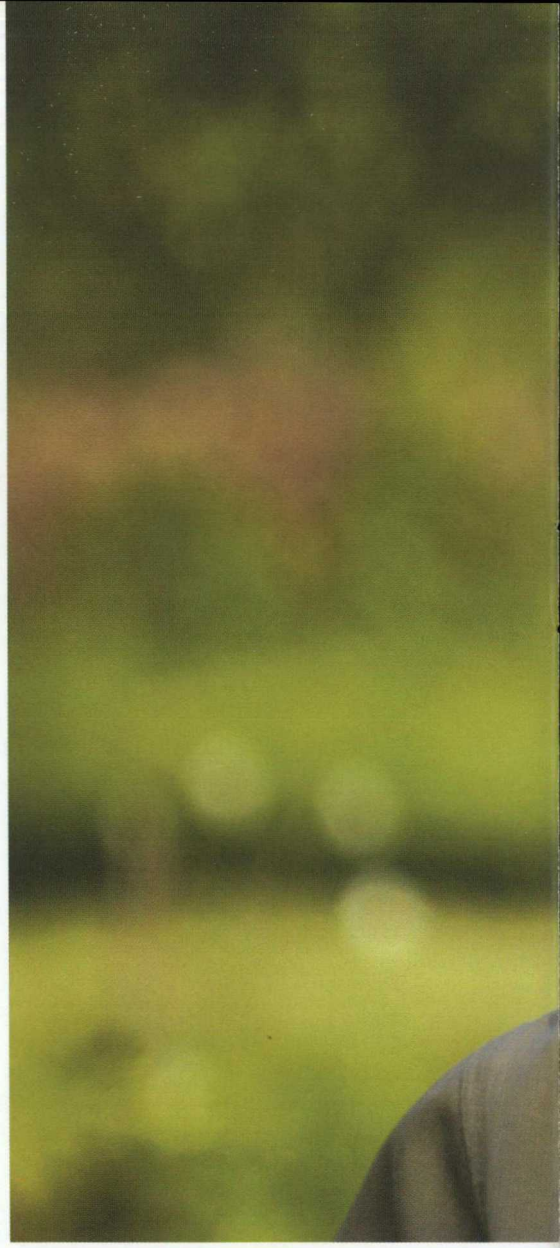
Interview with Professor Adam Bielański



I've Been Lucky With People

Academia: You have had close ties with Kraków your entire life.

Adam Bielański: That's right. My father actually started studying at the polytechnic in Lwów, but he moved to Kraków around 1907. He was drawn by the fascinating engineering works being undertaken at the time. The city was plagued by floods – at times, waters of the Vistula and Rudawa rivers reached as far as the Planty park surrounding the Old Town. To counteract this, the excellent and industrious mayor of the city, Juliusz Leo arranged suitable credit, and Kraków commenced flood-prevention measures. The construction was on an unprecedented scale, never before undertaken in the region. There is a wall right by my house – can you see it? Just beyond it run the Vistula boulevards, with the river flowing much below that. Once upon a time – so long ago that even my parents wouldn't have seen it – the garden extended right down to the riverbank. My father supervised the construction of the wall when he was a young engineer. That's when he was assigned staff quarters in the house. Today we have excellent transport links, but at the time the house was a long way from the city center, so my father originally intended for the move to be temporary. As it happens, my family is still living in the apartment today, having raised three generations here. In fact, the next generation – my great-grandchildren – also wants to move in. And so this eccentric house, first state-owned, then municipal, and finally our own, has been home to five generations of the Bielański family.

Have you ever been tempted to leave Kraków, perhaps work abroad?

No, I've never wanted to leave permanently [laughs].

Was it the atmosphere at home, or perhaps family traditions? How did it happen that not just you, but also your brother and sister became involved in science?

To be honest, I'm not sure, but you're right – we all became scientists. My brother Władysław (1911-1982) was a professor at the Agricultural University and founded the PAS Committee for Animal Reproduction Biology, acting as its first director. My sister Zofia [Bielańska-Osuchowska – ed.] was a long-time director of the Laboratory of Histology and Embryology at the

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Faculty of Veterinary Medicine at the Warsaw University of Life Sciences.

Two biologists, yet you broke the mold and became a chemist.

I started as a young boy with all sorts of experiments, usually conducted in the bathroom at home. For example, I had an alcohol light I used to use to soften and bend glass, or boil stuff in test tubes. Of course I did all this without any real supervision from my parents.

The high school I went to focused on the humanities – that's just how things were before the war – but I had an excellent chemistry teacher. We were on friendly terms, and he occasionally showed me around the school laboratory. And that was how I chose to study chemistry. It was such a long time ago now...

I started university in 1931, and after graduating in 1936, I worked at the Academy of Mining. My supervisor was Prof. Adam Skąpski – at the time the youngest professor nominated by the President of Poland, and one of the smartest people I have ever known.

We worked on the extraction of non-metallic inclusions from steel. Steel is never completely uniform, and it contains various other substances: some oxides, maybe manganese sulfide... We used a cunning electrolysis method, which Skąpski brought back from his trip to Sweden.

He was someone whose work had real momentum. He made great contributions to the expansion of the Academy's Laboratory of Physical Chemistry, and we were always getting new equipment. His group soon grew to around ten researchers, but then the war started and everything came to an end. The buildings of the Academy were occupied by the Nazi General Government. Laboratories – if they weren't destroyed – were simply expelled. Some of the professors were interned at concentration camps, but those who remained and their families stuck together. It was a group of genuine friends. Before the war, we often visited one another, getting together for birthdays and other celebrations. During the occupation, we often met at Mr.s Skąpska's at the Na Groblach square. We really appreciated it.

When the war broke out, your PhD was almost completed.

After three years at the Academy, I was starting to specialize. One day, Skąpski said to me, "You know what? Let's turn your subject into a doctorate."

The problem was that the Academy of Mining wasn't authorized to award PhDs in chemistry. So Skąpski visited Prof. Tadeusz Estreicher, a professor of inorganic chemistry at the Jagiellonian University, and explained the situation. Estreicher listened attentively, and agreed to take me through the process at the Jagiellonian. Trouble was, by then it was summer 1939... I'd been polishing the material for six years, and sitting exams - according to regulations at the time, doctoral candidates had to take certain tests. I visited Prof. Estreicher, who clearly remembered his conversation with Skąpski, and was already listed in the documents as my promoter. He decided that I would take exams in inorganic chemistry, physical chemistry, and physics. There was a war on, and I had to visit each specialist professor in turn and take exams following a roughly agreed curriculum. Each one gave me a certificate confirming that I passed the relevant exam for their specialist subject. It was a clandestine university, so all the documents were backdated to August 1939. In any case, by the time the war was coming to an end, I had completed all the requirements, and that's how I earned my doctorate.

Prof. Adam Bielański

Born on 14 December 1912 in Kraków. Specialist in physical and inorganic chemistry; pioneer and founder of the Polish school of chemical catalysis. Graduated in chemistry from the Academy of Mining in 1936; obtained his PhD at the Jagiellonian University in 1945. Since 1955 assistant professor; since 1962 full professor. Holder of honorary doctorates from the AGH University of Science and Technology and the University of Wrocław; honorary professor of the Jagiellonian University. Since 1964, ordinary member of the Polish Academy of Sciences; Vice President of PAS between 1990-1995. Member of the Polish Academy of Learning. Since 1983, he has been working at the PAS Institute of Catalysis and Surface Chemistry. Author of numerous chemistry papers and articles, including *Surface Properties of Transition Metal Oxides: Concepts and Ideas*, Cambridge University Press, 1998, *and Oxygen in Catalysis* (with Jerzy Haber), Marcel Dekker, New York, 1990. Author of the benchmark university textbook *Podstawy Chemii Nieorganicznej* ("Foundations of Inorganic Chemistry").

And you immediately returned to what was then called the Academy of Mining and Metallurgy. Did you find many of your pre-war colleagues?

Of those who had worked on my team before the war, there was only Aleksander Kotliński. The others were scattered around the globe.

No one knew what happened to Skąpski; it's only recently that I have managed to partially piece his story back together. In September 1939, he found himself on the Soviet side with his wife and two daughters. His wife returned to Kraków, while he stayed where he was, planning to join the Polish government in exile. I'm not sure what happened exactly, but it seems that the Soviets suggested some form of collaboration; he refused, and ended up being condemned to several years of hard labor. The archives of the Hoover Institute in the US hold Skąpski's description of his internment at a camp near Arkhangelsk. He wrote that he survived purely thanks to a Russian doctor running a medical center at the camp. He was eventually released from the camp following the Sikorski-Mayski agreement, first travelling to Samara, where Stanisław Kot, Ambassador of the Republic of Poland, was in office. He later moved to London, where he became Deputy Minister of Education in the Polish government in exile. He never returned to Poland; he clearly realized that there was nothing to go back for. His superior, the Minister of Education and Religious Faith, Father Zygmunt Kaczyński, decided to go back; unfortunately, he was arrested a few years later and executed by the Communist security services.

How did the Academy of Mining and Metallurgy function after the war?

As soon as the Nazi forces had withdrawn, the Academy started reforming in its old building. Of course there wasn't anything there - even the lecture halls were devastated. Students sat on old desks that had been used by the Germans, on drawers and floorboards. It was all very basic, but we got going. Meanwhile, I managed to get a grant from the British Council, and I went to London. I thought at the time that I'd died and gone to heaven! I was working at Imperial College under the supervision of Prof. Frederick Tompkins, who specialized in physical chemistry. When I returned to Kraków a year later, things had changed greatly back at the Academy.

Was that in 1949?

That's right. The rector at the time was Prof. Walery Goetel. Soon after my return from England, he called me to his office, and told me that a new Faculty of Mineralogy was being created. It turned out that in Lower Silesia, forming a part of the Regained Territories, there was a shortage of specialists who could develop the extraction and processing of minerals for local industries working in glass, cement, ceramics and so on. Goetel appointed me to run the faculty. I have very fond memories of that time. The faculty developed very well - today it is the Faculty of Material Engineering - and for a while I was even a Vice-Rector in charge of education.

But you missed the Jagiellonian?

I simply received an offer to move back. The job of running the Faculty of Inorganic Chemistry was taken over from Prof. Estreicher by Prof. Wiktor Jakób, who had been a professor at the Lwów Polytechnic before the war. He suggested I transfer to the University. I found an-

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"I gain a lot of strength from my family," says Prof. Bielański. Photo shows his granddaughter Joasia explaining the details of her own PhD

other excellent team; we worked together for many years, and I am still able to call in favors from time to time. I've been lucky with people. My closest colleagues were Jerzy Dereń and Jerzy Haber; the PAS Institute of Catalysis and Surface Chemistry was named after the latter a couple of years ago.

We conducted measurements of electrical conductivity during catalytic reactions. My colleagues quickly rose to international stature.

After Stalin's demise, I attended a seminar in Moscow. It was my first visit to the capital of the Soviet Union. I soon struck up a friendship with Prof. Fyodor Fyodorovich Volkenstein – a physicist and author of a theory predating the contemporary physics of semiconductors.

I was rather surprised to discover that the Russians were already familiar with our work, although they weren't the only ones who were interested. Stanisław Malinowski, professor at the Warsaw Polytechnic working with organic substance catalysis, came up with the idea of holding an international meeting with researchers from Czechoslovakia and France. Somehow, we were able to exchange information with scientists in various countries.

You mentioned F.F. Volkenstein. What can you tell me about your friendship?

We were all interested in catalysis of metal oxides exhibiting semiconductor properties. It turned out that everything that occurs in such a catalyst affects its conductivity. If something settles on the surface and is adsorbed, it results in an electron exchange between the settling substance and the catalyst. The process can be studied by measuring conductivity. Volkenstein had developed an electron theory of catalysis in semiconductors, and I really valued working with him.

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Archiwum rodzinne

The family home, more than a century old, of Prof. Bielański at Jaskółcza Street in Kraków. The upstairs window commands a view over the Vistula River and Wawel Castle

In any case, not all Russians were enchanted with Communism. Immediately after the Russian Revolution, Fyodor's family moved abroad, so he spoke good German and excellent French; in fact it was easier to communicate with him in those languages than in Russian. The other thing was that if anyone from our group went to Moscow, their stay with the Volkensteins was very family-oriented. It was a home where everything was discussed openly; it gave us an insight into the lives and thoughts of Russian intellectuals. One time, we invited Volkenstein to visit Kraków. He spent a month with us, holding lectures on his theory. As he was leaving, he said to me, "I felt great in Kraków – much better than in Moscow." My colleagues exercised complete freedom of speech around him, and there was no awkwardness. It's such a shame he didn't live to see better days.

You resigned from the Jagiellonian in 1968.

At the time I was Vice-Rector in charge of research; the rector was Prof. Mieczysław Klimaszewski. One day, he went to a meeting with students at the halls of residence, while I was left in charge at Collegium Novum. That day, the students held a flower-laying ceremony, I think it was at the Mickiewicz statue. A huge row broke out, the militia were beating the students with batons, and tear gas was released in the main building. After it was over, Klimaszewski – whom I have fond memories of to this day – says to me, fidgeting nervously, "You know, I'm under pressure. They want you to resign." I left immediately.

'They' meaning the authorities?

That's right, the governing party. I was far closer to the students than the party officials.

You are the author of the Polish textbook "Foundations of Inorganic Chemistry," which whole generations of researchers have been brought up on. Do you still need to keep updating it?

Yes, and I have to give credit where it's due to the PWN Polish Scientific Publishers – they are open to all changes and improvements to the textbook. The latest edition was published last year. I have been assigned an editor to keep an eye on the correct language and organization of the book. Małgorzata Galusowa is very kind; she used to work as an assistant to Prof. Wiktor Kemula, and she has a PhD in chemistry. She is able to read the text and say, "Sir, in Chapter 20 you have written something one way, but in Chapter 5 it's different."

What motivates you? You have published many papers since reaching the retirement age.

I gain a lot of strength from my family; I have three sons, and nine great-grandchildren. But most of all I'm driven by curiosity.

The latest topic of interest arose during the 1990s. We started working on catalysts that are heteropoly acids. Doesn't that sound terrifying – heteropoly acids? They can be crystallized, and they are at least as strong as sulfuric acid. Their catalytic properties arise from this high acidity. Reagents are able to remain in crystalline heteropoly acids, and not just on their surface. They can also move inside them, into the crystalline matrix, and react there. They are an unusual type of catalysts, which are only really beginning to be understood and studied.

I have been working on them part-time at the Institute of Catalysis, but the Faculty of Chemistry at the Jagiellonian is kind enough to let me and my colleagues work at their laboratories. I am extremely grateful to the University for that.

Do you visit the Institute often?

Pretty much every day. I wouldn't have it any other way. ■

Interview by **Anna Zawadzka** and **Agnieszka Pollo**