

About the Beginning of Powder X-ray Diffraction in Poland - a Story of Two Merit Apparatus

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Two research groups of Poznań University pretend to be seen as a cradle of Polish powder crystallography. Both of them published their first X-ray diffraction results in early 1930s, what can suggest the first experiments as early as in 1920s. Some historical background based on documents and relations of scientists lets us better know our science heritage.



Department of General Chemistry of Poznań University on the Solacz Hill. Here was located the X-ray 'Apparatus 1'.

Episode I

Stanisław Glixelli ran the Department of General Chemistry at Faculty of Agriculture and Forestry, Poznań University, in 1920. Crystallography had fascinated him during studying at Warsaw University, where his tutor had been Professor G.V. Wulff. When after some years the director of a factory “Spółka Bracka” from the town Tarnowskie Góry, grateful for the help in inventing an important technology, funded for Professor Glixelli an X-ray apparatus (*'Apparatus 1'*), it became the most valuable equipment of just organised department [1]. The apparatus was extensively used in routine work. In years 1920 – 1939 Professor Glixelli's group published 69 scientific papers [2,3], including particularly interesting works of Aleksander

Nowakowski concerning synthesis of the cellulose esters and ethers and study of their structures with the X-ray diffraction method [4], and papers of Aleksander Nowakowski and Kazimierz Boratyński on the structures of phosphoric acids [5,6]. Maria Rychlewska, former Professor Alfons Krause student, was employed in Department of General Chemistry in year 1939. As she remembers, operation of this instrument was very difficult and time consuming.

September of year 1939 meant closing of Poznań University. In April 1941 the occupation authorities removed from the building the laboratory equipment, including the most valuable X-ray *Apparatus 1*, which got lost forever. Up to now it remains only in memory of scientists as their good comrade.



Stanisław Glixelli
(1882 – 1952)



Alfons Krause
(1895 – 1972)



Collegium Chemicum. Here, in one of rooms at the first floor, the X-ray 'Apparatus 2' survived the war.



Apparatus 2: Siemens 3475733. Now exhibited in the Institute of Bioorganic Chemistry, Polish Academy of Sciences in Poznań.

Episode II

X-ray apparatus ('Apparatus 2'), produced by Siemens, had been moved to a new building of Collegium Chemicum in 1936. The date of purchase has not been established (probably 1928). It was delivered by Hipolit-Cegielski-Company at request of Prof. Alfons Krause. It turned out to be the most valuable acquisition of Department of Inorganic Chemistry, supervised by Prof. Krause. The X-ray device 'collaborated' very well with the department team. A few dozen of papers were published thanks to their united effort [7-10].

This X-ray apparatus survived the occupation and a heavy carpet bombardment of the Collegium Chemicum building by the Allies. When in neighbouring laboratories the Nazis were producing the heavy water, it simply stood in one of storage rooms, covered by a piece of canvas. It was waiting for a brighter future.

If then, being closed in a den, it could look out the window, it would have seen the building of high school attended earlier by Włodzimierz Trzebiatowski., whose handbooks were from 1950s a basis for rapidly growing community of Polish crystallographers. If one could follow the passing tram, one should have got the Jan Kanty junior high school (at present a high school), where Max Laue studied for four years [11, 12]. Although the den was small and dark, it was still a part of the diffraction world. Unfortunately, when the war seemed coming the end, the May 29th 1944 drew the hell of carpet-bombing on [13]. In the presence of three hundred flying fortresses, each carrying 2.7 tons of bombs, our small X-ray apparatus seemed to have no chance. However, it survived. A great number of scientists survived, too. After the war, they came back to the earlier interrupted studies. Just after the 2nd World War, Anzelm Lewandowski published [14] the results of his PhD thesis from year 1937. Powder diffraction was reborn. Unfortunately, the comeback of the X-ray set to a full efficiency needed more time. *Apparatus 2* seemed to be only a useless piece of scrap-iron, but a young

scientist Włodzimierz Wolski (a former PhD student of Prof. Krause), took care of it. Damaged parts had to be replaced. Meanwhile it appeared that the original X-ray tubes are not easy to obtain, and a serious rebuilding was needed. In the new form, it got four windows instead of three, what allowed more simultaneous measurements. Three fine mechanics turned it back to a full splendor – they were: Antoni Wenzel, Wiktor Polacki and Feliks Depa.

The measurements went forward...

Science developed faster and faster. A time came to give its place to a new diffractometer. Finally at the mid-seventies our Siemens instrument, *Apparatus 2*, retired. One can see it now in the Institute of Bioorganic Chemistry of Polish Academy of Sciences in Poznań where it is exhibited.

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