

IN MEMORIAM

Ivan Filipović
1911–1998

After a short illness, our dear and esteemed professor, Dr. Ivan Filipović, left us on 11 August 1998. To many of us he was our favourite professor who, by his knowledge, modesty, fairness and honesty, embodied the ideal of an honourable and respected university teacher and scientist. We met him in our first year of study when, through his excellent lectures, he aroused in us love for chemistry and thus helped us determine the course of our professional lives.

Ivan Filipović was born in Sv. Ivan Zelina on 12 December 1911 to mother Zlata, née Konopa, and father Ivan Filipović. He had three brothers, Miro, Rudolf and Želimir. He married Neda Šibenik, with whom he has a daughter – Željka.

He finished elementary school in Varaždin. When he was twelve years old, he already occupied himself with chemistry, physics and biology in his own laboratory in their family house in Varaždin. He went to grammar school in Varaždin and Sremska Mitrovica and graduated from the Technical Faculty of Zagreb in 1935. Upon advice of Professor Franjo Hanaman, who thought the place of a young chemical engineer was in industry, he began his working life at Iron Works Zenica. It was here that he started his professional and scientific career. He acquired great experience in applying traditional and instrumental methods of inorganic chemical analysis. He had his first scientific paper on brown coal moisture determination published in the journal *Brennstoff-Chemie*. His love of science and teaching soon brought him into the Institute for Fuels, Ores and Metallurgy in Zagreb. It was here that he started his pioneering work on polarography, which he employed in his entire scientific research work. His first paper from the field of polarography was published in 1943 and dealt with determination of gold in auriferous ores. This was the very first polarographic paper ever published in Croatia.

In 1946, Professor Filipović was appointed assistant lecturer in the Department of General and Inorganic Chemistry of the Faculty of Pharmacy,

University of Zagreb. Though he was only assistant lecturer, Prof. Hrvoje Iveković entrusted him with teaching the course on Qualitative Analytical Chemistry. Applying his life-long principle that teaching activities should be accompanied with relevant written materials, he prepared authorized mimeographed materials entitled »Introduction into Qualitative Analytical Chemistry« for his students. At the same time, jointly with Prof. Petar Sabioncelli, he wrote his first book »Laboratorijski priručnik za anorgansku kemijsku analizu« (Laboratory Manual of Inorganic Chemical Analysis), which was printed in two volumes in 1946. These handbooks were of invaluable help to technicians and engineers working in the chemical industry in the postwar period.

He defended his doctoral thesis »Polarografske studije s bizmutovim amalgamom« (Polarographic Investigation of Bismuth Amalgam) in 1951. Due to amalgam instability in air, this involved very complex experimental work. It was also the first dissertation from the field of polarography in the former Yugoslavia. After habilitation in 1951, he was appointed assistant professor at the Faculty of Pharmacy. The major part of his scientific and teaching career took place at the Faculty of Technology (the present Faculty of Chemical Engineering and Technology) where he was appointed associate professor in 1954. After joining the Faculty, he undertook the responsible and difficult task of establishing the Department of Inorganic Chemistry, for which he organized both the teaching and research activities. The Department also undertook to teach in the newly founded Department of Food Science and Biotechnology of the Technological Faculty. In 1962, the Department moved into a new building, where Professor Filipović supervised the arrangement of teaching and research premises. Equipment was acquired for scientific research in polarography and studies of coordination balance in solutions. Team research work started with graduands, master's and doctor's degree candidates. In 1961, he was appointed full professor of the same faculty.

Professor Filipović's scientific work comprises research into ionic interactions and balance in complex solutions as well as investigation of electrode processes. Research on balance in monocarboxylato complex solutions resulted in significant achievements in developing electrometric and spectrophotometric research methods and mathematical-statistical processing of the measured physical values. Metal monocarboxylato complexes provided simple model systems on which basic rules of coordination chemistry were studied, i.e. the effect of metal ion electron configuration and the effect of ligand structure on complex stability. More than 90 metal complexes with unsubstituted and substituted monocarboxylato ligands were investigated using electrochemical, spectrometric and thermochemical techniques. Due to the low stability of investigated complexes, experimental data were computer processed by the least squares method. Appropriate programs were designed for this purpose and a computerized system for electrochemical measurements was constructed in 1972, the first in the former Yugoslavia.

Fully automatic experiment management was made possible by instruments, also computer controlled, which through feedback optimized the experimental parameters. This was achieved by Professor Filipović's associates, Prof. B. Grabarić and Prof. M. Tkalčec. Research results on monocarboxylato complexes were published in 36 scientific articles in the leading chemical journals in this country and abroad. Many of the published results of this research were cited in the most highly ranked coordination chemistry monograph in the world »Critical Stability Constants« of Martell and Smith, which proves the global quality of these papers.

Professor I. Filipović co-authored several secondary school textbooks, wrote university textbooks and laboratory manuals, all of which were revised and reprinted many times. He co-authored the university textbook »General and Inorganic Chemistry«, which has seen nine editions to date and is still used at many faculties throughout Croatia.

As an established scientist, Professor I. Filipović chaired the Department of the Chemistry of Complex Compounds in Solutions and Electroanalysis of the Institute for Inorganic and Analytical Chemistry, University of Zagreb, from 1960 to 1972. From 1966 to 1974, he was engaged as external research associate of the Rugjer Bošković Institute. In 1952, he became an associate of the Chemistry Section of the Department of Mathematical, Physical and Technical Sciences of the Croatian Academy of Sciences and Arts. He was a member of the Croatian Chemical Society, Society of Chemical Engineers and Technologists of Croatia, and the International Society of Electrochemistry. He served as president of the Croatian Chemical Society, dean of the Faculty of Technology in Zagreb, and head of the Chemical-Technological and Biotechnological Departments for several terms. He held the position of the head of the Department of General and Inorganic Chemistry of the Faculty of Technology until his retirement in 1982.

Professor I. Filipović founded and developed the school of coordination chemistry and the centre for the development and application of electroanalytical methods in chemistry, notably polarography, which he had introduced into Croatian science and practice. His overall work constitutes a significant contribution to Croatian science and university teaching practice. Therefore, in the period from 1960 to 1989, he received several high awards for his role in the establishment, organization and development of faculties and high schools in Split and Zagreb. In 1995, the Croatian Chemical Society awarded him the »Božo Težak« medal for his achievements. His publishing and scientific work brought him valuable prizes as well: the Government of Croatia award for his »Laboratory Manual« (1950), the »Školska knjiga« life achievement award »Davorin Trstenjak« for his many textbooks (1985), the Republic prize »Rugjer Bošković« for scientific work (1975), and the Republic life achievement award (1991).

Finally, some personal remembrances. I heard about Professor I. Filipović from my father when I was still a child. Professor I. Filipović was always try-

ing to improve measuring techniques and measuring instruments, in which he was helped by my father. Thus, I learned about the mirror galvanometer when I was still in primary school. I remember the great amount of work that my father put into making the bronze wire coil for this instrument. I found out later that Professor I. Filipović needed a slow-swinging galvanometer for easier current readings during polarographic measurements. When I enrolled in the Faculty of Technology in Zagreb, I first met Professor I. Filipović in the packed Main Lecture Hall at 20 Marulićev trg where he lectured on general and inorganic chemistry. His lectures were excellent and the experiments most impressive. The entire lecture hall workbench was often covered with apparatus. The Professor was standing on one side and, if the experiment did not give the desired results, he would »shoot« the instructor or undergraduate assistant who was doing the experiment with his well-known glance over the rim of his spectacles. The students were listening attentively and taking notes, though some of them were sitting on the stairs or standing. Too small was even the Big Lecture Hall in Pierrotti Street where younger student generations attended his lectures. Students gathered in front of this lecture hall long before the lectures started hoping to get a seat inside. They were not discouraged by the low temperature, which barely reached 15 degrees in winter. In such conditions, the Professor exceptionally replaced his white overall by his winter coat.

Professor I. Filipović was extremely thorough in his work. The Department records still contain his neatly written notebooks with his students' names and exam grades. With the same thoroughness and incredible patience, he prepared texts for publication. He did not miss a single detail. He wrote each note and correction legibly and clearly. The Department clerk who typed his handwritten manuscripts made by far more mistakes than the Professor did. Corrections, copying, new corrections, etc. went on until the text obtained the form that fully satisfied him.

We knew little about Professor I. Filipović's other interests. None of us knew that he used to paint in his youth. He transferred his passion and desire for visual expression to photography and film and watched the world around him through the viewfinder of his camera. The two of us talked about photography, discussed the advantages of particular camera models and admired each other's prints and slides. We also joked because the Professor was a witty person who liked a good laugh. He enlivened his conversation with witty remarks. Still, he was a modest and unobtrusive person, who did not like public appearances and exposure.

As founder of the Department of General and Inorganic Chemistry of the Faculty of Technology in Zagreb, Professor I. Filipović incorporated 28 years of his life and work into its growth and development. As an outstanding scientist and teacher, he combined his scientific and teaching activities, constantly imparting his knowledge and experience to his students and younger associates. Many degree essays, master's theses and doctoral dis-

sertations were made under his guidance. He educated many generations of students, some of whom are now renowned scientists or specialists in this country and abroad. As an excellent teacher, scientist and person of high moral standards, Professor I. Filipović has always been and still is an example to all of us – his students and associates. This was also confirmed at the AMACIZ Society meetings, where he was always greeted by spontaneous and long applause.

We will keep Professor I. Filipović in our lasting memory.

Mihael Tkalčec

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