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Professor *Vladimir Prelog*, Mentor to Croatian Chemists

Kruno Kovačević*

A number of Croatian chemists, including myself, had an exceptional fortune to work here in Zürich with and under the supervision of Prof. *Vladimir Prelog*. It was not by chance, because *V. Prelog* started his academic career at Zagreb University, and, after he moved to Zürich, he continued his successful relationship with Croatian chemists. I will give you more details and names regarding three generations of '*Prelog's School of Organic Chemistry*'.

Croatian by birth, born in Sarajevo, educated in Zagreb, Osijek, and Prague, young Dr. *V. Prelog* returned to Zagreb in 1935, becoming an Assistant Professor and then Professor at the Technical Faculty of Zagreb University.

Very quickly, *Vladimir Prelog* established a research group of undergraduate students, Ph.D. students, and post-docs who worked enthusiastically together with their young teacher. The names of his co-

workers are given in *Fig. 1*. On *Photo 1*, taken on his 33rd birthday, you can see all the members of this group, which later became known as '*Prelog's Zagreb School of Organic Chemistry*'. As you can see from *Fig. 1*, within a very short period of time, the school published more than 30 full papers on the chemistry of hetero- and alicyclic compounds. Among them, there was the first synthesis of adamantane.

At the same time, young Dr. *Prelog* established, very successful collaboration with the local pharmaceutical company *Kaštel* (later *PLIVA*) (*Fig. 2*), which, at the time, intended to embark on the synthesis

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Photo 1. Students and their young professor (*V.P.* sitting second from right); *V. Prelog's* 33rd birthday, Zagreb University 1939

**'Prelog's School of Organic Chemistry'
Zagreb, 1935–1941 (1)
First generation**

ZAGREB UNIVERSITY, TECHNICAL FACULTY

B.Sc. Students: **Eugen Guštak, Adolf Režek, Pavao Mildner**
First five Ph.D. students: **Dragutin Kolbach, Eugen Cerkovnikov, Miha Piantanida, Rativoj Seiwert, Mihovil Proštenik**
Other researches: **Viktor Hahn, Suzana Heimbach**
Postdoctoral student: **Krešimir Balenović**

- Results: over 30 scientific publications
- Scientific areas: barbiturates, quinuclidines, adamantanes, rubane
- Therapeutic areas: hypnotics, antimalarics, antibacterials

Fig. 1. 'Prelog's School of Organic Chemistry', Zagreb, 1935–1941; first generation

**'Prelog's School of Organic Chemistry'
Zagreb, 1935–1941 (2)**

Scientific collaboration with the pharmaceutical company
Kaštel (later PLIVA)

Chemistry: **Viktor Hahn, Eugen Guštak, Ljubo Trinajstić, Ernest Reiner, Dragutin Kolbach**
Pharmacology: **Pavao Stern**
Bacteriology: **Josip Kolačny**

- Sulfonamides, Quina-Alkaloides, Quinuclidines, Piperidines, Barbiturates
- Bactericides (*Streptazol*), Antimalarics, Spasmolytics, Analeptics (*Leptamin*), Ca-therapy (*Eukalcin*)
- Patents and over 20 Publications

Fig. 2. Scientific collaboration with the pharmaceutical company Kaštel, Zagreb, 1935–1941

**'Prelog's School of Organic Chemistry' –
Professors of Chemistry
at Croatian Universities (1)**

Technical Faculty, Zagreb University
Rativoj Seiwert and Viktor Hahn

Faculty of Sciences, Zagreb University
Krešimir Balenović, Member of the Croatian Academy of Sciences and Arts

School of Medicine, Zagreb University
Mihovil Proštenik

Fig. 3. Prelog's former students, professors of chemistry at Croatian universities (1)

**'Prelog's School of Organic Chemistry' –
Professors of Chemistry
at Croatian Universities (2)**

Veterinary Faculty, Zagreb University
Adolf Režek

Faculty of Food Technology and Biotechnology, Zagreb University
Pavao Mildner

Faculty of Pharmacy and Biochemistry, Zagreb University
Dragutin Kolbach and later **Stanko Borčić**

School of Medicine, Rijeka University
Eugen Cerkovnikov

Fig. 4. Prelog's former students, professors of chemistry at Croatian universities (2)



Photo 2. Opening of PLIVA Research Institute, 1952. From the left: D. Dvornik, R. Seiwert, D. Kolbach, V. Prelog, and E. Guštak.

**Students from Zagreb,
Visiting Researchers in *Prelog's* ETH-Laboratory;
Second and Third Generations**

Dušan Dvornik^{c,d}, Stanko Borčić^{a,b}, Mirko Ternbach^{a,d}, Berislav Glunčić^c,
Branimir Gašpert^{b,c}, Rade Marušić^c, Žarko Stojanac^{a,d}

Vitimir Šunjić^{a,b}, Davor Bedeković^d, Nada Šarčević^{a,d}, Mladen Žinić^{a,b}
Kruno Kovačević^c, Stjepan Mutak^c, Miljenko Dumić^c, Miće Kovačević^c

^{a)} Zagreb University

^{b)} National Institute 'Ruđer Bošković'

^{c)} *PLIVA* Research Institute

^{d)} Outside Croatia

Fig. 5. Students from Zagreb, visiting researchers in *Prelog's* ETH-Laboratory; second and third generations

**Croatian Thanks to
Prof. *Valdimir Prelog***

- State's Awards (1986 and 1996)
- Honourable Ph.D. (Zagreb and Osijek Universities)
- Honourable member of Croatian Academy of Sciences and Arts
- *Prelog's* Symposiums on occasion of his 80th and 90th birthday
- Honourable Citizenship of Zagreb and Osijek
- Surprise *Festschrift* of *Croatica Chemica Acta* (1996)
- Medal on the occasion of *PLIVA's* anniversary (1996)
- Croatian Chemical Society and *PLIVA* established
- Award 'V. *Prelog*' for young organic chemists (since 1996)

Fig. 6. Croatian thanks to Prof. Vladimir Prelog



Photo 3. First and second generations of *Prelog's* former students at the Croatian Congress of Chemists, Zagreb 1973. Standing from the left: B. Glunčić, B. Gašpert, P. Mildner, R. Marušić, D. Kolbach, M. Lačan, E. Guštak, V. *Prelog*, S. Borčić, R. Seiwerth, K. Balenović and S. Đokić. Sitting from the left: Mrs. J. Guštak, Mrs. Z. Stefanac, Mrs. K. *Prelog* and Mrs. N. Bregant.



of pharmaceutical compounds. *Prelog's* group at *Kaštel*, among other things, developed very useful methods for the preparation of sulfanilamide, launched as *Streptazol* in 1937, and other products (*Leptamine* and *Eukalcin*). From that time on, *Kaštel* started to grow, and continued to do so later under the name *PLIVA*. The chemical, pharmacological, and bacteriological laboratories were the 'embryo' from which *PLIVA's* research institute developed later on.

In 1941, after the World War II seized former Yugoslavia, Prof. *Prelog* moved to Zürich, to Prof. *Ružička's* laboratory. As you know, he was first an Assistant Professor and then Full Professor of Organic Chemistry at the ETH.

In the meantime, his former PhD students in Zagreb became Professors at Croatian Universities, as presented on Figs. 3 and 4.

Prof. *Prelog* did not stop contacting his previous University and Zagreb. On the contrary, he was continuously involved in the development of both, the University and the pharmaceutical company *PLIVA*. In 1952, *PLIVA* Research Institute was established, and Prof. *Prelog* was the guest of honour at the opening ceremony (Photo 2). His former student, Dr. R. Seiwerth, became the first director of the institute, and the most important researchers belonged to '*Prelog's* School'.

For more than three decades, Prof. *Prelog* kept inviting researchers from Zagreb to work with him at the ETH (see Fig. 5).

Photo 4. Prof. *Prelog* with former students in his ETH-Laboratory, 1986. From the left: M. Dumić, S. Mutak, K. Kovačević, M. Kovačević, B. Glunčić, B. Gašpert.

With respect to the time of their visits and their ages, these students are referred to as the second and third generation of Prof. *Prelog*'s students. Many of us worked at the ETH for a year or more, and, as it was the explicit wish of Prof. *Prelog*, the majority returned to Croatia to continue their scientific work either at the University of Zagreb, at the National Institute 'Ruder Bošković', or, like myself, at the *PLIVA* Research Institute.

Prof. *Prelog* continued to regularly visit Zagreb, to participate in scientific meetings and to give lectures. *Photo 3* was taken on one of these occasions. His students of the first and second generation were present.

Croatian students also kept visiting Prof. *Prelog* in Zürich, either in his laboratory or in his office. *Photos 4* and *5* were taken in 1986, on the occasion Prof. *Prelog*'s 80th birthday.

The entire Croatian community and, in particular, the Croatian Chemical Association are extremely grateful to Prof. *Prelog* for his enormous contribution to the development of chemical science in Croatia. Prof. *Prelog* was the mentor to a large number of organic chemists from Croatia, both from the university and from the industry. On various occasions, this gratitude was formalized, and Prof. *Prelog* received numerous honours, awards and special prizes. Some of them are listed in *Fig. 6*.

However, there is no doubt in my mind that Prof. *Prelog* considered success of his former students to be his biggest reward. *Photo 6*, taken during his last visit to Croatia, in *PLIVA*'s club in 1989, captures his delight on learning about the discovery of *PLIVA*'s new antibiotic *Azithromycin*. His delight is shared with three generations of his students.

Our Professor (*Photo 7*) has left us, but he has fulfilled an extremely important mission of conveying his exceptional knowledge and experience to young scientists. He will be remembered and his work will be continued by chemists all over the world.

Thank you, dear Professor, in the name of all my colleagues, and in my personal name.

I would like to thank to Prof. Dr. *Dieter Seebach*, inviting me to talk at this solemn occasion, and to my colleague Dr. *Miljenko Dumić*, who provided most of the photographs.

Photo 7. Prof. *Prelog* with samples he had prepared 45 years ago. Taken in 1986 in his previous laboratory at Zagreb University



Photo 5. In *Prelog*'s ETH-office, 1986, with former students. From the left: B. Gašpert, K. Kovačević, V. *Prelog* and M. Dumić.



Photo 6. In the *PLIVA club*, Zagreb, 1989. Prof. V. *Prelog* together with three generations of his former students. Sitting from the left: R. Seiwerth, D. Kolbach, V. *Prelog*, Mrs. K. *Prelog*, M. Proštenik. Standing from the left: M. Dumić, S. Mutak, B. Glunčić, K. Kovačević, B. Gašpert, M. Žinić, M. Kovačević, S. Borčić, V. Šunjić and S. Đokić.

