My Scientific Collaboration and Fraternal Friendship with *Giambattista Consiglio*

by **Franco Morandini**

Dipartimento di Scienze Chimiche, Università di Padova, Via F. Marzolo 1, I-35131 Padova

When I was asked by my friends *Antonio Mezzetti* and *Barbara Milani* for a contribution for a publication in *Helvetica Chimica Acta* in honor of Professor *Giambattista Consiglio* on the occasion of his 65th birthday, I must say I was rather undecided as to the best contribution. Surely, a scientific paper of some sort would be most appropriate. Then, upon reflection, I recalled that some months earlier we had published our latest scientific work. This set me thinking back over recent years, 30 to be exact, and I realized that all I could do was to write a few words that would bring back those years for both of us.

I arrived in Zurich one day in May 1977, having been offered a scholarship with the ETH Zurich to work in the group of Professor *Piero Pino*. I was rather bewildered and somewhat undecided at first, although, clearly, the opportunity was a very stimulating and attractive one. I was then involved in the synthesis, characterization, and reactivity of transition-metal complexes containing the carboranyl group, a different field from that in which I should have been interested. The first thing I did, as is usual, was take myself off to the library to find out what was being studied by this prestigious research group, of which I knew very little.

I arrived in Zurich, as mentioned, in May 1977, and the very first person I met was *Giambattista Consiglio*. From the start, he was extremely kind and cordial. Professor *Piero Pino* had offered a scholarship, initially for one year, but with a possibility of renewal. I remember I was going to stay at the ETH two or three hours at most, but it was evening before I left, after meeting many people with whom I would build very close relationships.

At the beginning of July, I was already at hard work. I was supposed to be studying the hydrocarboxylation of olefins. Then, as often happens, there was a mechanistic work to be perfected and finished off concerning the hydroformylation of deuterated olefins, requiring their syntheses and characterizations. It was not exactly what I was used to, and *Gianni* came to my aid. We were in the laboratory together and I, quite candidly, asked him for a great deal of advice on how to carry out the various steps in the preparation of such compounds. He was more than happy to give me advice, and I tried to learn new procedures of synthesis as quickly as I could.

Once this research was terminated [1], I began with the work that was more akin to my interests, *i.e.*, the synthesis and characterization of palladium complexes and their use in olefin hydrocarboxylation reactions. Together, in a short time, we produced convincing and definitive results, thanks also to the help of Mr. *Felix Bangerter*, friend and veritable source of knowledge of NMR spectroscopy [2]. I must honestly say that at the ETH Zurich, I was fortunate enough to work alongside many people who clearly con-

tributed much to my learning, among whom, for instance, I must not forget Professor *L. M. Venanzi*, an extremely courteous and amicable person who always had time to advise me or answer questions. I remember I went to Professor *Venanzi*'s inorganic-chemistry lectures with enthusiasm, and I still have today the photocopies that were handed out to students, and which proved so useful to me also later.

In an atmosphere of total freedom to research, for which I shall be eternally grateful to Professor *Pino*, *Gianni* proposed to start a research based on the use of organometallic transition-metals complexes containing chiral ligands to be used as probes in a deeper study of the stereochemical course of simple organometallic reactions of catalytic interest. In effect, this was an attempt to determine the way in which chirality information is transmitted by the metal, when this itself is a stereogenic center, or by the chiral ligand to the prochiral substrate coordinated to the metal. It was a fascinating field, which absorbed me from the start. We chose (cyclopentadienyl)ruthenium(II) complexes containing as chiral ligands diphosphines such as the (*R*)-1,2-bis(diphenylphosphino)propane ((*R*)-Prophos)) and the (*S*,*S*)-2,3-bis-(diphenylphosphino)butane ((*S*,*S*)-Chiraphos)). Both the preparation of starting ruthenium(II) complexes and that of the chiral diphosphines had been reported in the literature only a short time before. With the (*S*,*S*)-Chiraphos, the Ru-atom, the metallic center, would not be stereogenic, and hence the chirality information transmitted to a coordinated ligand would be due solely due to the ligand and not to the chirality at the metal. However, with (*R*)-Prophos, diastereoisomeric Ru^{II} complexes would be obtained with a counter absolute configuration at the Ru-atom. In this case, we would observe, in addition to the influence of the chiral ligand, that due to the oppositing senses of chirality on the metal. In brief, the complexes concerned had to be prepared and also the ligands, which in those days were either not commercially available or were far too expensive to be purchased. In the meantime, I had returned to Padova and so, with *Gianni* in one country and I in the other, we continued the work. There were no computers back then, and I think the phone lines and postal services between Zurich and Padova were kept extremely busy. There was a very frequent exchange of notes, NMR spectra and other results, ideas, and possibilities. Every opportunity was good for a meeting.

When *Gianni* was invited to teach at the Gargnano school on Lake Garda, we decided to meet there, for, in the meantime, he had prepared a fair amount of (*R*)-Prophos, which I would need to obtain the two diastereoisomeric Ru^{II} complexes for fractional crystallization. I remember that we went into a bar on the lakeside for a coffee, and *Gianni* handed me the glass container that contained the (*R*)-Prophos. The waiter arrived with our order, but the table was rather wobbly and the container with its precious compound fell to the ground and shattered into a thousand pieces. For those who may not know, (*R*)-Prophos is a white crystalline powder that looks very similar to other compounds with rather different characteristics. Imagine the two of us, clearing away the other customers, scrabbling around on the ground with bits of paper, packets of cigarettes, and any other means in an attempt to recover this white powder. I am still surprised to this day that nobody did arrive to investigate what was happening. The funniest thing, from a chemical point of view, was purifying the (*R*)-Prophos not from the usual undesired chemical by-products but from dust, soil, cigarette ends, and everything else that can be found on the ground around tables at a bar. I must say it was quite an

educational experience, and, in the end, with a couple of simple hot–cold recrystallizations, I obtained the pure diphosphine back.

Work progressed quickly over time and, though I say it myself, with fascinating results [3]. In addition to Ru^{II} complexes, we also studied Rh^{I}, Rh^{III} [4], and Ir^{I} [5] with the same aim of stereochemical investigations.

Most recent work has dealt with synthesis, characterization, and reactivity of the so-called electron-rich complexes, which might act as *Lewis* bases with regard to common *Lewis* acids. The last work we published together was in 2005 [6]. The first, if I remember correctly, was in 1978. A fair amount of time has passed since then. Thirty years, which, quite frankly, I have not noticed passing.

To conclude this trip down memory lane, it only remains for me to say that I have fond memories of all the times I was a guest at *Giambattista*'s house in Zurich, and enjoyed his hospitality together with that of his wife, *Grazia*, and daughter, *Camilla*. I felt at home, and the evenings were very relaxing, enjoyable, but above all family evenings, and I shall never forget them.

I am sure all those involved in this celebration will join me in a heartfelt wish:
Happy birthday *Gianni*!

REFERENCES

[1] G. Consiglio, D. A. von Bezard, F. Morandini, P. Pino, *Helv. Chim. Acta* **1978**, *61*, 1703.
[2] F. Morandini, G. Consiglio, F. Wenzinger, *Helv. Chim. Acta* **1979**, *62*, 59.
[3] G. Consiglio, F. Morandini, *Chem. Rev.* **1987**, *87*, 761.
[4] G. Consiglio, F. Morandini, *J. Chem. Soc., Chem. Commun.* **1991**, 676; F. Morandini, G. Pilloni, G. Consiglio, A. Sironi, M. Moret, *Organometallics* **1993**, *12*, 3495.
[5] F. Morandini, G. Consiglio, *Inorg. Chim. Acta* **1997**, *258*, 77.
[6] F. Morandini, I. Munari, M. Panese, A. Ravazzolo, G. Consiglio, *Inorg. Chim. Acta*, **2005**, *358*, 2697.

Received February 10, 2006