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Journal of Organometallic Chemistry 643–644 (2002) 1–3

Journal of Organometallic Chemistry

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Preface

Special Issue on François Mathey

This special issue of the Journal of Organometallic Chemistry is dedicated to our friend and colleague François Mathey on the occasion of his 60th birthday to celebrate his contribution to science through his remarkable achievements in organophosphorus and organometallic chemistry

At first sight, writing a preface dedicated to François Mathey is not a difficult task if you only limit your investigation to a classical comment of his very dense curriculum vitae and exclusively focus on his brilliant advancement and scientific achievements. However, when you know him, it becomes rapidly obvious that the man is too atypical to deserve such a conventional presentation. Furthermore, I am really sure that he would not appreciate a preface that might resemble a kind of posthumous eulogy or something equivalent. Nevertheless, one has first to recount the most important dates of his career.

François Mathey was born in Paris on November 4, 1941. His first contacts with the world of chemistry date back to the years he spent at the college Louis Le Grand in Paris. After a two-year period in preparatory classes, in the same institution, he studied at the Ecole Polytechnique (Paris) from which he graduated as an engineer in 1963. He then completed his scientific education at the University Paris VI Jussieu from 1963 to 1968. During the same period, he also worked as a research engineer at IRCHA (Institut National de la Recherche Appliquée). As he often likes to say, this period clearly marked a 'turning point' in his career. Though he had a rare opportunity to come in contact with the industrial world and all its technical and economical requirements early, he really suffered from scientific isolation and had to conceive the most part of the thematic of his PhD thesis himself. This rather unusual situation forced him to develop a very personal way of thinking and his originality mostly issued from this period. After the successful completion of his PhD thesis in 1971, he directed a larger group in IRCHA until 1980. The same year, in agreement with the CNRS, he then founded the first mixed research unit between the CNRS and industry (SNPE) on the campus of Thiais where he stayed until 1986. During this period his group slowly enlarged, and his centres of interest progressively shifted from industrial to more fundamental academic research. Fascinated by teaching he was then appointed Professor of Chemistry at the Ecole Polytechnique in 1986. The same year, he moved with his group from Thiais to Polytechnique in Palaiseau where he founded the 'Laboratory of Phosphorus Chemistry and Transition Metals'. In 1989, he definitively left the industrial world and was appointed

0022-328X/02/$ - see front matter
PII: S0022-328X(01)01486-3

by the CNRS as a first class research director. He is currently leading the same laboratory, which in the meantime has been renamed 'Hétéroéléments et Coordination', at the level of research director of exceptional class.

As everybody knows the chemistry he developed all these years mostly focuses on phosphorus heterocycles. He rapidly appeared as one of the most active founder of the domain and really contributed with his group to its striking expansion in a relatively short period. Indeed, one has to keep in mind that in 1950, in the first edition of Mann's book, only 15 pages and 18 references were allowed to cover the whole field. Twenty years later, in the second edition, 354 pages and 503 references were needed to cover the same topic and finally, in Quin's book, which appeared in 1981, the topic of phosphorus heterocycles including P–C bonds represented a volume of 430 pages and 1100 references. So, if you question him about his successful contribution to the domain, he will probably answer with his usual modesty that he was at the right place at the right time and that he had a very performing group. Furthermore, he will certainly add that it would have been impossible to fail because so many topics in the chemistry of the higher elements of the main group remained dramatically unexplored at the time. He is partially right, but everybody will acknowledge the idea that this simple historical context in itself cannot justify the success he had. There are many striking analogies between Science and Arts, especially during stages leading to creation. As a painter or a musician in front of an immaculate canvas or a virgin score, a highly creative scientist has to behave as a resolute visionary first. He clearly belongs to this category and those who know and had to work with him will surely confirm that he has really got this gift.

Among his most important scientific achievements, one may quote the development of the chemistry of phospholes, a domain that has now reached a high level of complexity and found interesting applications in various areas. He also massively contributed to the chemistry of small strained phosphorus rings such as phosphiranes and phosphirenes, the phosphorus equivalent of cyclopropenes he discovered in 1982. He did not limit his researches to the pure field of organophosphorus heterocyclic chemistry and his contribution to organometallic and coordination chemistry turns out to be very important. In this regard, the discovery of phosphaferrocenes, which proved to be the first example of an heterometallocene, is a real landmark that paved the way for a systematic exploration. Many interesting developments and applications resulted from this discovery. Finally, all phosphorus chemists will remember the extraordinary history of stabilised terminal phosphinidene complexes, the phosphorus analogues of Fischer's carbenes. Beside their interest as powerful synthetic tools in the synthesis of diverse phosphorus compounds (rings, functionalised phosphines…), their discovery enlightened the idea that transition metal fragments can also be used to efficiently stabilise kinetically or thermally unstable phosphorus species. Another elegant illustration of this property was given some years later by the discovery of the famous Phospha-Wittig reaction, a transposition of the well-known Wittig reaction, that allows the synthesis of various functionalised phosphaalkenes starting from ketones or aldehydes. All these incursions in the field of low-coordinated phosphorus species led him to propose the idea of a diagonal analogy between phosphorus and carbon. A remarkable book he wrote in collaboration with his two colleagues, J.F. Nixon and K.B. Dillon, summarised very well this new and attractive concept and all its chemical consequences. Most recently, his centres of interest slightly moved towards homogeneous catalysis and, as he always did all along his career, he entered the domain with his personal touch. He developed the use of bridgehead phosphorus-based bicyclic ligands to circumvent the cumbersome problem of racemisation processes. With this idea in mind, a series of efficient monodentate and bidentate bicyclic phosphines were recently synthesised in the laboratory in collaboration with industrial companies.

All these findings and concepts were designed with a very simple idea in mind. 'Rusticity', a term he overall likes. Many of his nearest colleagues probably remember memorable scientific discussions where he always insisted on the importance of simplicity in chemistry. On reflection, one may argue that this attitude very probably results from his stay in industry. Indeed, he often tells them never to forget that the simplest synthetic approaches, compounds, and even concepts, are often the most efficient ones, an idea which is somewhat difficult to admit when you are a beginner who believes that sophisticated things will help to put forward your own creativity. He really applied this rule in most of his greatest scientific achievements and, as a consequence, many compounds synthesised in the laboratory have been upscaled in the chemical industry over the last few years.

Another important point in a scientific career is the idea of timelessness. Sometimes, he says that the most difficult moment for a scientist would probably be to retire without having significantly marked his time: obviously, not with the concern of being celebrated by colleagues for years but mainly with the aim to bequeath something useful for future generations. It is quite obvious that he really needs not worry about this rather painful idea. He really created a style that many scientists try to adhere to (not only in phosphorus chemistry) and his scientific influence has passed the French borders. Indeed, many groups throughout the world have been inspired by his findings and use them

as a comfortable starting platform for their research before defining their own way.

Throughout his research and teaching activities, François Mathey has had many very different responsibilities in the management of Science. What is also particularly important is his implication in the French community of chemists. Throughout his career he has been really concerned in the development of chemistry in France and he never failed to defend and promote it whenever possible. This attitude, which is unfortunately too rarely widespread, definitely honours him and arouses the admiration and gratitude of most of his colleagues. He is not only concerned by the future and the health of the French community but also acts as a very active partner in the elaboration of the European network of publication, especially since he has been elected as the Head of the French Chemical Society.

Now, about the man himself. Though François is a tireless worker he never forgets that there is a time for working and a time for joking. He is well known for having developed a very particular and personal sense of humour, full of understatements, that might be experienced as slightly caustic if you do not know him well. Those of us who had the pleasure to know him will confirm that, despite a heavy schedule, he always makes it possible to spend time with persons who need advice and never refuses to support and encourage them in their research endeavours. He is also a very cultured personality and his personal centres of interest go far beyond chemistry. Thus, music (jazz and classical) plays a very important role in his life and he is always willing to share his long passion for astronomy. If you question him about his life he will surely answer that nothing would have been realisable without his family and he is deeply indebted to his wife Dominique, who supported him along his career whatever the circumstances.

Now, to get back to a more traditional preface one has to mention all his scientific achievements in terms of production and distinctions, though I am not really sure that he will appreciate this. Anyway, his scientific production amounts to about 470 publications and he is also the owner of 32 patents. He participated in the writing and editing of three books. The more recent one, entitled '*Phosphorus–Carbon Heterocyclic Chemistry: The Rise of a New Domain*' (Pergamon, Oxford, 2001), will probably serve as a 'bible' for heterocyclic phosphorus chemists in the years to come. He received many awards such as the Silver medal from the CNRS in 1979, the Paul Langevin Prize (1985), The Alexander von Humboldt Forschungspreis (1988), the Raymond Berr-Atochem Prize (1988), the Mergier–Bourdeix Award from the French Academy of Science (1989), the Grignard–Wittig Award (1997), the ICMGC Award for excellence in main group chemistry research (1999), the Watt Centennial Lecturer (Texas, 2000), the JSPS fellowship (2000), and this year, the Arbuzov Prize. He also actively contributed to the management of Science in France and was involved in many different committees at the CNRS and other institutions from 1975 up to now. He was elected a permanent member at the French Academy of Science in 1998 and is also a member of the Deutsche Akademie der Naturforscher Leopoldina and of the Academia Europaea. During his career he always manifested his interest for the world of scientific publication and belongs to the advisory board of many international journals. He also acted as the Editor-in-Chief of the *Bulletin de la Société Chimique de France* from 1991 to 1995 and of the *Comptes Rendus de l'Académie des Sciences*, *série IIc*, (*Chemistry*) (1998–2001) and was a Regional Editor of the *Journal of Organometallic Chemistry* from 1996 to 1998.

So, to conclude, François, please keep in mind that a sixtieth birthday does not signify the end of the story! Many great things have still to be achieved and as you said in the conclusion of one of your reviews on phosphorus-based π-complexes (*New. J. Chem.* 11 (1987) 585): "Il y a encore beaucoup de pain sur la planche".

On behalf of your colleagues and friends from France and abroad.

Thank you for everything!

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