
On the Occasion of the 65th Birthday of Dr. *Ferdinand Näf*

The following six publications in this issue of *Helvetica Chimica Acta* are dedicated to Dr. *Ferdinand Näf* who was Corporate Vice President of R&D at *Firmenich* (1989–2005).



Ferdinand Näf was born in Winterthur (Switzerland) on December 7, 1940. After completing his secondary education locally, he then entered the Chemistry Department of the *ETH* (Abteilung IV) in Zürich in 1960, obtaining his diploma degree in 1964. He then joined the research group of Professor *Emil Hardegger*, where he worked on the synthesis of biologically active prostaglandins, receiving his Ph.D. thesis, entitled: ‘*Versuche zur Synthese der Prostaglandine*’, in 1966. Soon afterwards, *Ferdinand Näf* departed for Boston, USA, where he spent two years as a Postdoc in collaboration with Professor *George Büchi* at the *Massachusetts Institute of Technology (MIT)*, working on the stereospecific syntheses of uleine and epiuleine, secondary plant metabolites belonging to a small group of indole alkaloids lacking the tryptamine unit.

It was certainly due to the close relationship Professor *Büchi* enjoyed as consultant with *Firmenich SA*, a Swiss-based, globally renowned Flavour and Fragrance company, that *Ferdinand Näf* decided to return to Europe and join its Scientific Research Divi-

sion at La Jonction, Geneva, as a Research Chemist on October 1, 1968. Ever since the days of the Nobel Laureate Professor *Léopold Ruzicka*, its first Research Director in 1925, *Firmenich* had nurtured and maintained an excellent and well-deserved reputation in organic chemistry, and it was a talented group of scientists, headed by Dr. *Günther Ohloff*, who welcomed *Ferdinand Näf* in 1968. This was at the beginning of a golden era of the Flavour and Fragrance industry, when important advances in analytical techniques such as gas chromatography, mass spectroscopy, and nuclear magnetic resonance permitted the discovery of a multitude of volatile natural ingredients whose commercial application was avidly demanded by the flavourists and perfumers. However, the isolation of a natural ingredient was often extremely tedious and costly, and the generally limited availability of the natural source presented a real obstacle for an eventual commercial success. Here, as now of course, the rôle of a synthetic chemist was of paramount importance: not only to synthesize the desired target molecule as proof of structure, but also to find the most inexpensive access. *Ferdinand Näf* was in his element. His creativity in synthetic organic chemistry and solid theoretical background, coupled with a creative mind and unlimited enthusiasm, rapidly allowed him to make his mark, and, over the next ten years or so, a consistent stream of patents and publications attested to his success.

His research during this period covered both pioneering synthetic methodology, and direct, state of the art syntheses of naturally occurring odorants. In the former category, examples are a stereospecific alkene synthesis using lithium vinylcuprates (1972) and an acid-mediated polyene cyclization providing a rapid and novel access to odorants possessing the 5,5,9-trimethyldecalin skeleton (1973). In the latter category, early highlights include a synthesis of undeca-1,3,5-trienes, organoleptically interesting constituents of the essential oil of *Galbanum* (1975), and an extremely elegant intramolecular *Diels–Alder* approach to patchouli alcohol. This was one of the first applications of this particularly powerful method to stereoselectively construct polycyclic structures, and it was in this publication, in 1974, that *Ferdinand Näf*, briefly comparing the retrosynthetic aptitudes of a chemist with those of a computer, plumped decidedly for the former, wryly remarking, with an amusing twist to *Robert Louis Stephenson's* famous adage, that ‘...we would not wish to discourage those who think travelling hopefully with a computer is better than arriving’! An efficient and practical synthesis of methyl (\pm)-jasmonate and *cis*-jasmone (1979) was followed in the same year by another application of the intramolecular *Diels–Alder* reaction, this time offering a novel entry to the eremophilane and valencane sesquiterpenes. It was, therefore, no real surprise to his colleagues and to the scientific community in general, that, in 1980, *Ferdinand Näf* was awarded the prestigious *Ruzicka Prize*, in recognition of an outstanding young talent.

It was about this time, in 1979, that Dr. *Ohloff*, in view of the increasing specialization required of the analytical and synthetic chemists, decided to re-organize the Research Division, and *Ferdinand Näf* was the obvious choice to become director of the newly created Product Research Department, heading a group of synthetic organic chemists working on the development of new synthetic methodology, and its application to the synthesis of flavour and fragrance ingredients. This was a position which gave *Ferdinand Näf* full rein to his creativity and leadership qualities. As the 1980s started, it was clear to him that ‘classical synthesis’ alone could not provide all the

answers, and that the extensive use of transition metal catalysis would provide an environmentally friendly alternative to the low-cost, large volume ingredients demanded by the industry. Though of course heterogeneous transition metal catalysis, such as hydrogenation, dehydrogenation, and autoxidation, had already been used extensively in production at *Firmenich*, his idea was to widen the scope to homogeneous catalysis and to develop other reactions such as alkene isomerization, alkene coupling, epoxidation, hydroformylation, carbonylation, cyclotrimerization, oligomerization, and metathesis *etc.* These reflections resulted in an internal *Firmenich* document entitled: ‘*Transition Metal Catalysis: a preliminary study concerning its impact on the search and manufacture of low-cost, large-volume fragrances*’. Looking back from the vantage point of 2005, where transition metal catalysis is widely employed in the manufacture of fine chemicals, it is easy to appreciate the wisdom of this idealism and forward-thinking. However, 25 years ago in 1980 the mindset was different and resistance to change was not insubstantial.

The requirements and needs of the *Flavour & Fragrance* industry were changing fast in the 1980s, and it was primarily to answer the business needs of the Flavour Division for natural flavours that, in 1987, *Ferdinand Näf* helped *Günther Ohloff* to set up a Biotechnology department within the Research Division. His self-discipline and perseverance, together with a real ability to learn about and master scientific disciplines outside synthetic organic chemistry, certainly made him the perfect person for this job, and two years later in 1989 *Ferdinand Näf* took over, on Dr. *Ohloff*'s retirement, the directorship of the Corporate R&D Division. Realizing that success in the *Flavour & Fragrance* industry depended not only on analysis and synthesis, but also on other important factors related to the performance of the perfume or flavour in application, he initiated the diversification of research activities, creating new domains of expertise within the R&D Division. These included sensory analysis, physical chemistry, delivery technologies, molecular biology, and computational studies. He also ensured that, for other key scientific domains in which the critical mass could not be attained in-house, strong links were created and maintained with centers of excellence outside the company. This was a busy and exciting time for everyone involved, and *Ferdinand Näf*, though fully occupied with these new responsibilities, continued to find time for innovative research. Published during this period were synthetic routes to two key fragrance ingredients: a novel access to α -damascone *via* a ketene intermediate (1987), and a short, two-step synthesis of the ambergris odorant (–)-*Ambrox*[®] from the naturally occurring (–)-sclareol, *via* β -cleavage of an alkoxy radical intermediate (1988). A continued interest in structure–activity relationships related to ambergris-woody odorants led to a paper concerning the synthesis and organoleptic evaluation of various hydronaphthalenes (1990), and several years later, in 1993, a new synthesis of *Furaneol*[®], an important strawberry flavour ingredient, starting from the readily available *methyl α -D-glucopyranoside* was developed. The contribution of non-volatile ingredients to flavour perception was treated in a presentation at the 210th ACS National Meeting at Chicago, USA (1995), and this was followed in the same year by a review article in *Perfumer & Flavorist* on essential oils and aroma chemicals for the *Flavour & Fragrance* industry.

By the end of the 20th Century and during the first years of the 21st Century, *Ferdinand Näf* had built an extremely effective Corporate R&D Division, with expertise in all the key areas of importance to the present-day F&F industry. He had brought

together a loyal and motivated group of scientists, technicians, and administrative staff, creating a friendly working atmosphere conducive to innovative research and commercial success for *Firmenich*. In this context, it is important to note that *Ferdinand Näf* instigated, in the late 1990s, a project management system designed to manage a multitude of interdivisional projects, to improve the interface between R&D and the Business Divisions, and to generally increase the transparency of the overall research activities. A great believer in rigorous working habits and quality research, *Ferdinand Näf* installed in his colleagues the importance of a comprehensive literature search prior to embarking on a project. He was also, and this is not at all contradictory, a fervent advocate of carrying out an experiment in the laboratory rather than theorizing about the possible outcome, understanding quite rightly that chemistry is above all an experimental science. In 2005, it can be stated unequivocally that *Ferdinand Näf* succeeded in his objective of maintaining the R&D of *Firmenich* as an industry leader, attested by the impressive number of quality publications and patents emanating from the Corporate R&D Division during his 16 years as director. As his colleagues can readily attest, his interest in science was continual, and it was appropriate that, in his penultimate year, in 2004, he published two papers concerning the practical, one-step synthesis of unsaturated aldehydes and ketones from lactones or carboxylic acids. Like the scientist himself, the synthetic chemistry described is particularly innovative and, above all, straightforward. As befitting his station and scientific reputation, *Ferdinand Näf* was also a member of several influential chemical committees, amongst them being *La Société Suisse des Industries Chimiques*, *La Société Académique de Genève (Commission de Fonds Frédéric Firmenich et Philippe Chuit)*, *Stiftung für Stipendium auf dem Gebiete der Chemie*, and the *Ruzicka Prize Committee*.

A keen interest in mountaineering, trekking, and a variety of outdoor sports have kept *Ferdinand Näf* in peak physical condition, and it was an extremely common sight at La Jonction during many years to see him jogging in to work from his daily mid-day run, dressed in his distinctive red tracksuit. This love of physical activity is allied with a healthy passion for good food and fine wines. Above all, *Ferdinand Näf* is generous, uncomplicated, and excellent company. Eclectic in his activities (in the pre-electronic age, he had a passion for repairing and maintaining his own cars!), he is above all very amusing, with an especial talent for producing the most remarkable analogies and one-liners! As is often the case with gifted scientists, he also has a keen appreciation of the arts, especially classical music.

His colleagues and friends at *Firmenich* sincerely wish him all the best for a well-deserved retirement and success in his future endeavors.

Roger Snowden