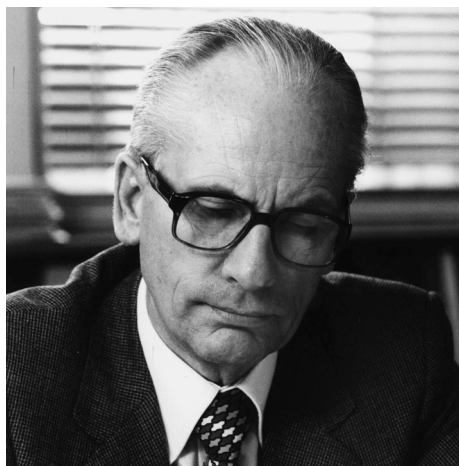


# Günther Ohloff – Chemist & Pioneer in the Art of Perfumery

## On the Occasion of his 80<sup>th</sup> Birthday

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**Keywords:** Ohloff, G.



Who is *Günther Ohloff*? Soldier, scientist, cosmopolitan, aesthete, collector of art, non-conformist and writer, Günther Ohloff was born on July 21, 1924, in Tapiau, a small village near Königsberg, Prussia. He passed his high school examination in Königsberg, in the midst of World War II. Due to the unfortunate circumstances, he was drafted as soldier into the German army, which was slowly progressing East. During the assault of Stalingrad, he was seriously wounded, but miraculously survived. For him, therefore, the attempted conquest of Russia was over and after having recovered, he was able to start his studies in pharmacy at Königsberg and Erlangen during which time he also met Asta, his future wife.

With a first degree in pharmacy, he then studied chemistry at the Technische Hochschule Dresden where he received his diploma with a thesis entitled ‘Chemical Investigation of Turpentine Oil of Silvester Pine (*Pinus Silvestris L.*)’. After followed a Ph.D. in 1951 under Professor Heinrich Wienhaus for a dissertation entitled ‘The Condensation of Terpenes with Formaldehyde’.

He then decided to move into industry: Schimmel & Co, Miltitz near Leipzig, which had been the largest perfume manufacturer in the world up to World War I.

The exposure in his young days to the constituents of essential oils, especially under Prof. Heinrich Wienhaus’ guidance, one of Prof. Otto Wallach’s last students, influenced him throughout his scientific career. Günther Ohloff has to be considered as Otto Wallach’s grandson, also born in Königsberg, who was one of the founders of terpene chemistry, receiving the Nobel Prize in 1910.

In order to work in this field of chemistry it was imperative to develop precise working habits and it was also necessary to have a comprehensive knowledge of the relevant scientific literature. These skills and knowledge have been passed on with great empathy by Günther Ohloff to his collaborators and has assured a continuous high quality of research work coupled with instructions for exact working methods, stimulation and motivation for extensive literature research.

Günther Ohloff was and still is attracted by terpenes comprising a fascinating diversity of molecular structures and possessing an extensive variation of odour qualities. Numerous publications or studies are concerned with natural product analysis, synthesis, configuration and chirality within terpene chemistry.

In 1953, he left Eastern Germany for a position at Dragoco in Holzminden to set up, together with his assistant G. Schade, a scientific research group.

It was during this period that he developed his research interests for the chemistry of perfumery extracts from animal sources, in particular amber and musk type ingredients, and which led to Ambropur<sup>®</sup>, Lactoskaton<sup>®</sup> and Isobergamiat<sup>®</sup> as commercial products.

Already during his early days as a pharmacist, and through his whole life he showed lively interest in the potential physiological activities of odorants. In 1956 a study about the aphrodisiac effects of his Ambropur<sup>®</sup> was published [1]. One of the reported investigations concerned a 54 year old opera singer suffering from Parkinson’s disease and a strongly impaired libido. After Ambropur<sup>®</sup> had been administered to the bed cushion of the singer his libido was significantly improved. Later on, as part of Ohloff’s continued research into the scent of ambergis odorants [2], Christian Vial isolated and synthesised the supposedly active principle of Ambropur<sup>®</sup> ( $\gamma$ -bicyclohomofarnesal [3][4]) without, however, having experienced the same pharmacological effects reported earlier!

An important scientific event during this early period was his getting into contact with Kurt Alder, Nobel Prize winner 1950, ‘father’ of the Diels-Alder and ene reactions.

From 1959 to 1962 Günther Ohloff had a most fruitful period at the Max Planck Institute, Mülheim, as Senior Research Assistant. He familiarised himself with singlet oxygen chemistry, sigmatropic 1,5-hydrogen shifts, ene and retro-ene reactions. During the same time he developed his passion for stereochemical aspects of chemistry and biology and in particular their applications to perfumery. His developments of industrial syntheses of (+)- and (–)-rose oxide [5], (+)- and (–)-citronellol [6], and (+)- and (–)-linalool [7] were highlights of this period.

It must have been Günther Ohloff’s remarkable scientific publications with promising technical applications for the perfume

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industry and finally a lecture in Paris about ionones which drew everybody's attention to this brilliant young man. History has amply shown the predilection of inhabitants of the North for a warmer climate in the South. Not surprisingly, Günther Ohloff could not resist the temptation to accept an offer from Firmenich & Cie, a prestigious perfume and flavour house located in the cosmopolitan town of Geneva. To make this offer even more attractive, Roger Firmenich, the then President of the company, allowed him not only to specially design and set up a process Research & Development centre in La Plaine, Geneva, but also to transfer with him his former team of co-workers and young, gifted scientists such as G. Schade, K.-H. Schulte-Elte, E. Klein, W. Giersch, M. Pawlak, G. Uhde, G. Schneider and G. Lingesleben.

Once in Geneva, he successfully developed many unique, industrial processes for important aroma chemicals such as the musks Exaltone<sup>®</sup> [8][9], Muscone [8][9], Exaltolide<sup>®</sup> [10] and the strawberry ingredient Furaneol<sup>®</sup> [11]. In parallel, he systematically investigated synthetic singlet oxygen chemistry [12] and solved many stereochemical problems in the terpene field. Going much beyond the scope of perfume and flavour chemistry and in conjunction with his photo-oxygenation work of limonene, he participated in the first total synthesis of  $\Delta^9$ -*trans*-tetrahydrocannabinol, an odourless, but physiologically very active chemical [13].

Together with his La Plaine team, he also developed several technical syntheses for the rose ketones [14][15], a most important group of natural rose scents discovered at Firmenich.

In 1963–64, in addition to his new activity in Geneva, he taught natural product chemistry at the University of Köln.

During the following years and after having taken over the direction of Scientific Research from Max Stoll in 1968, he concentrated his research on ambergis type structures, in particular the relationship between diastereoisomers, enantiomers and odour quality and intensity [2]. After a chance discovery of Polywood<sup>®</sup>, a decalyl acetate [16][17], and a systematic synthesis of all the other stereoisomers, which proved odourless, he postulated the 'Triaxial Rule of Ambergis Scent' [2][18] which some of his colleagues would call 'dictatorship on a molecular level' (isomer A **must** smell, and isomer B is **not allowed** to smell!).

Since one of the main targets of fragrance research is the discovery of new odoriferous chemicals and as a continuation of his ambergis studies, he tried to better understand in a broader sense the structural, molecular properties which create specific odour profiles. Profiting from his extensive knowledge of known flavour and

fragrance chemicals and through systematic structural variation of lead structures (*via* the synthesis of positional isomers, diastereoisomers and enantiomers, together with homologs), he decisively contributed to the better understanding and prediction of structure–odour relationships [19] and therefore, to the targeted discovery of new aroma chemicals (later on supported by molecular modelling techniques).

In a courageous extrapolation from the insect and vertebrate kingdom, he strongly believed throughout his whole career in the existence of human pheromones, which he was looking for in the group of animal scents such as certain steroids, musks, and fatty acids, some of which also occur in human sweat. Only now, scientific evidence is accumulating that human pheromones really exist [20–24].

During his long and successful career, Günther Ohloff received many honours and awards such as:

- Ruzicka Prize from ETH Zurich in 1967;
- Membership of Firmenich's General Management in 1973;
- Ernest Guenther Prize from ACS in 1974;
- Hackford-Jones Prize from PPL, UK, in 1980;
- Otto Wallach Medal from GDCh, Germany in 1981;
- Honorary Doctorate from Geneva University in 1982;
- Presidency of the Swiss Chemical Society in 1986;
- R.H. Wright Award from Simon Fraser University, Canada, in 1988;
- Distinguished Visiting Professorship at the Simon Fraser University in 1989.

After his retirement in June 1989 he continued his scientific explorations with emphasis on the cultural role of perfumery throughout the history, art and literature of mankind. In his native, German language, which he masters like a poet, he summarised his findings and insights in three books: 'Riechstoffe und Geruchssinn. Die molekulare Welt der Düfte' [19]; 'Irdische Düfte–himmlische Lust' [25]; and very recently 'Düfte–Signale der Gefühlswelt' [26].

His passion for a pleasurable life, odours, taste, food and wine, flowers, plants, colours and shapes makes him an aesthete par excellence. In his home, he has not only been able to maintain one of the best wine cellars, but he has created over the years a most prestigious collection of modern art: paintings, drawings and sculptures, mostly acquired from artists whom he knew personally.

His liking for colourful objects influenced him to such an extent that he was the first person to publish in *Helv. Chim. Acta* using coloured formulae [27].

Non-conformist himself in his whole attitude towards life he was always support-

ive of people with new, creative ideas in an attempt to change the world. In particular, he generously helped young, emerging scientists with their – sometimes odd – ideas.

We wish him all the best for many more years of a healthy, enjoyable future.

Received: January 23, 2004

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