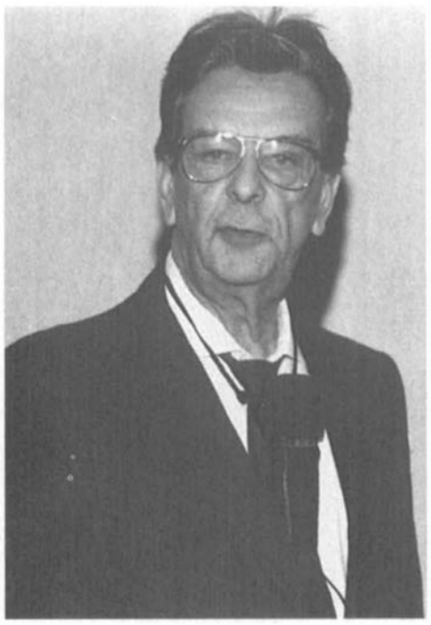
CHIMIA 47 (1993) Nr. 5 (Mai)

Die Gretchen-Frage



R. H.

Duilio Arigoni, Laboratorium für Organische Chemie, ETH-Zürich, Switzerland

Im Anschluss an kurze philologische Kommentare zum Worte 'hommage' und zum Eigennamen '*Albert*' reminisziert der Autor, nicht ohne eine gewisse Wehmut, über seine ersten Begegnungen mit dem Gefeierten und ganz allgemein über 'die guten alten Zeiten'. Texte von *Albert Eschenmoser*, welche sich über vier Jahrzehnte erstrecken, werden perspektivisch verwendet zur Erläuterung seiner Einstellung zum Problem der Biosynthese und später der präbiotischen Chemie ebenso wie zur zentralen Rolle, die in diesem Zusammenhang der organischen Chemie zukommt. Als mögliche Antwort für die sich daraus aufdrängende, im Titel umschriebene Frage dient ein Zitat des Pianisten *Alfred Brendel*, wonach 'je genauer das Wissen, desto grösser das Staunen'. Persönlich gefärbte Erinnerungen und strategisch ausgesuchte Bilder sollen belegen, dass, obwohl es nicht immer einfach war, über mehr als 40 Jahre neben ihm zu bestehen, doch jede Minute dieser kollegialen und freundschaftlichen Beziehung als einmalige Bereicherung empfunden wird.

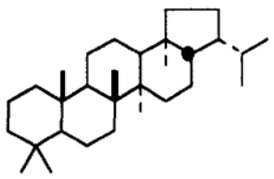
(Abstract by the author)

Cholesterol: the End of the Road in Membrane Construction

R. H.

Guy Ourisson, Laboratoire de Chimie des Substances Naturelles, associé au CNRS, Centre de Neurochimie, Université Louis Pasteur, Strasbourg, France

The study of the *exact* molecular structure of the organic constituents contained in sediments (clays, coals, shales, limestones, soils, petroleums, of any age...) has allowed us to isolate several hundreds of 'molecular fossils', among which derivatives of hopane are remarkable by their *ubiquity*. The Geohopanoids are easily the most abundant natural products on Earth.



Hopane

They have been found to derive from Biohopanoids, a novel family of widespread bacterial lipids that we discovered *after* we had found their fossils. This is one of the many indications that the major constituents of petroleums (and other organic sedimentary matter) are residues of bacteria, and do not reflect directly the composition of the initial organisms.

Biohopanoids, a large family of triterpenes often C–C linked to a sugar-like portion, have in particular one essential function in microorganisms: they are *cholesterol surrogates*, reinforcing phospholipid membranes.

Many other sedimentary molecular fossils reflect the structures of other types of polyterpenes, previously not recognized as bacterial membrane components and reinforcers. We have tested many of them and found that they can indeed reinforce membranes like cholesterol.

We have thus come to the inescapable conclusion that in *all* living organisms, polyterpenes are associated in an essential manner with biomembranes. This appears to be their universal role, the other ones (scents, photoprotection, hormones, vitamins, *etc.*) being subsidiary.

This has led us to try to recognize an evolutionary sequence among all these structures, and to search for the 'most primitive' substances able to form biomembranes. Evidence will be presented, that di-polyterpenyl phosphates may be suitable candidates for this role, and that the successive recruitment of new enzymatic reactions, one at a time, is enough to lead finally to cholesterol through a reasonable phylogenetic series.

The work on Geohopanoids has been inititiated and is being pursued independently in a vast programme of Organic Geochemistry by Dr. *Pierre Albrecht* (Strasbourg). The work on Biohopanoids has been initiated and is being pursued independently by Prof. *Michel Rohmer* (Mulhouse). The work on membrane evolution is being pursued with the direct help of Prof. *Yoichi Nakatani* (Strasbourg).

(Abstract by the author)