

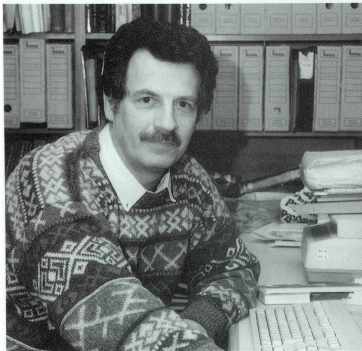
# Paleobotany

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Cenozoic paleobotany, palynology and paleoecology, comparative anatomy of living and fossil plants, actuo-paleobotany, plant taphonomy, sedimentology, dendrochronology, paleoclimatology

In collaboration with: Dr. Reinhard Zetter (Cenozoic palynology), Dr. Christa-Charlotte Hofmann (plant taphonomy, basin analysis), Dr. Barbara Meller (Tertiary carpology), Dr. Otto Chichocki (xylotomy, dendrochronology)



### Research

Paleobotany is a multidisciplinary subject, being at the interface between Botany and Geology. This explains why I myself first studied Geology at St. Andrews University in Scotland and then went on to get a training in plant systematics at the University of Liverpool ( England ). Only then was I ripe to tackle paleobotany. Because I was interested in the evolution of fossil plants in more recent geological time, I left Great Britain to study in

Utrecht (The Netherlands). My work there involved the collecting and description of plant-remains from clay which had been deposited in an ox-bow lake some 15 million years prior to my arrival.

To this day it still gives me a kick to cleave sediment with a knife or the blow of a hammer and find some exquisitely preserved leaves, flowers or fruits blinking back at you. If they are well-preserved, it is not only possible to describe their superficial form, but examine their anatomy as well. Thus one may find one's self looking down a microscope at the stomata of a leaf which has long since stopped photosynthesizing or at the complex geometry of a pollen grain that once fertilized a flower. Armed with information on the fine-structure of different plant parts, it is possible to identify the fossils more accurately. Although these micro-morphological features are often relevant to plant systematics, comparatively little work has been done on this by the botanical community. Thus any paleobotanist interested in flowering plant fossils has to build up his own collection of comparative material. While this entails a not inconsiderable amount of work, the rewards are correspondingly great. In this way it is possible to trace evolution through to the present-day.

Many of the plants we find fossil in the Tertiary of Europe still survive in southern and western China. This is related to the Ice Ages which wiped out large tracts of the vegetation in Europe north of the Alps in the last two million years and the relatively mild humid climate still to be found in those areas where they survive. Because they are rooted to the substrate, plants can only survive if they are adapted to the weather conditions throughout the year. For individuals there can be no question of

migration to avoid harsh conditions. Thus knowledge of a plant's present-day habitat might be expected to be useful in the interpretation of past climates. Just how far one can go in this respect is dependent on the extent to which our fossils present an accurate picture of past vegetation.

Extrapolating back to the plant communities from the fossil assemblages is not an easy task and can only be unravelled with a certain degree of confidence if something is known of the processes to which the plant material was likely to have been subjected *en route*. In order to gain an insight into the factors involved, we have undertaken experiments on the strength and flotation power of plant material and made direct observations on the fate of plant detritus in the field. This research has taken us to eastern Asia, southeastern U.S.A. and Venezuela. In this respect we are following in a long-established Viennese tradition for actuo paleontology.

## Teaching

In our teaching we try to pass on to the students some of the excitement we ourselves feel about our subject. In the introductory lectures the path taken by detritus on its way to become fossilized is discussed, so that the students learn to look behind the scenes at the source vegetation. In classes for more advanced students, this knowledge is applied in the interpretation of specific fossiliferous localities. The different techniques required to extract a maximum of information from our plant fossils are taught in the paleobotanical and palynological practicals. This knowledge is complemented by field-work and excursions to interesting localities.

## International Cooperations

Considering the intimate link between our Tertiary fossils and the present-day flora of China, we have established close ties with various institutes in the People's Republic.

## Selected References

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