

FORAMINIFERA FROM THE CRETACEOUS OF SOUTHERN LIMBURG, NETHERLANDS, XXVII.

ON *KARRERIA FALLAX* RZEHAŁ.

by J. HOFKER

In 1948 Brotzen has given an account on *Karrerria fallax* Rzeħak (Sver. geol. Unders., Ser. C, No. 493) and suggested that this species might have evolved from *Cibicides beaumontianus* from the Upper Cretaceous.

A close study of typical *Karrerria*, however, made it clear that the species cannot be closely allied to *Cibicides beaumontianus*, since the latter species is a calcareous, though granular, species with pores in the test, whereas *Karrerria* lacks any traces of real pores and is throughout agglutinated. The walls of *Karrerria* are in most cases observed thin, and have been agglutinated by very fine calcareous grains with much calcareous cement between.

Brotzen could study only *Karrerria* from the Upper Danian and early Paleocene and found that the aperture is formed by septal foramina which, in the rectilinear endstage, may become areal, often provided with a short tooth. These rectilinear endstages are common in the Danian of Sweden, as the author can emphasize.

The thin wall very easily breaks down when preparing rocks with the usual methods. But in well-preserved samples, especially those gathered in holes and hollow flints, when decanting the material, one often finds large quantities of *Karrerria fallax* in the Lower and Upper Md, of the Maestrichtian Chalk Tuff, in the Lowest Paleocene, in the Tuffeau de Ciply of Southern Belgium and of Holland. In this way the author could study more primitive forms than Brotzen had.

In the primitive stages of *Karrerria fallax* from the Lower Md, the aperture consists of a narrow slit with one or two more visible openings, or a sutural opening with an irregular tooth over part of it. Here the larger opening always is situated on the more ventral side, near to the periphery. All tests are rounded, with inflated chambers, a rounded periphery, and at the ventral side only the chambers of the last formed whorl visible, on the dorsal side also some of the more central (initial) chambers. The colour of the test is always dull-white or slightly yellowish, not transparent.

In the Lowest Paleocene, the dorsal side becomes more or less flattened and must be the attached side, since that side often shows irregularities due to the attaching on a rounded or irregular surface. The aperture has become more rounded, is found sutural to the more bulky ventral non-attached side, and in more outgrown specimens becomes areal and in some cases splits into some irregular openings. Specimens with a series of rectilinear chambers could not be observed.

In the somewhat younger Paleocene and the overlying Tuffeau de Ciply, the species is found in quite the same development, with rounded sutural or round areal apertures, and always with flattened or irregularly shaped dorsal (spiral) side. Brotzen believes that the species found in the Paleocene of Belgium (Tuffeau de Ciply?) is a somewhat aberrant species (p. 115, "a new species, which has been found in the Paleocene of Belgium"). Comparing the many specimens from the Chalk Tuff of Maestricht, the Lower Paleocene of Southern Limburg, and the Tuffeau de Ciply from Belgium and Holland, I found that the specimens are slightly larger than those from the Paleocene or Danian of Sweden and Denmark, but otherwise are similar, but for the fact that never rectilinear chambers could be observed, though tendency to become rectilinear is present.

Karrerria is known only from the Danian, the Paleocene and the Eocene (Cuba). The latter species has been used for genotype of *Stichocibicides* and may be another form. *Stichocibicides*, however, is finely perforate, so it cannot belong, as Brotzen believes, to *Karrerria*. It was found for the first time at Bruderdorf near Vienna (Rzeħak) in layers which Glaessner believes to be of Cretaceous age; but Brotzen relates them to Danian.

This once again is a strong indication that at least the Md of the Maestrichtian chalk tuff is not Cretaceous, but in age already Danian. In Sweden it occurs in the Danian and the Paleocene.

The taxonomic place of *Karrerria* cannot be in the vicinity of *Cibicides*; the agglutinated wall (though only consisting of chalk-particles), the more or less trochoidal arrangement of the chambers, the originally sutural aperture, all these characters point to the *Trochamminidae*.

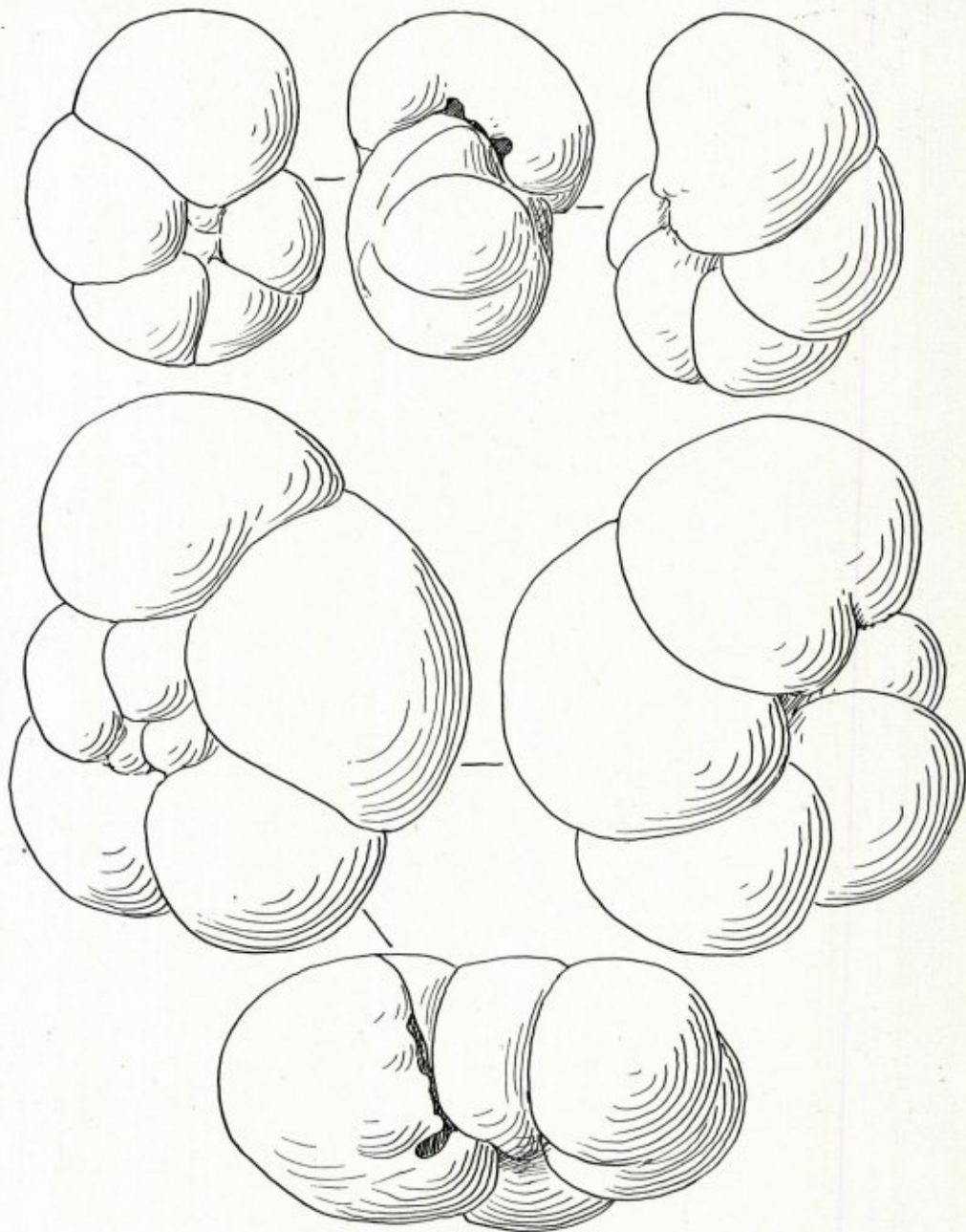


Fig. 1. Two specimens of the not attached primitive form of *Karrereria fallax* from filling of holes in the Lower Md, 3 m above the base of the quarry Curfs, near Houthem. $\times 85$.

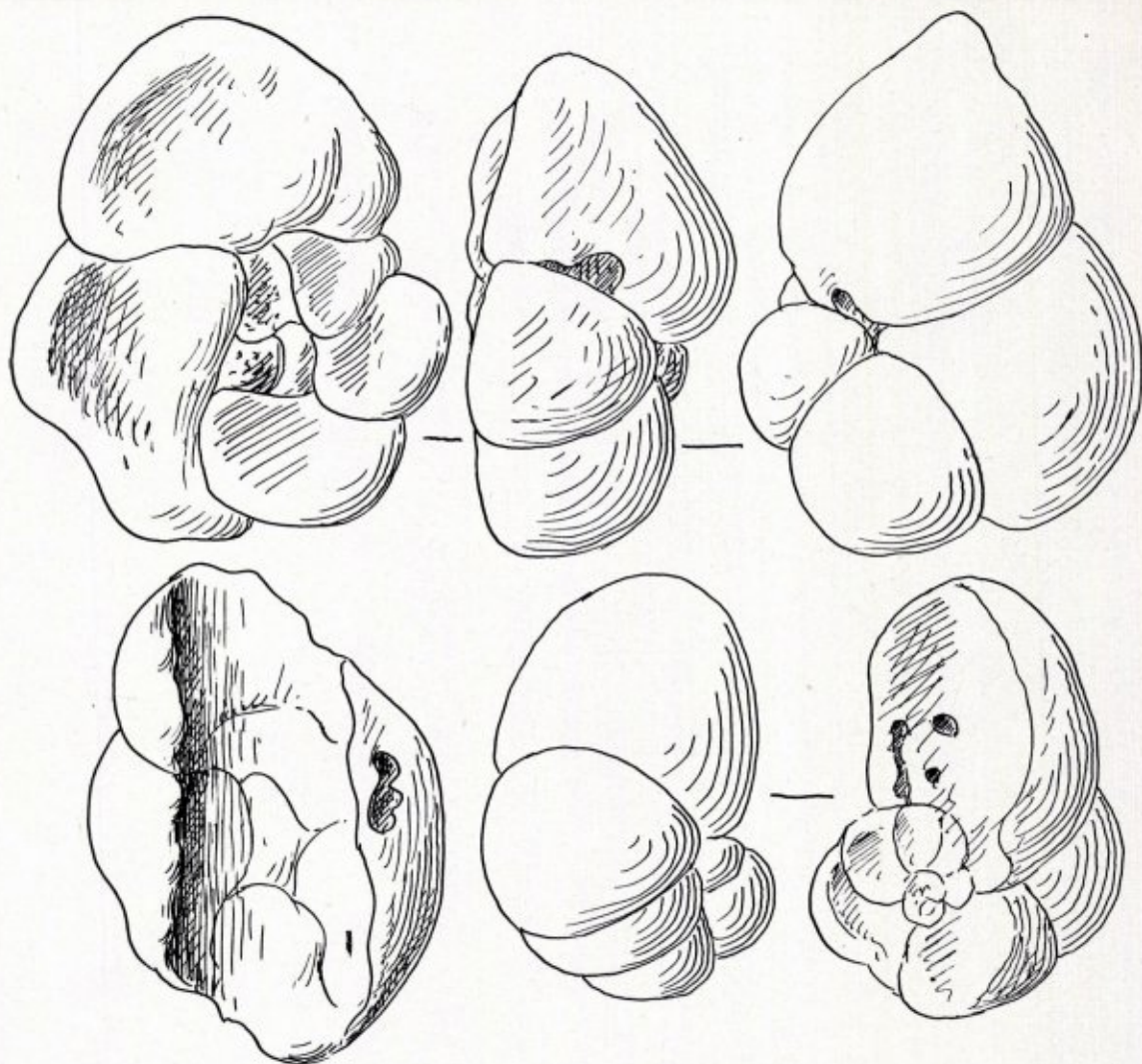


Fig. 2. *Karrereria fallax* from the Lower Paleocene, quarry Curfs, near Houthem, fillings of the hard ground between Md and Lower Paleocene. Upper row: one specimen with flattened dorsal side, lower row: first a specimen from the dorsal side, obviously having been attached to a rounded plant stem, with areal aperture; then a specimen from ventral and flattened dorsal sides, with multiple areal aperture. $\times 45$.