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THE SPECIES RELATIONSHIPS AND STRATIGRAPHIC DISTRIBUTION OF SOUTHERN AFRICAN UPPER CRETACEOUS EPISTOMINA

By Yvor H. Smitter

Abstract

Briefly set forth are the phylogenetic inter-relationship of the various species of the foraminiferal genus *Epistomina* occurring in the upper Cretaceous of Southern Africa. The known stratigraphic ranges of the forms as they occur in Southern Africa are presented.

One of the most striking features in Southern Africa of many upper Cretaceous microfossil assemblages is the profusion of Foraminifera belonging to the genus *Epistomina*. With this abundance of individuals of *Epistomina*, there is associated an interesting diversity of speciation within the genus and excellent opportunity is afforded, consequently, for the study of species interrelationships. In addition to the purely phylogenetic considerations of such a study, however, an appreciation of the development of the various forms of *Epistomina* with regard to their stratigraphic distribution is of further value in providing supplemental means for the indexing or dating of Southern African upper Cretaceous sediments.

Of the upper Cretaceous group under consideration, the unornamented form of *E. caracolla* (Fig. 20(a)) is the first of the Epistomina to appear in the column. The form occurs in what are probably Santonian beds at Umkwelane Hill and Umsinene and is found thereafter in Campanian, Maestrichtian and Montian material. Somewhat higher in the section, *E. caracolla* evidences, in many specimens, a tendency to develop irregular wall thickenings of both dorsal and ventral surfaces (b). This expression of the species has a known stratigraphic range extending from the Campanian again through to Montian. Both the unornamented and ornamented *E. caracolla* have been recorded from Europe and North America, although the vertical occurrences of the two forms have not been differentiated in these areas.

In the uppermost Campanian or possibly lower Maestrichtian horizons of the Umzamba and Zululand strata, *E. zuluensis* (c) and *E. pondensis* (d, e) appear. *E. zuluensis* it seems is restricted in range to upper Campanian and Maestrichtian whereas *E. pondensis* ranges through to Montian. *E. pondensis* manifests a considerable variation in degree of wall ornamentation and, as might be expected, expressions of the species showing a lesser amount of wall development occur in the Campanian and lower portion of the Maestrichtian. Highly reticulated forms, on

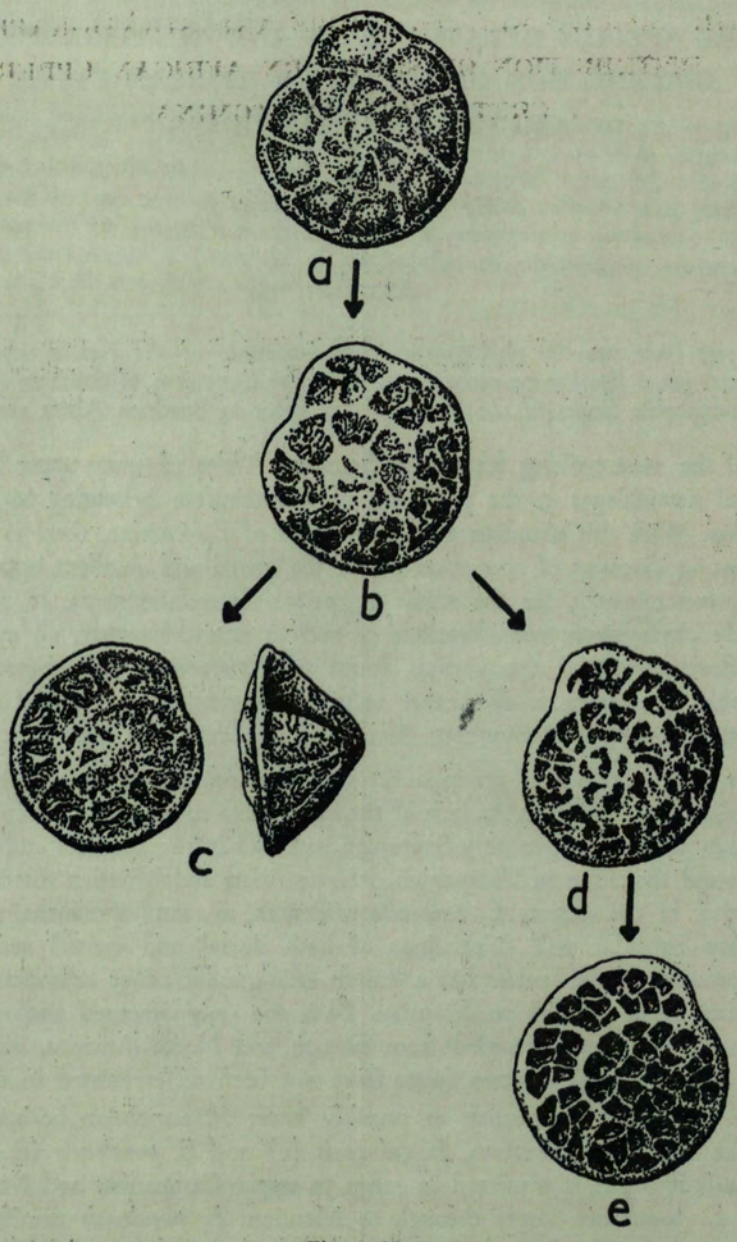


Figure 20

the other hand, seem to be characteristic of the later upper Maestrichtian and Montian.

It is interesting to note that the three species discussed are all very closely interrelated and, although the accompanying figures indicate more or less arbitrarily the various stages in the development of these *Epistomina,* the many intergradations in the group can only be appreciated on inspecting a complete range of study material. It is quite evident that in the group the principal direction of development involves the growth and specialization of the wall structure of the test. Commencing with *E. caracolla,* a progressive development of the ornamentation of the test wall leads to a heightening and increased reticulation of these surface structures, presumably terminating in development with the rather bizarre *E. pondensis. E. zuluensis* also evidences the irregular thickenings of the wall and is unquestionably an outgrowth of *E. caracolla,* but the species is set apart from the others in having a flattened dorsal surface and highly convex ventral surface.

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