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TAXONOMIC SIGNIFICANCE OF EXTERNAL AND INTERNAL FEATURES IN *AKTINOCYCLINA* GUEMBEL 1868 (FORAMINIFERA)

BY

Paul BRÖNNIMANN

In a recent paper SAMANTA (1963, p. 658-664) described *Discocyclina* (*Discocyclina*) *assamica* n. sp. from the Upper Eocene Kopili formation, Garo Hills, southwestern Assam, India. The test of this discocyclinid is very thin, wafer-like, usually somewhat undulating and always with a small, well-defined umbo. As indicated by the ratios of the diameters of umbo and test of the 4 specimens measured by SAMANTA (1963, p. 660), 0.076, 0.122, 0.076 and 0.092, the umbo is throughout very small in respect to the diameter of the test. Further, the annular wall of each equatorial chamber (= outer lining of REISS' terminology (1963)) is marked on the surface of the test by concentric rings of papillae somewhat larger than those formed over the lumina proper of the equatorial chamberlets. The arrangement of the pillars clearly reflects an internal structure. It has been noticed also in thin sections of other thin discocyclinids and does not seem to be a feature characteristic of *D. (D.) assamica* alone. Reference is made to *Discocyclina* (*Proporocyclina*) *mirandana* HODSON, 1926 (= *D. (P.) pertenuis* BRÖNNIMANN, 1942), in which the annular arrangement of larger papillae and the occurrence over the radial septa (= inner lining of REISS' terminology (1963)) of smaller papillae is virtually the same as in *D. (D.) assamica* (BRÖNNIMANN, 1942, pl. 2, fig. 1, and text-fig. 7 on p. 10). Moreover, the arrangement of papillae in *D. (D.) assamica* is identical with that in *Discocyclina* (*Aktinocyclina*) *radians* (d'ARCHIAC) (BRÖNNIMANN, 1945, text-fig. 13 on p. 572). Apart from papillae and umbo, the surface of *D. (D.) assamica* does not show any other ornaments, in particular no radiating ridges.

The internal features of *D. (D.) assamica*, as exhibited by both the horizontal and vertical sections, correspond closely with those of *D. (A.) radians*, described by BRÖNNIMANN (1945), by VAUGHAN (1945) and by VAUGHAN and COLE (1948). In *D. (D.) assamica* as well as in *D. (A.) radians* the radial walls or radial septa of the chamberlets of adjoining annular chambers are usually aligned. This structure,

characteristic of *Aktinocyclus*, is illustrated by SAMANTA's photograph of a portion of the equatorial layer (1963, fig. 6, pl. 94). In the upper part of this photograph it can moreover be seen that 2 rows of radially aligned equatorial chamberlets are being replaced peripherally by 4 more narrow rows of radially aligned equatorial chamberlets. This peripheral intercalation of additional radial rows of equatorial chamberlets, usually 2 for one, compensates for the increase in area of the growing discocyclinid. Also this feature seems to be characteristic of *Aktinocyclus*. It has been previously described and illustrated by BRONNIMANN (1945, pl. XX, fig. 6 and fig. 6 on p. 566). Apparently it does not occur in *Discocyclina* (*Discocyclina*) where the partitions between chamberlets of adjoining annular chambers are normally not aligned.

As SAMANTA (1963, p. 661) correctly pointed out, "...this Assam form is so closely similar to *Aktinocyclus radians* (d'ARCHIAC), described and figured by BRONNIMANN (1945), that although these two forms can easily be distinguished from each other by external characters [lack of thin radiating ridges in *D. (D.) assamica*], they are identical in the characters of the equatorial chamber layer. If only equatorial sections are available, therefore, it is not possible to separate them." However, Samanta's final statement "...in the case of these two closely related subgenera, *Discocyclina* s. s. and *Aktinocyclus*, the arrangement of equatorial chambers¹ in adjacent annuli has no supraspecific taxonomic value." cannot be accepted. As has been demonstrated by numerous investigations of foraminiferal morphology, external features such as ribs, papillae, spines etc. are as a rule subordinate in taxonomic significance to internal structures of the test. This is in particular true for orbitoidal Foraminifera in the widest sense. In the case of *A. radians* it has been demonstrated that the thin radial ridges ornamenting the surface of the test are formed by lateral chambers² only, a group of structural elements definitely more plastic than and therefore subordinate in taxonomic value to the structural elements of the equatorial layer. Consequently, the alignment of the radial walls of equatorial chamberlets of adjacent equatorial chambers is considered to be of higher taxonomic significance than the external features of the lateral layers, including radial ridges and pillars. SAMANTA's new discocyclinid, therefore, should be assigned to *Aktinocyclus* and not to *Discocyclina*.

Although the surface of the specimen of *Aktinocyclus assamica* (SAMANTA) illustrated by fig. 1, pl. 94 (SAMANTA, 1963) does not show any signs of radiating ridges, their occurrence cannot be ruled out because the peripheral portion of the vertical section (SAMANTA, 1963, pl. 94, fig. 3) shows delicate ridges structurally comparable with those developed by lateral chambers in typical *A. radians* (BRONNIMANN, 1945, fig. 10f on p. 571, pl. XX, fig. 7). Illustrations and descriptions of the

¹ It has been conclusively shown that the neanic equatorial layer of discocyclinids is composed of annular chambers which are subdivided through corrugation of the inner lining into chamberlets.

² The term chamberlet is here not accepted for the lumina of the lateral layers (REISS, 1963).

distribution of radial ridges of *A. radians* (BRÖNNIMANN, 1945, text-fig. 14b on p. 574; BIEDA, 1963, p. 212) suggest that these may be added on the marginal portion of the test. *A. assamica* (Samanta) is possibly an ecologic variant of *A. radians* (d'Archiac) and, should this be the case, be regarded as a junior synonym of *A. radians* (d'Archiac).

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