

PALEONTOLOGY

COMPARISON OF *LEPIDOCYCLINA ZEIJLMANSI* TAN FROM BORNEO WITH *LEPIDOCYCLINA BIRMANICA* RAO FROM BURMAH

BY

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Abstract: The foraminiferal species *Lepidocyclus zeijlmani* and *L. birmanica* are studied. They are found to be good, distinct, though closely related, species.

In 1936 TAN described a new species of *Lepidocyclus* from the Eocene of northern central Borneo. This form, called *L. zeijlmani*, was remarkable in being the first representative of the subgenus *Polylepidina* in the East Indies, and in being the first instance of *Lepidocyclus* occurring in the Eocene of these regions.

In 1942 RAO also described a new form, *L. (Polylepidina) birmanica*, from the Upper Eocene of the Yaw Stage in Burmah. As RAO was not aware of TAN's publication, and only compared his form with species from the New World, a comparison of both species mentioned was indicated.

Both the "Hoofd van de Dienst van de Mijnbouw" at Bandoeng and the Director of the Geological Survey of India were so kind to put relevant material at my disposal, for which I wish to express my sincerest gratitude.

The Borneo material consists of rock specimens, and the fossils can only be studied in oblique sections. In addition however to the excellent figures of TAN's publication, this proved to be quite sufficient. From Calcutta I received a sample of detached tests of *L. birmanica*. The Yaw Stage material is not so well preserved as that from Borneo, which will be evident to anyone, comparing the figures of TAN and RAO. I have nothing to add to the description of *L. zeijlmani*, but wish to make two remarks on *L. birmanica*. These regard the pillars and the structure of the embryonal apparatus of the megalospheric form.

RAO describes from the axial section of *L. birmanica*: "lateral chambers in regular tiers between narrow pillars, which appear at the surface as granules". The lateral chambers sometimes are arranged in regular tiers, but often they are not. Moreover pillars are absent in my specimen. At low magnification pillars seem to be present locally, but in reality this impression is formed by the slight overlap of floors and roofs of alternating chambers in adjacent tiers (fig. 2). Pillars may of course be present in other specimen but they are not so prevalent as is suggested in the original description.

As to the embryonal apparatus, this is described by RAO as consisting of four chambers, arranged in an intricate pattern, with the first chamber the largest. This is not a normal type of embryonal apparatus for *Polylepidina*, and it seems probable that nepionic chambers have been included in the description (cf. TAN, 1939). Horizontal sections are difficult to study, as the tests are partly recrystallised, and as the aequatorial layer, together with the embryonal chambers, is very low. Best results were obtained by studying a rather thick section under the binocular microscope. Fig. 1 gives a camera lucida drawing of the centre of an aequatorial section, made in this way. The embryonal apparatus

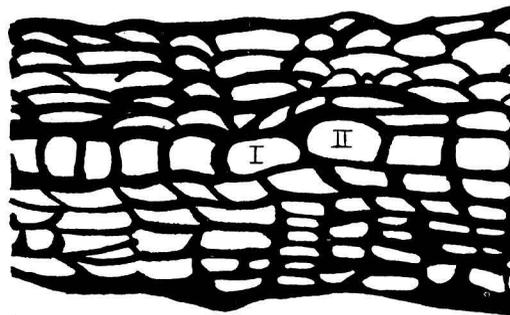
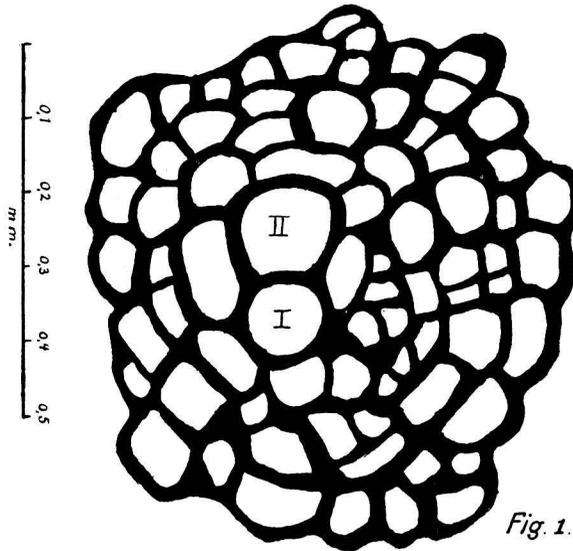


Fig 2.

Figs. 1, 2. *Lepidocyclina (Polylepidina) birmanica* RAO, $\times 50$. I, II = first and second embryonal chamber. Geol. Inst. Amst., coll. nr. Re 7127, Re. 7129.

Fig. 1. Horizontal section of central part of aequatorial layer, showing the two-chambered nucleoconch, with adauxillary chambers and nepionic spirals.

Fig. 2. Vertical section of central part of test, showing lateral chambers without pillars and low aequatorial chambers and nucleoconch.

consists of two chambers only. These are of small size, and of nephro-lepidine type. There are two adauxillary chambers, from which four short nepionic spirals start, completely encircling the embryonal chambers. As one of the adauxillary chambers is slightly larger than the other, this type of embryonal apparatus comes under TAN's subdivision of: "Forms with an asymmetric quadriserial nepiont" (TAN, 1939, p. 62). *L. zeijlmansi* belongs to the same group.

In comparing the two species, we find:

<i>L. zeijlmansi</i> :	<i>L. birmanica</i> :
with umbo	without umbo
rather robust form. diameter-thickness = 1 : 3 to 1 : 4.	much thinner, waferlike. diameter-thickness = 1 : 12.
strong pillars in umbonal region	pillars absent or rare, always thin
Moreover the aequatorial chambers in <i>L. zeijlmansi</i> are arranged somewhat more regularly than in <i>L. birmanica</i> (compare TAN, 1936, fig. 10 and RAO, 1942, fig. 1).	

These differences are enough to separate the two forms specifically.

Although there is thus no conspecificity in the genus *Lepidocyclina* between the Eocene of Borneo and of Burmah, the two forms are very narrowly related. As stated above they belong to the same group within the subgenus *Polylepidina*, characterised by an asymmetrical quadriserial nepiont. This is the highest evolutionary step attained by this subgenus, showing the shortest nepionic spirals, or in other words, the shortest span between embryonal and adult stages. *Polylepidina* as a whole being a subgenus of short duration and rapid evolution, the different pylogenetic stages within the subgenus are of necessity closely related.

The conclusion as to the narrow relationship of a *Polylepidina* from Burmah to another species from Borneo is in accordance with older views, lastly expressed by BEETS (1949), as to the faunal resemblance of Burmah and the East Indies during the Eocene.

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