

# Some radiolarians from Dengkil, Selangor

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**Abstract:** An assemblage of radiolarians was discovered from a chert sequence exposed in Dengkil, Selangor. Three taxa were identified; *Astroentactinia* sp., *Entactinosphaera palimbola* Foreman, and *Duplexia?* *parviperforata* Won. This assemblage indicates an Early Carboniferous age.

**Abstrak:** Suatu himpunan radiolaria telah ditemui daripada satu jujukan rijang yang tersingkap di Dengkil, Selangor. Tiga taksa telah dapat dicamkan; *Astroentactinia* sp., *Entactinosphaera palimbola* Foreman and *Duplexia?* *parviperforata* Won. Himpunan tersebut telah menunjukkan usia Karbon Awal.

## INTRODUCTION

Dengkil is located in the vicinity of Putra Jaya township. It is undergoing rapid development. As a result of progressive development, many low hills were cut and new outcrops are exposed. New outcrops provide more information about the rocks in the area which was previously not known. Recently, we conducted a fieldwork to look for siliceous deposits in the area and we discovered an outcrop of very thin chert layers.

The aim of this paper is to identify the radiolarian faunas and to use them for determining the age of the rock sequence in the area.

## GEOLOGICAL DESCRIPTION

A line of northwest trending small low hills is situated southwest of Dengkil. One of the hills located on northwest of Bukit Tampoi, about one and a half km from Dengkil along the road to Banting (Fig. 1) was studied in detail. This hill is an abandoned earth quarry and is composed of a highly weathered outcrop of sandstone, mudstone and cherts.

The outcrop exhibits two lithofacies i.e. mudstone with minor chert facies at the bottom and a massive sandstone facies at the top. The boundary of the two lithofacies is sharp. These rocks are slightly metamorphosed and are informally called the Dengkil Bed. Its relationship to the Kenny Hill Formation is unknown.

The mudstone with minor chert facies comprises foliated mudstone with thin chert sequence. The chert sequence consists of alternating layers of chert and siliceous mudstone. The thickness of the chert sequence varies from 1 to 2 m. The thickness of individual chert layer varies from 3 to 10 cm. Some chert layers are broken into lenticles, which are parallel to the general bedding of the sequence (Fig. 2). The chert is hard and dark grey in colour. Every chert sequence interbeds with two to three metre thick foliated greenish grey mudstone. The whole sequence of chert and foliated mudstone is capped by

massive sandstone (Figs. 3 and 4). The whole sequence exhibits an open gentle warping with axes plunging gently ( $18^\circ$ ) towards ENE ( $65^\circ$ E).

The thickness of the massive sandstone is from one to several metre. Shear zone is indicated by lensoid form of sandstone and folded sandstone within foliated greenish grey mudstone or perhaps mylonite. The thickness of the lensoid and folded sandstone is less than 1 m. The sandstones are devoid of any sedimentary structure. Generally, the shear zones strike WNW (west northwest) to NW (northwest) and dip gentle to moderately steep ( $10^\circ$  to  $48^\circ$ ) towards northeast (NE).

## RADIOLARIANS AND GEOLOGICAL AGE

More than ten samples were collected from the chert sequence, only two samples (D1 and D2) yielded moderately well preserved radiolarians. Most of them have undergone

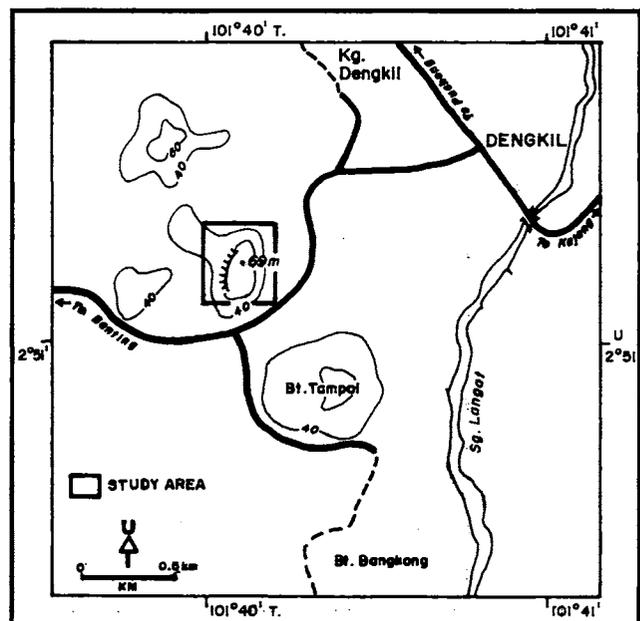


Figure 1. Map of Dengkil showing locality of the study area.

recrystallisation due to metamorphism. The radiolarians belong to Spumellarian type. Three taxa were recognized:

- Astroentactinia* sp.
- Entactinosphaera palimbola* Foreman
- Duplexia? parviporata* Won

These radiolarians indicate an Early Carboniferous age. Stratigraphically the position of the chert sequence within the Dengkil Bed is not known. In Peninsular Malaysia, radiolarians of Early Carboniferous age was reported from the chert of the Kubang Pasu Formation.

### DISCUSSION

The Kenny Hill Formation comprises of a sequence of clastic sedimentary rocks occurring in the Kuala Lumpur area and further south, into the Sepang area. The age of the formation is not properly defined due to the absence of fossils in most part of the formation. The presence of an ammonoid (*Agathiceras* sp.) in the formation at Salak, indicated that the age of the Kenny Hill Formation is at least in part considered to be Permian (Abdullah Sani Hashim, 1985).

The sequence of sandstone and mudstone at Dengkil is similar to the clastic sequence in the Kenny Hill Formation. There has been no report of the occurrence of siliceous

sequence in the Kenny Hill Formation. If the extension of the Kenny Hill Formation to the Sepang area is accepted, the occurrence of the siliceous sequence at Dengkil is important. The Dengkil Beds yielded radiolarians, which indicate that the Kenny Hill Formation is in part of Early Carboniferous age. The rock association of chert and mudstone may indicate the paleogeography and paleoenvironment of the depositional basin.

Early Carboniferous radiolarian cherts are common in Peninsular Malaysia. Carboniferous chert has been recorded from the Langkap Chert, Negeri Sembilan (Basir Jasin and Che Aziz Ali, 1997), the Kubang Pasu Formation, Kedah (Basir Jasin, 1995; Basir Jasin and Zaiton Harun, 2001), the Karak Formation, the Gombak Chert and Raub-Bentong



Figure 2. Disrupted beds of chert layers in foliated mudstone (hammer as scale).

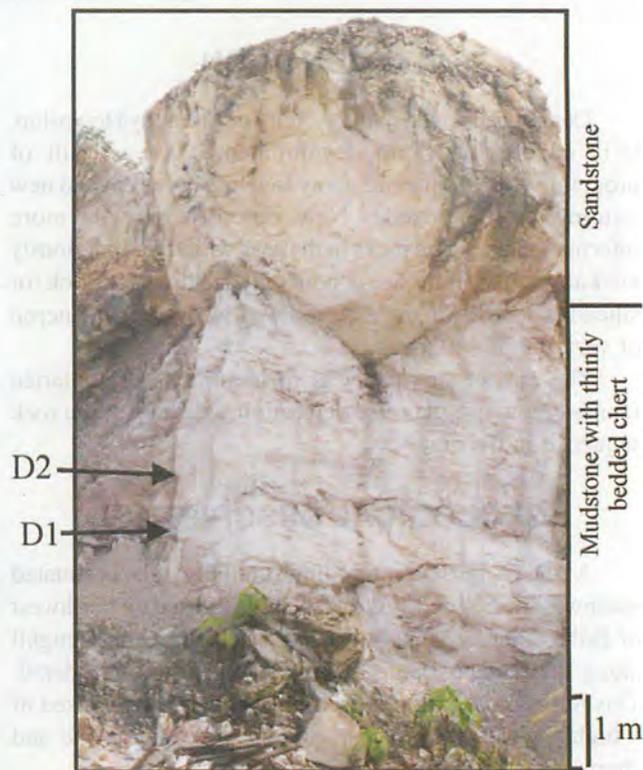


Figure 4. Stratigraphic section of the study area showing the sample locations.

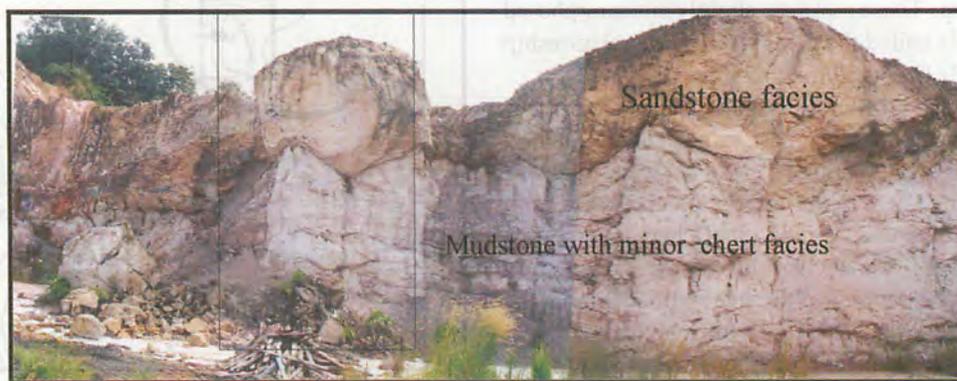


Figure 3. A geological section showing mudstone with minor chert facies and massive sandstone facies. The section is approximately 30 m wide.

Suture zone (Spiller, 1996). The occurrence of chert reflects the high radiolarian productivity during the Early Carboniferous.

The Carboniferous chert association in Peninsular Malaysia is very similar. The chert is associated with siliceous mudstone or shale. This association is known as chert-shale association (Karl, 1989) or continental margin chert association (Jones and Murchey, 1986). The chert was deposited in a basin close to a continent. The absence of volcanic material suggests that the basin was located on a passive margin. The chert was probably deposited on an older continental basement and not on the oceanic crust.

## CONCLUSION

Radiolaria is very important for age determination of the chert. The occurrence of *Astroentactinia* sp., *Entactinosphaera palimbola* Foreman and *Duplexia? parviperforata* Won indicates an Early Carboniferous age. Early Carboniferous cherts are widespread in Peninsular Malaysia. This indicates that radiolarian productivity was high during that time. The absence of volcanic material in the Early Carboniferous chert bearing rock formations suggests that the chert was likely deposited in a basin located on a passive continental shelf.

The relationship between the rocks exposed in the Dengkil area and the Kenny Hill Formation is not fully understood. The Dengkil Beds which comprises mudstone passes up to thickly bedded massive sandstone is similar to that of the Kubang Pasu Formation. The rock sequence in the Dengkil area is slightly metamorphosed and many radiolarian tests were crystallized.

## TAXONOMIC NOTES

***Entactinosphaera palimbola* Foreman, 1963**  
(Plate 1, figs. 1, 2, 3)

*Entactinosphaera palimbola* Foreman, 1963, p. 277-278, Pl. 2, figs. 7a-e; Pl. 3, figs. 3a-d; Gourmelon 1985, Pl. 2, fig. 4; Gourmelon 1987, p. 52-53, Pl. 4, figs. 7-10; Braun 1990, p. 112-113, Pl. 7, figs. 11,12.

### Remarks

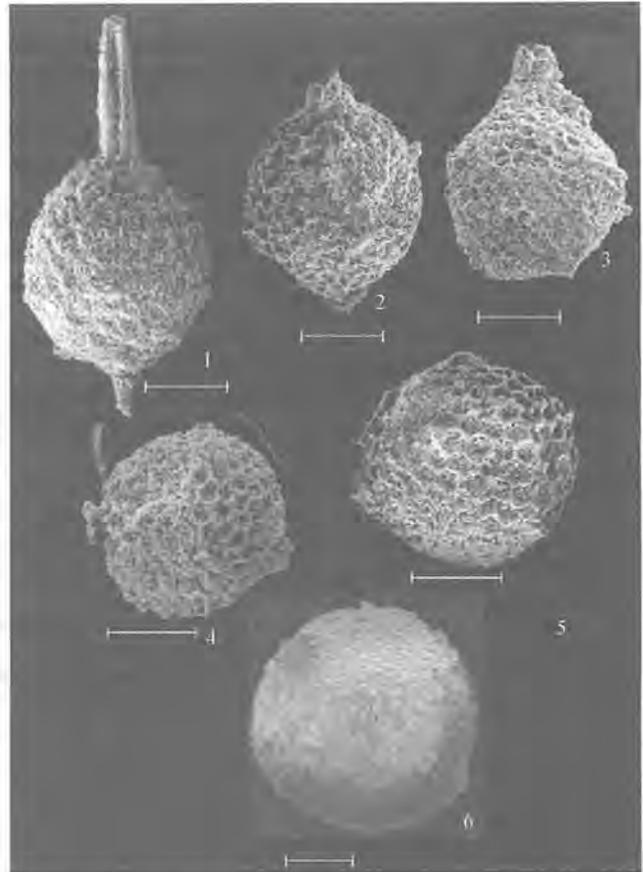
The specimens possess a spherical lattice shell with a relatively large and long spine and several short spines. It has numerous pores and are covered by siliceous matrix. Several fairly well-preserved specimens were retrieved.

### Stratigraphic Range

*Entactinosphaera palimbola* was first described from the Famennian, Late Devonian of Ohio, North America by Foreman (1963). It was also recorded from the Touraisian, Early Carboniferous of France (Gourmelon, 1985, 1987), Germany (Braun, 1990) and Peninsular Malaysia (Basir Jasim and Che Aziz Ali, 1997).

***Duplexia? parviperforata* Won (Plate 1 fig. 6)**

*Duplexia? parviperforata* Won, 1990, p. 134, Pl. 4, figs. 1-6; Won, 1998, p. 236, Pl. 7, figs. 1-3. Basir Jasim and Zaiton Harun, 2001, Pl. 2, fig. 6.



**Plate 1.** SEM photograph of the radiolarians (scale bar 100µm). 1, 2, 3. *Entactinosphaera palimbola* Foreman; 4, 5. *Astroentactinia* sp.; 6. *Duplexia? parviperforata* Won

### Remarks

*Duplexia? parviperforata* Won has a large two-layered spherical shell with very fine pores. It also has very short spines. In the present specimens, the fine pores are covered by matrix and the spines are broken.

### Stratigraphic Distribution

It was first recorded from the Early Carboniferous of Germany (Won, 1990, 1998). Basir Jasim and Zaiton Harun (2001) recorded it from the Early Carboniferous chert of the Kubang Pasu Formation.

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