AN ALGAL-MUD MOUND IN THE TRIASSIC LIMESTONE HILL OF BUKIT KODIANG, KEDAH

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In the quarry of Bt. Kodiang, 5 conformable lithostratigraphic units were observed. They are, in their vertical sequence:

Youngest Unit	1.	12 m of thinly bedded black calcareous mudstone.
	2.	30 m of grey massive limestone
	3.	2 m of maroon intraformational breccia
	4.	20 m of black calcareous mudstone
Oldest Unit	5.	5 m of dolomitic limestone with chert nodules

The boundaries between the units are sharp.

The chert nodules within the dolomitic limestone of Unit 5 vary in size from 1 cm lenses to 30–40 cm long and appear to 'float' within the dolomite. Occasionally, the chert nodules are fractured perpendicular to their long axis and the gaps are filled with the dolomitic limestone.

The black calcareous mudstone Unit 4 consists mainly of micritic, thin shelled bioclasts and grazing trace fossils. This unit grades into maroon coloured intraformational breccia unit of Unit 3 with 0.1 mm to 30 cm size clasts of dolomite, chert and mudstone. There is also an increase in clast-size upsequence.

The grey massive limestone of Unit 2 is composed mainly of a skeletal packstone in the lower part, grading upwards into a coral-algal boundstone. Within the packstone, the constituents were mainly heavily micritized bioclastic clasts of indeminate origin.

The thinly bedded black calcareous mudstone of Unit 1 consists of 2–4 cm beds and are deformed into kink folds.

The dolomitic limestone with chert nodules were deposited in an environment that was favourable for dolomitization, probably in quiet shallow marine waters that were at times exposed to the atmosphere. The deposition of silica probably occurred near the sediment-water interface in which fractures in the chert nodules may be related to dessication processes during or near subaerial exposure.

The black calcareous mudstone signify a very quiet environment with absence of waves or continuous currents. This may either be in very shallow shell waters where lime mud formed in abundance or in deeper offshore waters where lime mud may be brought in from shallower areas. However, the presence of extensive micrite matrix and open-marine benthonic organisms like the thin shelled bivalves and grazing trace fossils suggest a deeper water deposit.

The maroon intraformational breccia is interpreted as having been subjected to gradual subaerial exposure sometime in the Triassic. The maroon colour suggests that deposition took place in an area where there is an excess supply of oxygen or where sedimentation rate is very low, or both. This could suggest a slow emergence of the deep-water black mudstone facies resulting in a subaerial setting.

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The grey massive limestone is considered here to represent a shallow water algal-mud mound facies. The criteria used to determine the depositional environments of these carbonate sediments are based on the general mound shape of the sediment body, the microfacies variations from packstone to boundstone within the body and the association of alga, coral and bryozoans within the sediments.

The algal-mud mound was developed due to the slight build-up caused by the emergence of the calcareous mudstone. Thus, the mound was formed essentially by organic trapping of algae and bryozoans. Bioclastic debris brought down from the relatively higher shelf areas were also trapped on this mound. As the mound 'grew' higher upward in the photic zone, the biotic community were slowly replaced by more encrusting forms of organisms such as corals and large bryozoans. However, eventually, the mound ceased to grow, as seen from the sharp contact with the thin bedded black calcareous mudstone. This was probably due to the sudden sinking of the mound and the subsequent influx of mud from the shelf areas.

Thus, the Kodiang basin was subjected to different bathymetric levels within the Triassic; from shallow marine to deep to shallow and back to deep marine again. This conclusion differs from the interpretation by Gobbett (1973) and de Coo (1974) regarding the Kodiang basin.