



Research Articles

Discovery of Orbitolinids (Foraminifera) at Lebyin, Thazi Township, Myanmar : Its Stratigraphic and Paleogeographic Significance

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Abstract

The purpose of this paper is to present the results of preliminary assessment on the orbitolinids discovered for the first time from an isolated hillock (locally known as Peinyoin Hill) situated at just northwest of Lebyin village (lying on the Thazi - Shwemyaung Rail Road), and from the limestone lenses embedded within a sequence of tuffaceous sandstone, mudstone and conglomerates that is exposed on the west of the Myit-thar Stream. The present preliminary examination reveals that the orbitolinid fauna at the limestone hillock consists of *Paracoskinolina* cf. *sunnilandensis*, *Iragia* sp., and *Simplorbitolina* spp. indicating an early Cretaceous age (probably Aptian-Albian). On the other hand, the limestone lenses exposed on the west of the Myit-thar Stream bear *Iragia thailandensis* [= *Haurania thailandensis* Kemper]. From this faunal evidence and prevailing lithostratigraphic characteristics, it has reached to the final conclusion that these controversial outcrops are no longer needed to be lumped in the Late Paleozoic Lebyin Group or in the Plateau Limestone Group, but must be designated as a southern continuation of the Pan Laung Formation of Jurassic-Cretaceous age.

Keywords: Jurassic-Cretaceous foraminifera, orbitolinids, Myanmar, Pan Laung Formation, Lebyin area

1. Introduction

Lebyin village lying on the Thazi - Shwemyaung Rail Road is situated about twelve miles east of Thazi, Mandalay Division of Myanmar. Geology of the area around Lebyin is very interesting and important since it forms a vital part

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for bridging the regional geologic gap between the northern and southern parts of the western margin of the Shan-Tanintharyi Block. A number of enthusiastic investigations, including Masters' thesis researches, have been carried out in this geologically interesting and complex region.

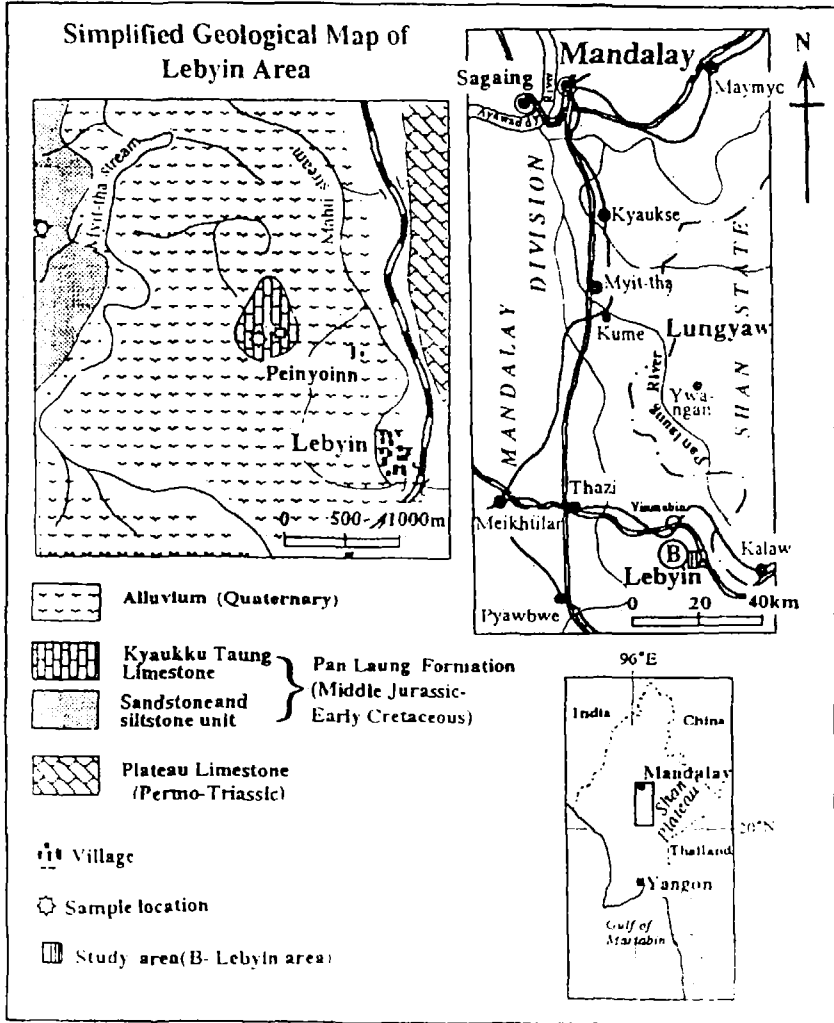


Figure 1. Location and simplified geological map of the Lebyin area.

However, there still remain some controversies on the age assignment of a limestone body that appears as an isolated hillock (locally known as

Peinyoin or Minpone Hill) jutting out from the alluvium northwest of Lebyin village. This limestone was mostly regarded as part of the Permo-Triassic Plateau Limestone, sometimes lumped within the so-called Carboniferous Lebyin Group, and rarely thought likely to be of Mesozoic rock unit.

On the other hand, a sedimentary rock sequence of tuffaceous sandstone, mudstone and conglomerates with occasional limestone bands and lenses exposed along the ridges and gullies, west of the Myit-thar Stream was conventionally placed in the contention of the upper portion of the Lebyin Group. However, there are some significant differences in lithofacies between this rock sequence (representing a shallow marine facies) and the typical Lebyin Group (exhibiting a turbiditic nature). Moreover, due to the lack of reliable faunal evidence, lithostratigraphic allocation and geologic age assignment for this rock sequence is questionable.

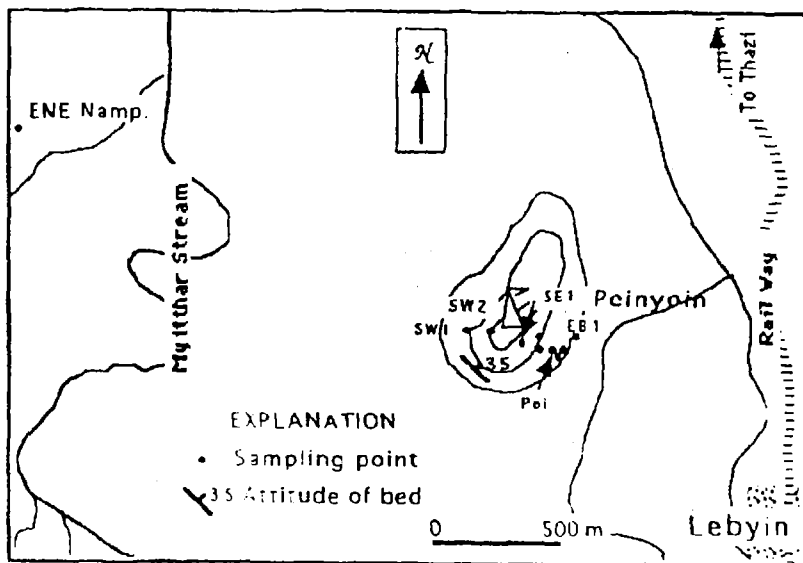


Figure 2. Sketch map showing localities of the samples collected.

2. Field Observation and Paleontologic Assessment

2.1 Lithofacies and microfossil fauna at Peinyoin Hill

Light colored limestones are mainly exposed as the major principle rock type. These are at places intercalated with some reddish or buff-colored sandstones

and conglomerates at the lower part. The rocks apparently dip to the northeast with a moderate dip amount, especially on the southwestern slope of the hill. Lithologically, the limestones at the Peinyoin Hill are very fined-grained, micritic in nature, and petrographically, peletted bioclastic lime mudstone or wackestone, peletted bioclastic wackestone-packstone, peloidal bioclastic grainstone and dolomitic lime mudstone. These limestones are characterized by their virtually massive poorly bedded nature, very fine-grained micritic texture, characteristic cream-white or whitish gray color and presence of intricate network of numerous clear calcite veinlets.

Taxa		Sample	Limestone at Peinyoin Hill								
			SE slope					SW slope			
			SE1	SE2	SE3	Pei	SE4	SE5	EB1	SW1	SW2
FORAMINIFERAS	Orbitolinids	<i>P. cf. sunnilandensis</i>				●					
		<i>Paracoskinolina</i> sp. ind.				●				●	
		<i>Simplorbitolina</i> sp. A				●					●
		<i>Simplorbitolina</i> sp. B				●					
		<i>Iraqia</i> sp. A				●					
		<i>Dicyoconus</i> aff. <i>walnutensis</i>				●					●
	Other Forams	<i>Feurillia</i> sp.				●	●				
		<i>Charentia</i> sp.		●			●	●		●	●
		<i>Praechrysalidina</i> sp.			●						●
		? <i>Ecougella</i> sp.	●								
Algae	<i>Cayeuxia</i> sp.								●	●	
	<i>Cladocoropsis mirabilis</i>							●			
	<i>Polygonella incrustata</i>								●	●	

Table 1. Distribution of microfossils in the limestone samples from the Peinyoin Hill

As a reward for the present investigation, the collected limestone samples from the Peinyoin Hill yielded a microfauna formed of foraminiferans and algae (Table 1) (see also Figure 3 and 4). These are listed as follows:

Orbitolinids: *Paracoskinolina* cf. *sunnilandensis*, *Paracoskinolina* sp. ind., [?=*Lucasella kaempferi* Kemper], *Simplorbitolina* sp. A, *Simplorbitolina* sp. B, *Iraqia* sp. A, (?) *Dicyoconus* aff. *walnutensis*[?=*Lucasella kaempferi*]

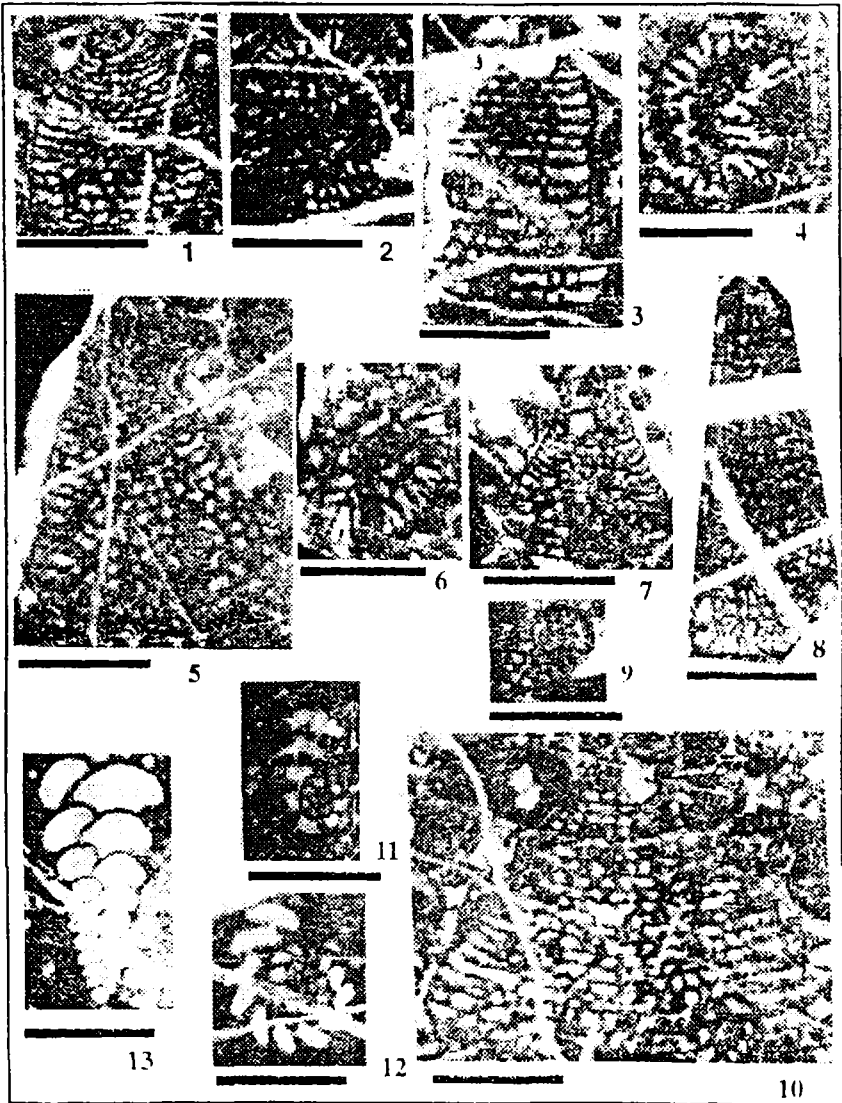


Figure 3. Foraminifera from the Peinyoin Hill, northwest of Lebyin. (Scale bar 0.5mm). 1 - 2 *Paracoskinolina* cf. *sunnilandensis* (Maync). 1, near axial section, 2, basal section (slide no. Pei 4). 3 - 4 *Paracoskinolina* sp. ind., 3, axial section, 4, oblique section (SW 1-3); 5 - 6 *Simplorbitolina* sp. A, 5, axial section (Pei 2), 6, basal section (Pei 4); 7 *Simplorbitolina* sp. B, axial section (Pei 8); 8 - 9 *Iraquia* sp. A, 8, axial section (Pei 5), 9, transverse section (Pei 2); 10 *Dictyoconus* aff. *walnutensis* (Carsey), axial section (Pei 6); 11 *Feurtillia* sp., median section (Pei 12); 12 *Charentia* sp., median section (SW2-3); 13 *Praechrysalidina* sp., longitudinal section (SW 1-3).

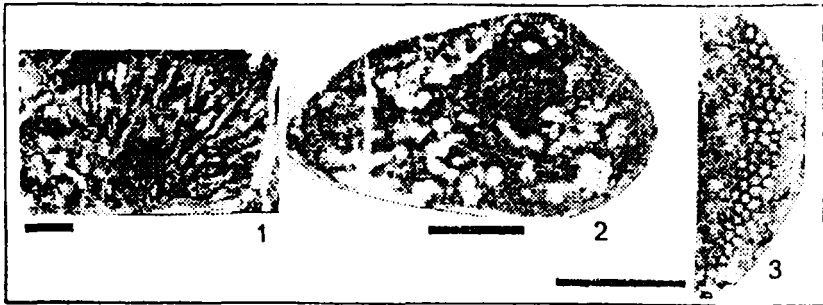


Figure 4. Microfossils from the limestones at Peinyoin Hill . (Scale bar 0.5mm). 1. *Cayeuxia* sp., longitudinal section (SW 2-3); 2 *Cladocoropsis mirabilis* Felix, oblique section (EB1A-1); 3 *Polygonella incrustata* Elliott, tangential section (SW 1-4).

Other smaller foraminiferans: *Feurtillia* sp., *Charentia* sp., *Praechrysalidina* sp., ?*Ecougella* sp., and a few textularids

Algae: *Cayeuxia* sp., *Cladocoropsis mirabilis*, *Polygonella incrustata*

Geologic Age		JURASSIC										CRETACEOUS							
		Early		Middle				Late				Early		Late					
		Frutkingian	Sinemurian	Pienzbachian	Toarcian	Zygodontian	Bajocian	Badonian	Callavian	Oxfordian	Kimmeridgian	Volgian	Kyazmanian	Valanginian	Hauterivian	Berriasian	Aptian	Albian	Cenomanian
FORAMINIFERAS	Orbitolinids	<i>P. cf. sunnilandensis</i>																	
	Other Forams	<i>Paracoskinolina</i> sp. ind.																	
		<i>Simplorbitolina</i> sp. A																	
		<i>Simplorbitolina</i> sp. B																	
		<i>Iraqia</i> sp. A																	
		<i>Dictyoconus</i> aff. <i>walnutensis</i>																	
		<i>Feurtillia</i> sp.																	
		<i>Charentia</i> sp.																	
		<i>Praechrysalidina</i> sp.																	
	? <i>Ecougella</i> sp.																		
Algae	<i>Cayeuxia</i> sp.																		
	<i>Cladocoropsis mirabilis</i>																		
	<i>Polygonella incrustata</i>																		

Figure 5. Chart showing stratigraphic distribution of orbitolinids and other associated fossils from the limestone of Peinyoin Hill (Based on known stratigraphic ranges).

Among the foraminiferans, various members of the orbitolinids are proved to be the key to settle the age problem of the limestones exposed at Peinyoin Hill. Although the detailed paleontologic investigation is currently under way, it is now possible to state that this orbitolinid fauna indicates an Early Cretaceous age most possibly Aptian to Albian, on the basis of the result of preliminary faunal consideration (Figure 5).

2.2 Lithofacies and microfossil fauna on the west of Myit-thar Stream

A rock sequence of tuffaceous sandstone, mudstone and conglomerates with occasional limestone lenses and bands constitutes a different rock suit on the west of the Myit-thar Stream. This rock unit is seemingly overlying the pebbly sandstones and mudstones of the Lebyin Group and exposed as scattered outcrops along the ridges, spurs and gullies. Tuffaceous sandstones are usually highly weathered and ash-gray or red in color. Mudstones are usually carbonaceous with rare traces of carbonized plant remains, and interbedded with the sandstones and polymitic bluish gray or reddish conglomerates. There are a few lenses and bands of various limestone types such as oolitic limestone, volcaniclastic limestone and sandy bioclastic limestone, occurring as minor rock types.

Taxa	Sample	West of Myit-thar Stream
		ENE Namp.
Orbitolinids <i>Iraquia thailandensis</i>		●
Algae <i>Clypeina</i> sp.		●

Table 2. Distribution of microfossils in the limestone sample, West of Myit-thar Stream

One of the limestone samples collected from the limestone bands carries a rich fauna of orbitolinids that is somewhat different from that of the limestones exposed at the Peinyoin Hill. The orbitolinid fauna consists exclusively of *Iraquia thailandensis* (Kemper) (Table 2).

Originally, this species was reported as *Haurania thailandensis* from the Thong Pha Phum of western Thailand and assigned to as Early to Middle Jurassic by Kemper (1976). Along with the above-mentioned orbitolinid

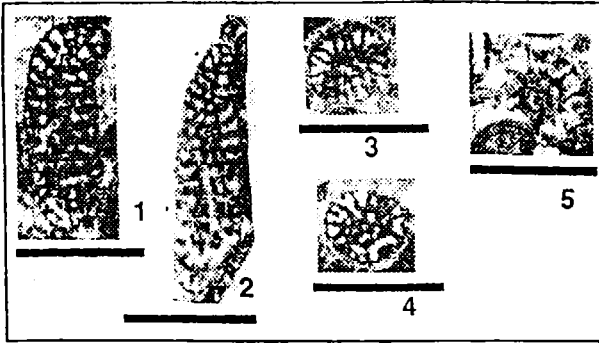


Figure 6 Microfossils from a limestone lens, west of Myit-thar Stream . (Scale bar 0.5mm). 1 - 4 *Iraquia thailandensis* (Kemper), 1: axial section (ENE Namp-3), 2: axial section (ENE Namp-4), 3: basal section (ENE Namp-4), 4: basal section (ENE Namp-3); 5 *Clypeina* sp., transversed section (ENE Namp-1).

fauna, a few specimens of *Clypeina* sp. (algae) are also discovered in this limestone sample (Figure 6). Known stratigraphic ranges of these fossils are shown in Figure 7.

Geologic Age		JURASSIC										CRETACEOUS								
		Early		Middle				Late				Early		Late						
Taxa		Halongian	Sinemurian	Pliensbachian	Toarcian	Asenian	Bajocian	Bathonian	Callovian	Oxfordian	Kimmeridgian	Valgian	Ryazanian	Valanginian	Hauterivian	Barremian	Aptian	Albian	Cenomanian	Turonian
Orbitolinid	<i>Iraquia thailandensis</i>																			
Algae	<i>Clypeina</i> sp.																			

Figure 7. Chart showing stratigraphic distribution of orbitolinids and other associated fossils from the limestone, west of Myit-thar Stream (Based on known stratigraphic ranges).

3 Stratigraphic and Paleogeographic Significance

As a result of the present discovery of orbitolinid faunas and prevailing lithostratigraphic characteristics, it has reached to the conclusion that these controversial outcrops are no longer needed to be lumped neither in the Late Paleozoic Lebyin Group nor in the Plateau Limestone Group. Instead, these limestone outcrops must be designated as a southern continuation of the Pan

Laung Formation of Jurassic-Cretaceous age, because the presently discovered faunal assemblages and their host lithologic units in the Lebyin area closely resemble those of the Pan Laung Formation that is typically exposed in the Myit-tha - Kume district (about 40 miles north-northwest of Lebyin).

In the area further north beyond Lebyin, it has already been reported that a NNW-SSE trending narrow belt of shallow marine sedimentary rocks, i.e. Pan Laung Formation and Loi-an Group, lying unconformably on the Late Paleozoic Lebyin Group (Myint Thein and Win Myint 1988). The present discovery of Jurassic and Early Cretaceous faunas could signalize the probable presence of such a kind of stratigraphic setting in the Lebyin area, and it makes up a step closer toward the deduction of the regional stratigraphic framework of the region as a whole.

In conclusion, it is here claimed that the present finding is the first to record the southeastern most occurrence of the eastern orbitolinid-bearing belt in Myanmar that has so far been recognized only on the east of Myit-tha town. This discovery, perhaps, records the southeastern reach of the Cretaceous equatorial Tethys marine incursion in this part of the area.

References

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