Fauna Assemblages of the Padaukpin area, Pyinoolwin Township

Maw Maw Myint[1], Hla Min[2], Kyu Kyu Mar [3]

Abstract

The study area is located about 14 km NE of Pyinoolwin, Mandalay Division. It is well known for its famous depositional feature, viz. Padaukpin Coral Reef which exposed around the environ of Padaukpin village, 22° 6' 30" N and 96° 40' E. The Padaukpin Limestones bear the Eifelian age (391 – 397 Ma) fauna assemblages. This paper has been attempted to list the fauna assemblages collected from the Padaukpin area and identify systematically. This area is only one in Myanmar for the collection of index - fossils (Mid. Devonian; Eifelian).

Key words: Padaukpin Coral Reef, Padaukpin Limestones, Eifelian, brachiopods, index - fossil.

Introduction

During the field seasons of 2005 and 2006, the author and field parties of final year geology students from the Meiktila University have carried out the mapping routine and fossil collection in the area, around the environs of Padaukpin village, situated about 14 km. NE of Pyinoolwin, northern Shan State. This area covers part of the topographic map of 93-B/12 (Fig. 1). During these field works, many specimens of coral and brachiopod were collected from the Padaukpin Coral Reef. This paper is an outcome of these collections.

Purpose of Study

- To list the fauna assemblages collected from the Padaukpin area.
- To identify systematically them as much as possible.

[1] Lecturer, Department of Geology, Meiktila University
[2] Assistant Lecturer, Department of Geology, Meiktila University
[3] Assistant Lecturer, Department of Geology ,Meiktila University

Regional Geology

The Wetwun-Padaukpin area is composed mainly Plateau Limestone, called as "Maymyo Dolomite" by Amos (1975). To the west of the area Naungkangyi Formation including Lower Naungkangyi Formation (or Sitha Formation) and Upper Naungkangyi Formation (or Kyaingtaung Formation) are well exposed in the Anisakan-Okpo area. To the east and west of the area, Plateau Limestone covers widespreadly. Lowers Paleozoic units including Naungkangyi formation are locally distributed especially in the southern part of the study area.

Previous Works

In the Padaukpin area, La Touche (1913) discovered an abundant well-preserved fauna of Eifelian age. Reed (1908) also described the Lower Paleozoic fossils and Devonian fauna of the northern Shan State. Pascoe (1959) firstly describe the Padaukpin assemblages and identified systematically as much as possible. Anderson et al. (1969) stated that the Padaukpin Reef, so called by La Touche, is not in fact a reef but a biostrome; this was also noted by Brunnschweiler (1970). Amos (1975) designated the Devonian carbonate sequence as Maymyo Dolomite Formations in which two distinct units of member rank includes, viz., Padaukpin Limestone and Wetwun Shale. The field party of Mandalay University (Hla Wai et al., 1985) investigated that the Padaukpin Coral

Reef is found to be longer and at least four major segments occur discontinuously. Moreover, they found that the *Styliolina* sp.*Tentaculites* sp. are induced in the Wetwun Shale and it can be correlated with part of the Zebingyi Formation. It is newly contributed in the Wetwun-Padaukpin area. Aung Moung (1996) collected some important brachiopods from Padaukpin area. Various geologic investigations were made by many geologists in this area due to its accessibility and well known stratigraphic units such as Padaukpin Limestone and Wetwun Shale.

Stratigraphy

General Statement

The study area is covered by the Paleozoic strata which are general trending NE-SW direction. The stratigraphic succession is formed of five units of formation rank and two units of member rank. These in ascending order are:

(1) Sitha Formation (Upper Ordovician)

(2) Kyaingtaung Formation (Upper Ordovician)

(3) Nyaungbaw Formation (Lower Silurian)

(4) Maymyo Formation (Middle Devonian)

- Padaukpin Coral Reef (Padaukpin Limestone)
- Wetwun Shale.

(5) Taungpula Limestone (Permian)

However, in this paper, only one unit ------ the Padaukpin Limestone unit bearing the fossiliferous horizon ---- is described in some details.

Padaukpin Coral Reef

Name Derivation : La Touche, 1913.

Synonym : Padaukpin Limestone (Wolfart et al., 1984)

Distribution

Padaukpin Limestone occurs as four major segments (Hla Wai et al., 1985). These segments are exposed near the Padaukpin village. The present study is also observed and measured at fossil localities: (1) 185801, (2) 186797, (3) 188794, (4) 190791. It is approximately 700' in width and 3500' in length. The strata of this unit trend generally in a NNE-SSW direction and mostly dipping eastward. Other fossil locality is newly found at GR 215804 by the present field work.

Lithology

Padaukpin Limestone unit consists of dark grey or bluish grey crystaline limestones, fossiliferous micritic limestone and shale or mudstone. These limestones are mostly thin - to medium-bedded, grey to black in weathered surface. Ferruginous materials such as hematite also occurred along the fracture or joint planes. The iron bearing limestone formation is regarded as the basal unit of the Padaukpin Limestone.

In some places, shale or argillaceous material are dominant. They are fossiliferous and usually associated with yellow, soft and loose clay. Loose brachiopods and some corals are easily extracted from the soft yellow muddy horizon.

Fauna Content

Due to the different fauna found at different locality, it can be recoonized as followings:

(1) Lower Assemblage Zone

(2) Middle Assemblage Zone

(3) Upper Assemblage Zone

(1) Lower Assemblage Zone

Fauna : Coral : *Calceola sandalina*
Temnophyllum sp.
Puanophyllum gigantum
Thamnophyllum padaukpinensis
Coenites sp.

Brachiopod : *Atrypa* sp.
Cyrtina sp.
Orthotetes sp.
Strophomena sp.

(2) Middle Assemblage Zone

Fauna : Coral	:	*Alveolites* sp.
		Favosites sp.
		Cyathophyllum sp.
		Spinophyllum spongiosum
Brachiopod	:	*Stropheodonta* sp.
		Atrypa recticularis
		Spinatrypa sp.
		Spirifer padaukpinensis
		Rhynchonella sp.
		Schizophoria sp.
		Kayserella sp.
		Desquamatia sp.
		Nucleospira sp.
Bryozoan	:	*Fenestrella* sp.
Gastropod	:	*Eumorphalus pentangularis*

(3) Upper Assemblage Zone

Fauna : Coral	:	*Phillipsastrea hlawaii*
		Stringophyllum presepementum
		Spinophyllum spongiosum
		Cladopora seriata
		Alveolites winchellana, and
		unidentified branching tabulate corals
Brachiopod	:	*Schizophoria* sp.
		Strophomena sp.
		Atrypa sp.

Ages and Correlation

Reed (1908, 1929) concluded a late Eifelian age for the Padaukpin Limestone. Anderson et al., (1969) have been described the brachiopoda of strong Eifelian aspects. Aye Ko Aung (1995) described the two new Middle Devonian (Eifelian) rugose corals from the Padaukpin Limestone and designated this unit as Eifelian age. Khaing Khaing San (2001) Systematically described the five Middle Devonian rugose corals from the Padaukpin Limestone. The present collection of brachiopod and coral assemblage also suggests the Eifelian age. Therefore, the age of the Padaukspin Limestone is certain to be Eifelian.

The other localities of the probable Padaukpin Limestone are W of Lokelaung village, Naungcho Township (U Aung Moung, Lecturer, D.S.I.T) and the Leikkya-Than-daung area (personal communication with U Thet Naing, Associate professor, Department of Geology, Mandalay University). Very recently, the first occurrence of the Padaukpin Limestone equivalent unit in southern Shan State is reported from south of the Htan Sum village, Taunggyi Township. (personal communication with U Htay Lwin, Associate Professor, Department of Geology, Dagon University).

Systematic Paleontology

Phylum - BRACHIOPODA

Class - ARTICULATA

Order - STROPHOMENIDA Opik, 1939.

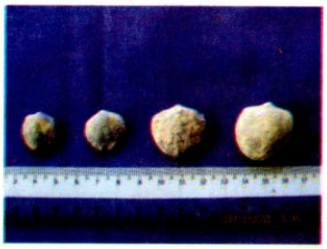
Family - STROPHOMENIDAE King, 1846.

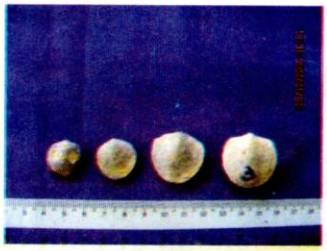
Genus - *Strophomena* sp. Blainlee, 1923.

Material studied	-Holotype specimen No. P.B. 001 is a complete shell including pedicle and brachial valves showing all external features.
Diagnosis	-*Strophomena* sp. is distinguished by semicircular utline and its pseudodelthydium and interarea.
Description	-Triangular shaped pseudodelthydium is distinct.

* The maximum width of the large specimen is 2.5 cm.

* The maximum length of the large specimen is 3 cm.





Family - STROPHEODONTIDAE Caster, 1939.

Genus - *Stropheodonta* sp. Hall, 1850.

Material studied -Holotype specimen No. P.B. 007 is a complete shell including brachial and pedicle valves showing outline of the valve, convexity and radial ornamentation. No.P.B.008-010 are also showing similar external features.

Diagnosis -*Stropheodonta* sp. is distinguished by its subquadrate or elongate subrectangular outline of the valve and mere uniformily distributed costellae on the flanks of the valves.

Description -Outline is probably subquadrate or elongate subretangular. The costellae are fine, closer together and more uniformly distributed on the flanks of the valves.

Family- LEPTAENIDAE Hall & Clarke,1885.

Genus- *Leptaena* Dalman, 1828.

Type species - *Leptaena demissa* Conrad, 1842.

Material studied -Specimen No. P.B. 011 is a complete dorsal valve

showing subquadrate in outline.

Diagnosis -*Leptaena demissa* characterized by its subquadrate outline and planoconvex in lateral profile.

Description -The valve is dorsally genticulated around the anterior and lateral margin. Long and straight hinge line is remarkable.

The maximum width of the specimen is 3.5cm and length is about 3cm.

Age -Devonian (Moore, p. H 395)

Family- ORTHOTETIDAE Waagen, 1884.

Genus- *Orthotetes* Fischer De Wald heim, 1829.

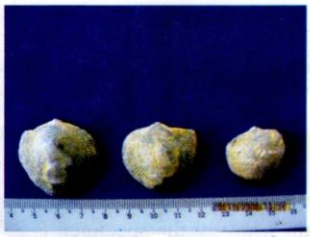
Type species - *Orthotetes radiate* Fischer De Wald heim, 1850.

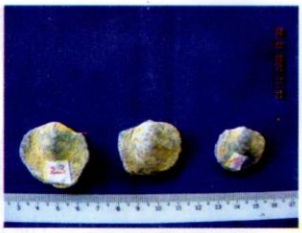
Material studied -*Holotype* Specimen No. P.B. 012 is a complete shell showing subcircular in outline. No. P.B.013-015 are nearly complete shell.

Diagnosis -*Orthotetes radiata* is distinguished by its size, shape, and outstanding of long and straight hinge line.

Description -Subequally biconvex to resupinate, finely costellae;

The maximum width of the specimen is 9cm and length is about 7cm.

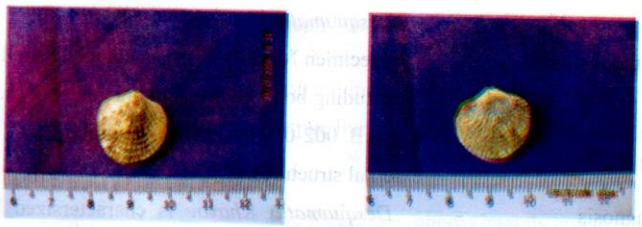




Order	-	SPIRIFERIDA Waagen, 1883.
Family	-	ATRYPIDAE Gill, 1871.
Genus	-	*Atrypa recticularis* Linne, 1774.
Material studied	-	Holotype specimen No. P.B. 016 is a complete shell including brachial and pedicle valves. No. P.B.017& 018 are showing similar external features.
Diagnosis	-	*Atrypa* sp. is characterized by the ornamentation of concentric costae are crossed by imbricating concentric growth lines distributed over the whole of the valve.
Description	-	Shell is equally biconvex valve: brachial valve is deeplyconvex and pedicle valves is slightly convex.

* The minimum size of the minute specimen is 2 cm in length and 2 cm in width.

* The maximum size of the large specimen is 3.3 cm in length and 3.5 cm in width.



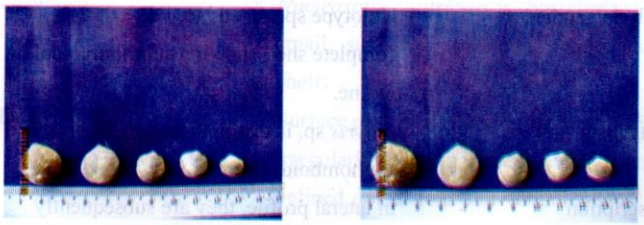
Genus - *Spinatrypa* sp. Stairibrook, 1951.

Material studied - Specimen No. P.B. 019 is a complete shell showing circular shape, well developed ornamentation of the valve.

Diagnosis - *Spinatrypa* sp. is characterized by ornamentation of rounded radial costae, crossed by evenly spaced frilly lamella over the whole of both valves.

Description - The hinge line is short and rounded. Width and length of the valve are nearly equal. The beaks are short, small and pointed, incurved over the umbo of brachial valve.

* Width and length of the specimen (P.B.006) is 1.7 cm and 2 cm.



Genus - *Desquamatia* Alek Seeva, 1960.

Type species - *Desquamatia khavae.*

Material studied - Specimen No. P.B. 001 is a complete shells including both pedicle and brachial valves. No. P.B. 002-009 also showing similar external structures.

Diagnosis - *Desquamatia Khavae* is charactersized by the symmetrical convexity of pedical and brachial valves, and its plications.

Description - Externally like Atrypa, but with finer costae and subduced growth lines;

* The width of the specimens range in 1.0cm - 1.8cm, length range in 1.0cm - 1.8cm.

Age - Mid. Devonian (Moore, 1965, p.4639)

Family - ATHYRIDAE M'coy, 1844.

Genus -*Athyris* sp. M'coy, 1844.

Material studied - Holotype specimen No. P.B. 005 is a complete shell showing subrhomvoidal in outline.

Diagnosis - *Athyris* sp. is distinguished by its size, and subrhomboidal outline.

Description - In lateral profile, they are subsequently

biconvex. The pedicle valve bears a prominent pointed incurved beak and a short curved hinge line equal to above half the maximum width which is met near midlength. Width and length are approximately equal.

Family - NUCLEOSPIRIDAE Davidson, 1881.

Genus - *Nucleospira* Hall, 1859.

Type species - *Nucleospira ventricsus* Hall, 1857.

Material studied - Specimen No. P.B. 010-020 are complete shells showing circular outline and distinct ornamentation of both valves.

Diagnosis - *Nucleospira ventricsus* is characterized by small, subequally biconvex, subcircular shells.

Description - Surface may be covered by numerous fine irregularly spaced spinules; narrow, poorly defined dorsal fold and ventral sulcus may be

present.

* The width of the specimens range in 1.0cm -1.5cm, length range in 1.0cm - 1.5cm.

Age - U. Sil. __ L. Carb. (Miss.) (Moore, 1965, p.4666).

Family - SPIRIFERIDAE Waagen, 1883.

Genus - *Spirifer*.

Type species - *Spirifer padaukpinensis* Reed, 1929.

Material studied -Specimen No. P.B. 007 is a complete shell showing its subtriangular outline with spiriferoid form.

Diagnosis -*Spirifer padaukpinensis* is distinguished by its subtriangular outline, well defined plication and sulcus.

Description -The shell is unequally biconvex with the pedicle valve the deeper. It has coarsely to finely costellate shells with a variably dorsal sulcus and distinct plications.

Family - CYRTINIDAE Frederieks, 1912.
Genus - *Cyrtina* Davidson, 1881.
Type species - *Cyrtina heteroclita* Defrance, 1828.

Material studied - Specimen No. P.B. 021 is a complete shell showing ally biconvex valves and distinct spiriferoid form.

Diagnosis -*Cyrtina heteroclita* is characterized by its subtriangular outline, subpyramidal pedicle valve and a nearly flat brachial valve.

Description -Small to medium sized; almost equidimensional pedicle valve semipyramidal, in some deformed; brachial valve weakly convex.

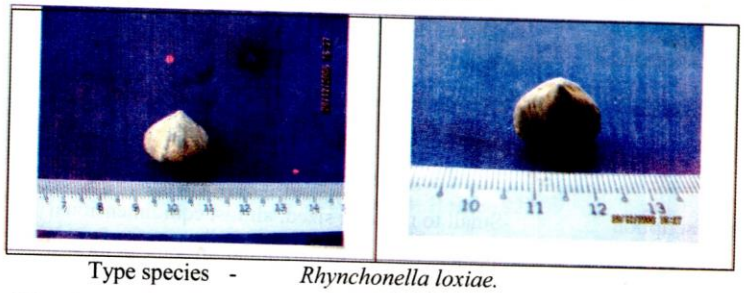
Age -Silurian _ Permian (Moore, 1965, P. 4678).

Order - RHYNCHONELLIDA Kuhn, 1949.
Family - RHYNCHONELLIDAE Gray, 1848.
Genus - *Rhynchonella* sp. Fischer, 1809.

Material studied -Spescimen No. P.B. 008 is a complete shell showing its subtriangular outline.

Diagnosis -*Rhynchonella* sp. is characterized by its subtriangular shape and size.

Description -Shell normally non-strophic, usually with beak and functional pedicle; delthydium partially closed.



Type species - *Rhynchonella loxiae.*

Material studied - Specimen No. P.B. 022 is a complete Shell showing its subtriangular outline.

Diagnosis - *Rhynchonella loxiae* is distinguished by its subtriangular shape and size.

Description - Small to medium in size, triangular; dorsal fold high, ventral sulcus somewhat flattened.


Order - ORTHIDA Schuchert & Cooper, 1932.

Family - SCHIZOPHORIIDAE Schuchert & Levene, 1929.

Genus - *Schizophoria* King, 1846.

Type species - *Schizophoria resupinatus* Martin, 1809.

Material studied - Specimen No. P.B. 023 & 024 are the complete shell showing pentagonal outline.

Diagnosis by - Schizophoria resupinatus is distinguished its shape and evenly biconvex valves.

Description - The width of the specimen range in 3.5cm – 1cm, length ranges in 3cm - 0.75cm.

Age - Silurian -Permian (Moore, 1965, p. 4332)


Family	-	KAYSERELLIDAE Wright, 1850?
Genus	-	*Kayserella* Hall & Clarke, 1892.
Type species	-	*Kayserella lepida* Schnur, 1853.
Material studied	-	Specimen No. P.B. 025 is a complete shell showingsubrectangular outline. No. P.B. 030-034 are also showing similar external structures.
Diagnosis	-	*Kayserella lepida* is characterized by its rectangular outline, small size and planoconvex the valves.
Description	-	The maximum width is 2.5cm. The maximum length is 2cm.
Age	-	Mid. Devonian (Moore, 1965, p.4338)

Conclusion

The Middle Devonian limestones are cropping out in very limited area in Myanmar. The Padaukpin area in Pyinoolwin Township has long been famous.

The previous works of La Touche (1913), Chhibber (1934), Pascoe(1959), Maung Thein and Ba Than Haq (1969), Thaw Tint (1965,1972), Amos (1975), I.G.C.P. (1980), Bender (1980), Wolfart et. al. (1984) are distinctly well remarkable in the stratigraphy of the northern Shan State. Various geologic investigations were made by many geologists in this area due to its accessibility and some well-known stratigraphic units such as the Padaukpin Limestone and Wetwin Shale.

In the Middle Devonian Padaukpin Limestone, rugose and tabulate corals, brachiopods and bryozoans occur in great abundance. The purpose of this work is to continue the investigation of the numerous fauna

occurring in the Padaukpin Limestone. It is hoped that this work will seek to fulfill the list of fauna assemblages of the Padaukpin area.

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