

Foraminifera from the lower Eocene Sakesar Limestone at Nammal, western Salt Range, northern Pakistan

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ABSTRACT

Study of the Sakesar Limestone of the lower Eocene age in the Nammal Gorge in western Salt Range is carried out. During the field investigation eight samples were collected from an 80 ft thick limestone horizon, at equal interval. A new Alveolinid, foraminifera assemblage is identified.

INTRODUCTION

The lower Eocene succession in and around the Nammal Gorge in the western Salt Range comprises the Nammal Limestone and Shale and the Sakesar Limestone (Fig. 1).

The Sakesar Limestone was named by Gee (1935) from its type locality at Mount Sakesar (32° 31' N, 71° 56' E). This formation is typically nodular in off-white colour containing frequent chert nodules. Several age-diagnostic larger foraminifera can be observed on the weathered surface. Its stratigraphic position in relation to the adjoining areas of the Kala Chitta and Hazara Mountains is shown in Fig. 2.

Eight samples were collected from the Sakesar Limestone (approximately 80 ft. thick) at an equal interval from bottom to top along the Mianwali-Talagang Road in the neighbourhood of the famous Nammal Gorge. The Nammal Gorge itself exposes an excellent stratigraphic sequence from Permian to Recent except some depositional gaps, one at the base of the Paleocene (marked by the laterite) and the other between the lower Eocene Sakesar Limestone and the non-marine Miocene to

Pleiocene sediments collectively known as the Siwaliks.

From the Sakesar Limestone, Davies and Pinfold (1937) reported a larger foraminiferal assemblage including *Nummulites mamillatus* (Fichtel and Moll, 1798), *Nummulites atacicus* Leymerie, 1846, *Assilina granulosa* (d' Archiac, 1847), *Assilina spinosa* Davies and Pinfold, 1937, *Lockhartia tipperi* (Davies, 1932) and *Alveolina globosa* Leymerie, 1846.

PRESENT WORK AND FINDINGS

In the present study, a total of 48 thin sections were examined and the following larger foraminiferal species were identified (Fig. 3 and 4): *Alveolina globula* Hottinger, 1971, *Nummulites mamillatus*, *Nummulites atacicus*, *Nummulites* sp., *Assilina spinosa*, *Assilina laminosa* Gill, 1953, *Assilina granulosa*, *Alveolina pasticillata* Schwager, 1883, *Alveolina* sp., *Alveolina ellipsoidal* Schwager, 1883, *Ranikothalia sindensis* (Davies, 1927), *Discocyclina dispansa* Sowerby, 1840, *Discocyclina ranikotensis* (Davies, 1927), *Lockhartia tipperi* (Davies, 1932) and *Lockhartia conditi* (Nuttal, 1926). The

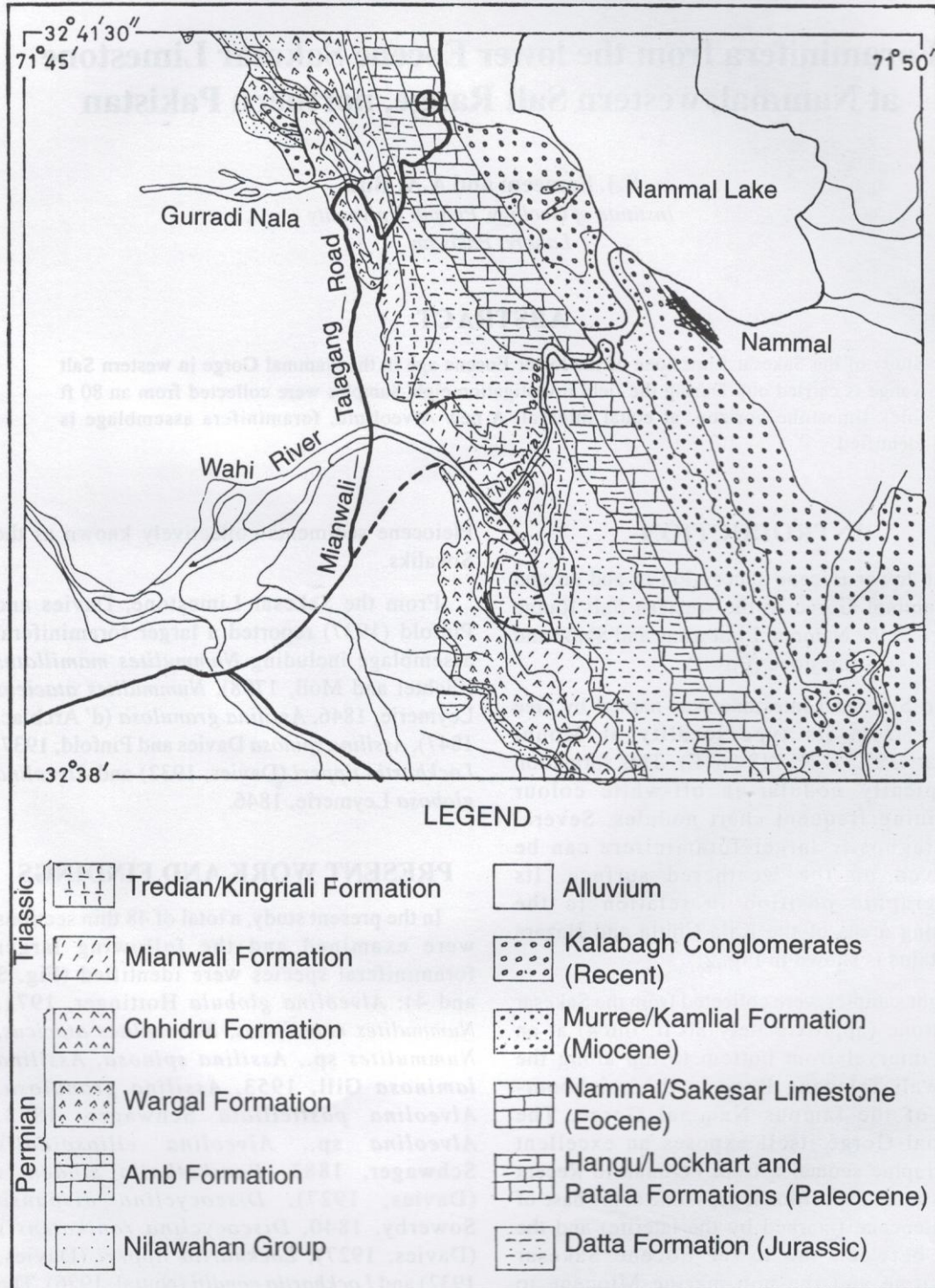


Fig. 1: Geological map of the Nammal area, Salt Range (after Gee, 1980).

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AGE		KOHAT	KALA CHITTA	HAZARA	SALT RANGE	
MIOCENE		MURREE FORMATION				
		FATEHJANG MEMBER				
OLIGOCENE						
EOCENE	UPPER (PRIABONIAN)					
	MIDDLE (LUTETIAN)	KOHAT FORMATION KULDANA FORMATION				
	LOWER (YPRESIAN)	CHORGALI FORMATION MARGALA HILL LIMESTONE			SAKESAR LIMESTONE NAMMAL FORMATION	
PALEOCENE	UPPER	PATALA FORMATION				
		LOCKHART LIMESTONE				
	LOWER	DANIAN	FERRUGINOUS PISOLITE		HANGU FORMATION FERRUGINOUS PISOLITE	
CRETACEOUS	UPPER	MAAST.				
		CAMP.	KAWAGARH FORMATION			
		SANT.				
		CON.				
		TUR.				
		CENOM.				
	LOWER	LUMSHI WAL FORMATION		CHICHALI FORMATION		

Fig. 2: Stratigraphic correlation of the Cretaceous-Tertiary succession of northern Pakistan.

Alveolina assemblage determined by the authors is found to be different from that of Davies and Pinfold (1937).

Hottinger (1971, Pl. 1, Fig. E) reported the occurrence of *Alveolina* sp. from the Nammal Formation of the Salt Range. It is identified here as *Alveolina ellipsoidalis*. Hottinger (1971, Pl. 3, Fig. A-B) also reported *Alveolina pasticillata* from the Meting Limestone in Sind. On the basis of Alveolinid zonation, Hottinger (1971) had placed both the Nammal Formation and the Meting Limestone in the Paleocene in his correlation chart, while these formations are, however, part of the Eocene succession in Pakistan.

Moreover, *Alveolina ellipsoidalis* and *Alveolina globula* Hottinger, 1971 are recorded from the lower Eocene foraminiferal assemblage of the Sakesar Limestone, which overlies the Nammal Formation.

CONCLUSION

A new *Alveolina* assemblage including several age-diagnostic species is determined. Further study of the foraminiferal biostratigraphy of the lower Eocene succession of the Salt Range is strongly recommended to correlate and define the age of the similar rock units.

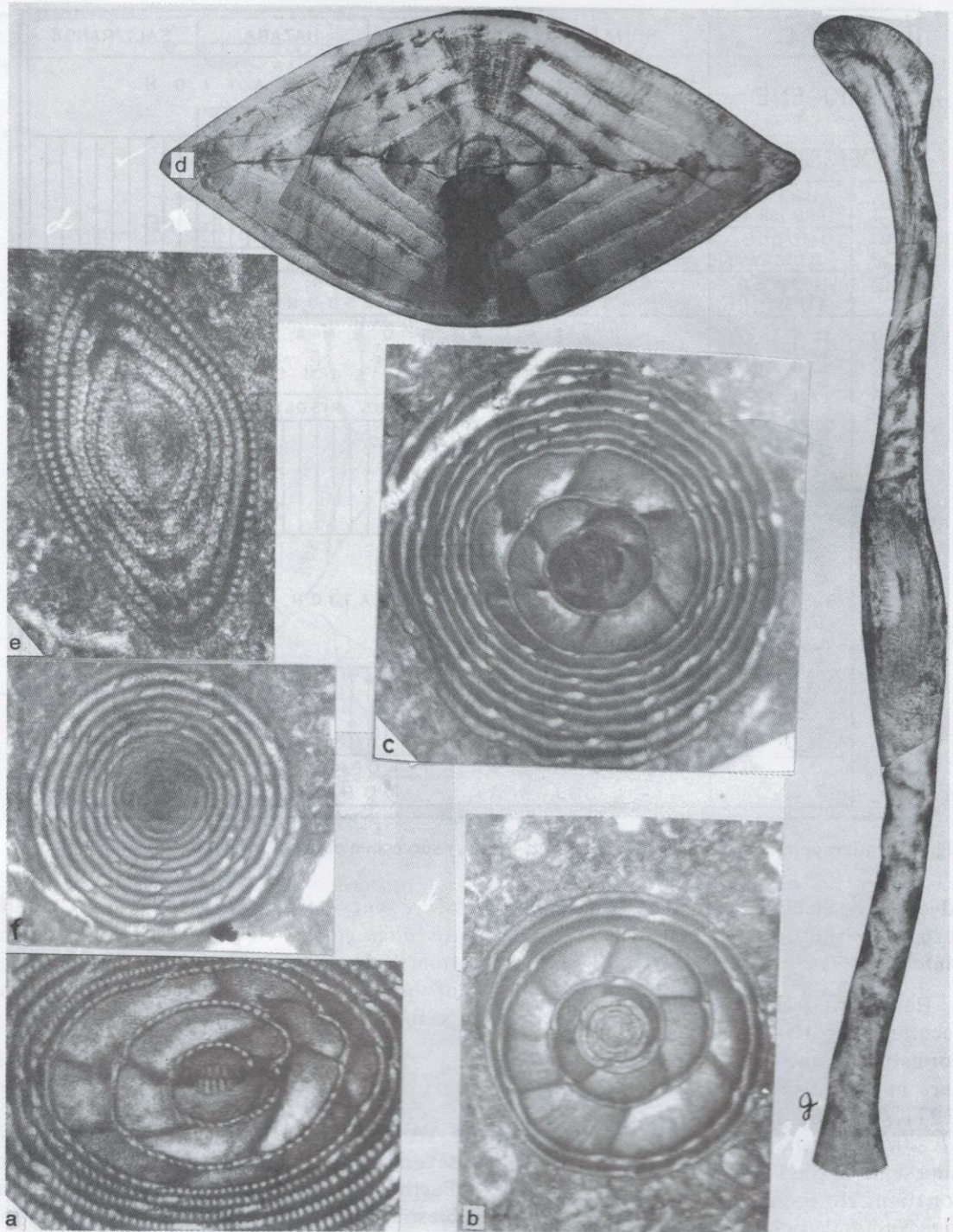


Fig. 3: a: *Alveolina globula* Hottinger x 30 (axial section), b-c: *Alveolina globula* Hottinger x 30 (equatorial section), d: *Nummulites mamillatus* (Fichtel and Moll) x 50; e: *Alveolina ellipsoidalis* Schwager x 30, f: *Alveolina* sp.; g: *Ranikothalia sindensis* (Davies) x 50

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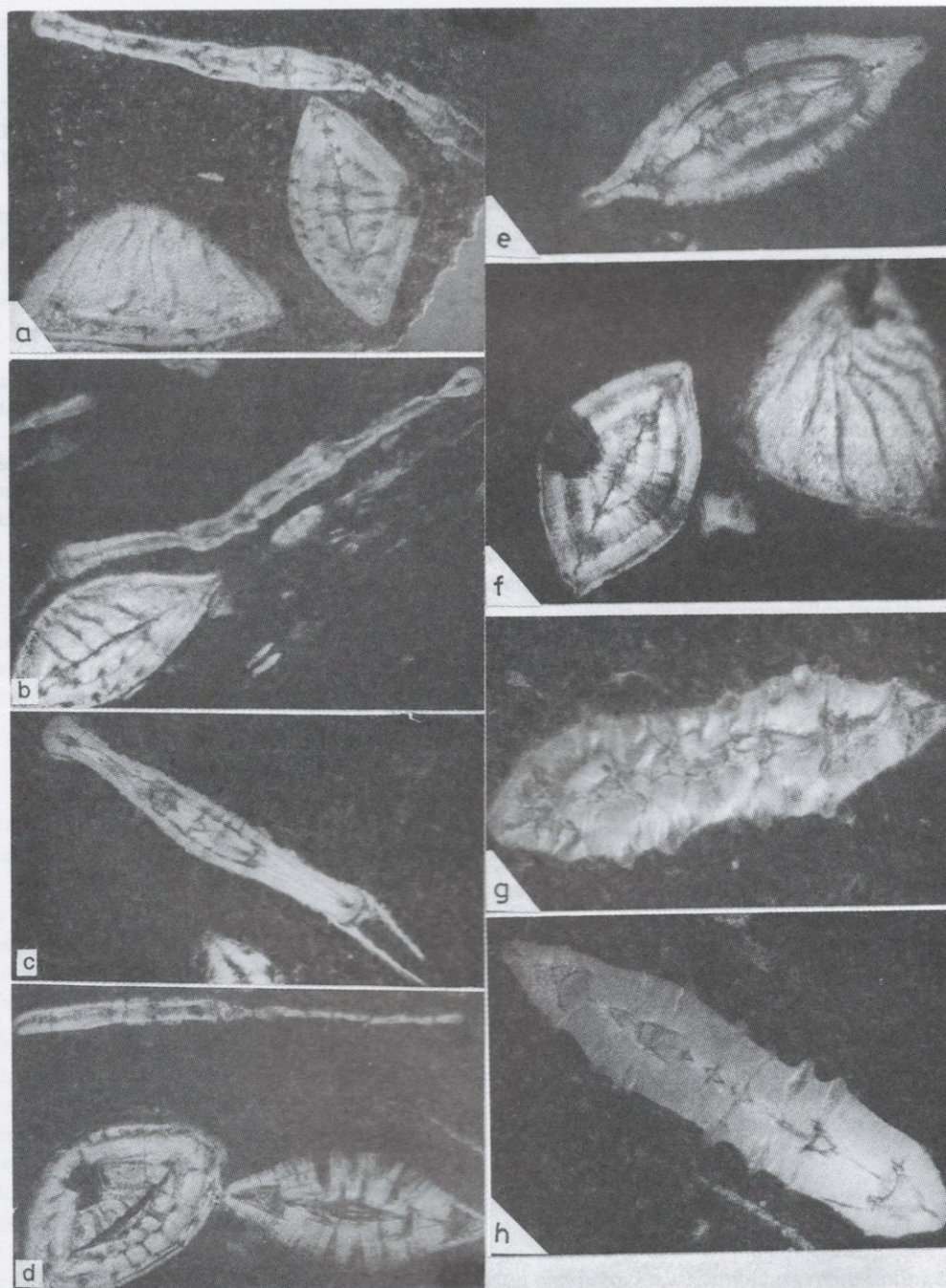


Fig. 4: a: *Ranikothalia sindensis* (Davies) x 30 (top), *Nummulites mamillatus* (Fichtel and Moll) x 30 (bottom); b: *Nummulites mamillatus* (Fichtel and Moll) x 30; c: *Ranikothalia sindensis* (Davies) x 30; d: *Ranikothalia sindensis* (Davies) x 30 (top): *Nummulites mamillatus* (Fichtel and Moll) x 30 (bottom left), *Assilina laminosa* Gill x 30 (bottom right); e: *Nummulites* sp. x 30; f: *Nummulites mamillatus* (Fichtel and Moll) x 30 showing septal filaments; g: *Assilina spinosa* Davies and Pinfold x 30; h: *Assilina subspinosa* Davies and Pinfold x 30.

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