

RESEARCH COMMUNICATIONS

Late and terminal Cretaceous foraminiferal assemblages from Ukhrul, Mélange zone, Manipur

Ch. Prithiraj, P. K. Mishra* and Ashok Sahni

Centre of Advanced Studies in Geology, Panjab University, Chandigarh 160 014, India

*Paleontology Laboratory, Keshav Dev Malaviya Institute of Petroleum Exploration, Dehradun 248 195, India

Foraminiferal assemblages from exotic blocks in the melange zone of Ukhrul, Manipur provide significant data on deep oceanic sediments in Late and Terminal Cretaceous and their subsequent obduction along the eastern margin of the Indian Plate. Using a modified version of copper sulphate and acetic acid technique, beautifully preserved and biostratigraphically important

planktonic foraminifera from two closely-spaced localities; Hundung North and Mova have been recovered. The age of the Ukhrul limestone helps to determine the basinal conditions and timing of obduction on a regional basis.

SEVERAL fossil-bearing localities have been recorded in recent years in the Mélange zone of Naga-Manipur Ophiolite belt. Assemblages are suggestive of Maestrichtian, Palaeocene and Eocene ages¹. Using a modified version of a maceration technique developed by Zolnaj², foraminiferal assemblages were recovered from limestone bodies ranging in thickness from a few metres to several metres, found as mélangé in the upper arenaceous part of the Disang Group of Middle to Upper Eocene^{3,4} age. The fossil biotas of these limestone blocks record the turbulent history of the

obduction of oceanic crust and deep sea sediments on to the advancing Indian plate along its eastern margin. The foraminiferal assemblages described in this paper help to establish a Late Campanian and Late Maestrichtian for the sampled sections and hold out promise for locating Cretaceous-Tertiary boundary events.

Recent sampling from two closely-spaced localities (Figure 1)—Hundung North and Mova resulted in the recovery of beautifully preserved foraminiferal assemblages. The assemblage at Hundung North comes from a hard brownish grey bio-micrite with various cross-cutting joint planes filled with calcite while the assemblage at Mova comes from a hard whitish-grey bio-micrite. These horizons are separated by a sequence of shales and siltstone, and the exact inter-relationship between the two is not obvious at present.

Microfossils recovered from both localities include planktonic and benthonic foraminifera, radiolaria, a few ostracods and placoid scales of shark. Some of the planktonic foraminifera have been identified and studied under microscope (Table 1). Presence of *Globotruncanita calcarata*, *G. subspinosa* and *Globotruncana linneiana* in the Hundung North sample undoubtedly indicates Late Campanian age for the Hundung North sample whereas the presence of *Abathomphalus mayaroensis*, *Rosita contusa* and *Globotruncanella petalloidea* in the Mova sample indicates a Late Maestrichtian age for the Mova sample. Only two most important

Table 1. Planktonic foraminiferal assemblages from Ukhrul Limestone

Foraminifera	Hundung North	Mova
Family: Globotruncanidae		
<i>Globotruncana linneiana</i> P/VPL-S3-5-7	p	p
<i>G. mariei</i> P/VPL-S8-13,14	p	p
<i>G. bulloids</i> P/VPL-S9-1,2	p	p
<i>G. arca</i> P/VPL-S6-1	p	p
<i>G. aegyptiaca</i> P/VPL-S8-4-6	a	p
<i>G. falsostuarti</i> P/VPL-S6-6,7	p	p
<i>G. ventricosa</i> P/VPL-S11-3-5	p	a
<i>G. orientalis</i> P/VPL-S11-1,2	p	a
<i>Globotruncanita stuarti</i> P/VPL-S6-8,9	p	p
<i>G. stuartiformis</i> P/VPL-S6-19,20	p	p
<i>G. pettersi</i> P/VPL-S8-10-12	a	p
<i>G. conica</i> P/VPL-S8-8,9	a	p
<i>G. calcarata</i> P/VPL-S3-1-3	p	a
<i>G. subspinosa</i> P/VPL-S9-8-10	p	a
<i>G. elevata</i> P/VPL-S9-5	p	a
<i>Rosita contusa</i> P/VPL-S2-6-8	a	p
<i>R. fornicata</i> P/VPL-S9-3,4	p	a
<i>R. patelliformis</i> P/VPL-S6-5-7	p	p
<i>Abathomphalus mayaroensis</i> P/VPL-S12-1	a	p
<i>A. intermedius</i> P/VPL-S2-20	a	p
<i>Gansserina gansseri</i> P/VPL-S4-5,6	a	p
<i>G. wiedenmayeri</i> P/VPL-S8-1-3	a	p
<i>Globotruncanella petalloidea</i> P/VPL-S5-1,2	a	p
Family: Heterohelicidae		
<i>Racemiguembelina fructicosa</i> P/VPL-S8-7	a	p
<i>Heterohelix globulosa</i> P/VPL-S2-12-14	p	a
<i>H. striata</i> P/VPL-S2-15-17	p	p
<i>Pseudoguembelina costulata</i> P/VPL-S2-18,19	p	p
<i>Pseudotextularia elegans</i> P/VPL-S2-3-5	p	p

p = Present, a = Absent.

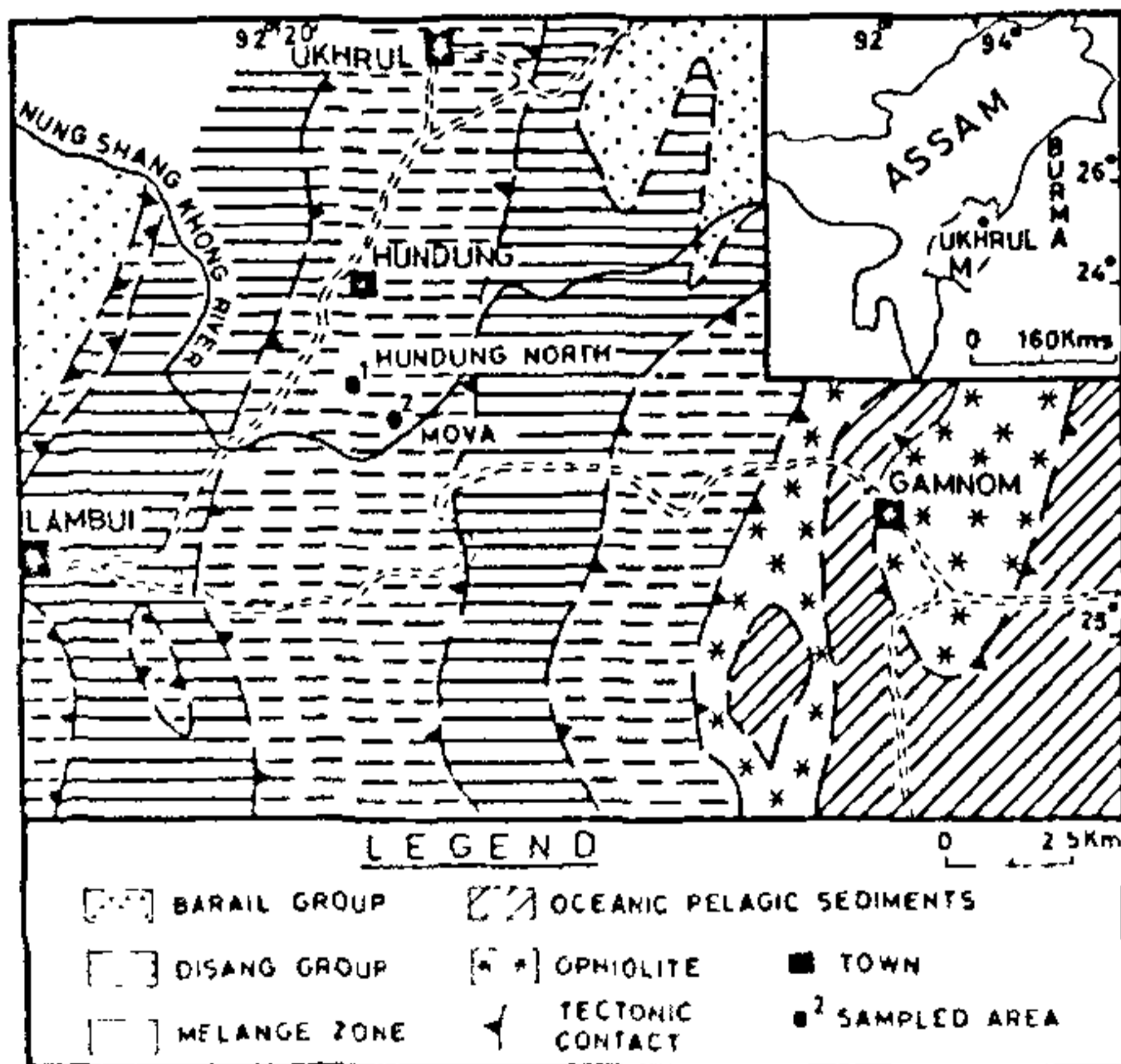


Figure 1. Geological and location map (Modified after S. A. Khan¹. Barail Group (Upper Eocene to Oligocene), Disang Group (Upper Cretaceous to Middle Eocene), Melange Zone (Cretaceous to Eocene), Oceanic Pelagic Sediments (Paleocene to Middle Eocene), Ophiolite (Maestrichtian and Older) M - Manipur, Loc. 1 - Hundung North, Loc. 2 - Mova and 1 km downstream

taxa have been illustrated for each sample (Figure 2). Assemblages from both these localities, compounded with very fine nature of the grains, indicate a deep water oceanic depositional condition and a slow rate of net sediment accumulation.

The present study holds out great promise in elucidating basal characteristics and biotas at the end of the Cretaceous and in setting constraints for the obduction process in previously geologically neglected area of Manipur. The previous systematic study in the area³ did not give a precise age for the oldest exotics nor did it illustrate the specific characters of the assemblages with clarity. The present paper suggests Late Campanian age for the oldest exotic block, continued deep oceanic sedimentation at least to the Lower Eocene³, reasonably good chances of locating Cretaceous Tertiary boundary events in the Mova locality and a diversified fossil association comprising radiolarite, nannoplankton, placoid scales of shark, planktonic and benthonic foraminifera. More detailed studies on individual limestone block in the Naga Manipur ophiolite belt could determine the time of suturing of eastern India and southern China blocks on a regional scale.

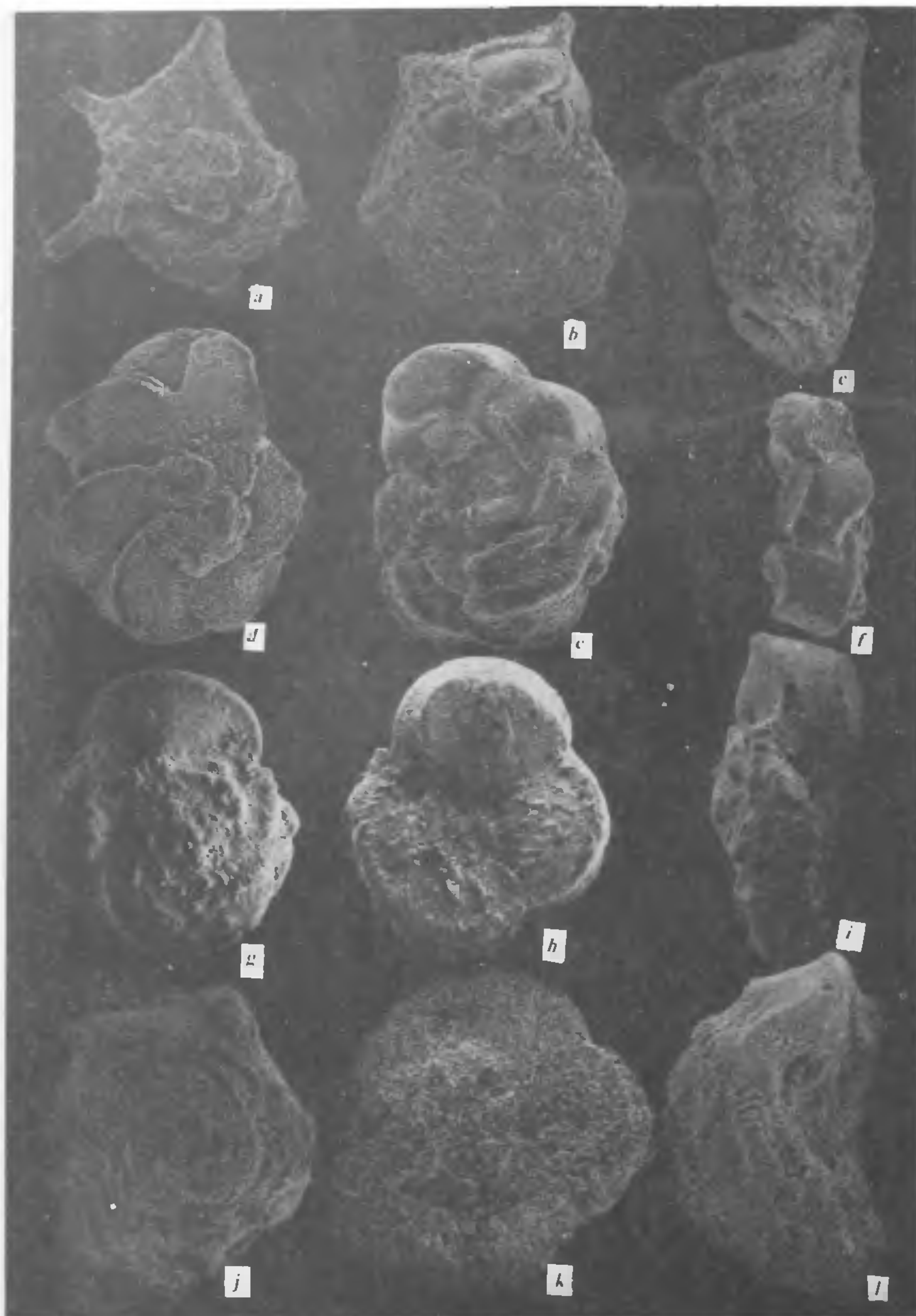


Figure 2.

Repository: SEM stubs (SI-S12). Vertebrate Palentology Laboratory,
CAS in Geology, Panjab University Chandigarh 160 014.

1. Acharyya, S. K., Roy, D. K. and Mitra, N. D., *Mem. Geol. Surv. India*, 1986, 119, 64.
2. Zolnaj, S., VII Int. Symp. on Ostracod, Beograd., 1979, p. 264.
3. Nagapa, Y., *Micropaleontology*, 1959, 5, 145.
4. Mitra, N. D. *et al.*, *Rec. Geol. Surv. India*, 1986, 114, 61.
5. Khan S. A. and Gupta, K. S., Hand-out for the Geological excursion: Imphal-Lambui-Singcha Section, National Seminar on Tectonic and Metallogeny of Ophiolites and Recent Advances in Geology of North-Eastern India; 3-6 March; 1990. p. 1.

ACKNOWLEDGEMENTS. We thank Dr Jagadish Pandey, ONGC, Dehradun, and Prof. S. B. Bhatia, Panjab University for valuable suggestion, and Dr D. S. N. Raju, ONGC, Dehradun, for help in identification and Mr. K. Dilip Singh, Industry Department, Govt. of Manipur, for help in field work.

Received 26 August 1991; revised accepted 25 September 1991
