

TABLE 2

Correlation matrix

	Basin area	Basin perimeter	Stream length	Drainage density	Basin elongation	Slope
Basin area	1.00	0.973	0.966	*-0.173	0.954	0.579
Basin perimeter	—	1.00	0.939	*0.199	0.980	0.626
Stream length	—	—	1.00	*0.043	0.894	0.553
Drainage density	—	—	—	1.00	*0.273	*0.349
Basin elongation	—	—	—	—	1.00	0.650
Slope	—	—	—	—	—	1.00

*Not significant at 5% level

(figure 2a) shows four major trends with corresponding mean trends of N10E-S10W, N35E-S35W, N55E-S55W and N30W-S30E. Maximum number of streams (20%) flow along the most significant trend, namely N55E-S55W. This trend is parallel to the regional NE-SW strike of foliation of rocks and the axial trends of major folds. Further, it is also parallel to the Bhavani lineament. The general pattern of orientation of third order streams and joints is similar (figure 2b). However, the most significant trend of joints (NNW-SSE) does not coincide with dominant trend of third order streams which is parallel to the trend of regional foliation major fold axial trends and the Bhavani lineament. The failure of the major joint trend to control the development of third order streams may therefore be due to the predominating influence of the NE-SW trending major structural elements viz., foliation and folds together with the Bhavani lineament.

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HOLOTHUROIDS FROM JURASSIC TETHYAN SEDIMENTS, MALLA JOHAR AREA, KUMAON HIMALAYA, UTTAR PRADESH

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THE note records for the first time the occurrence of holothuroids from the Jurassic of Himalaya. Earlier, the Mesozoic holothuroids have been frequently recorded from various localities of India by several workers¹⁻⁹. However, holothurian occurrences in the Himalayan region are confined to the Triassic of Kumaon^{5, 7}, Kashmir⁶ and Spiti and Ladakh⁸.

The holothuroid bearing samples now reported belong to the Tethyan Jurassic sediments exposed in the Malla Johar area of Kumaon Himalaya (Uttar Pradesh). These samples were collected from the

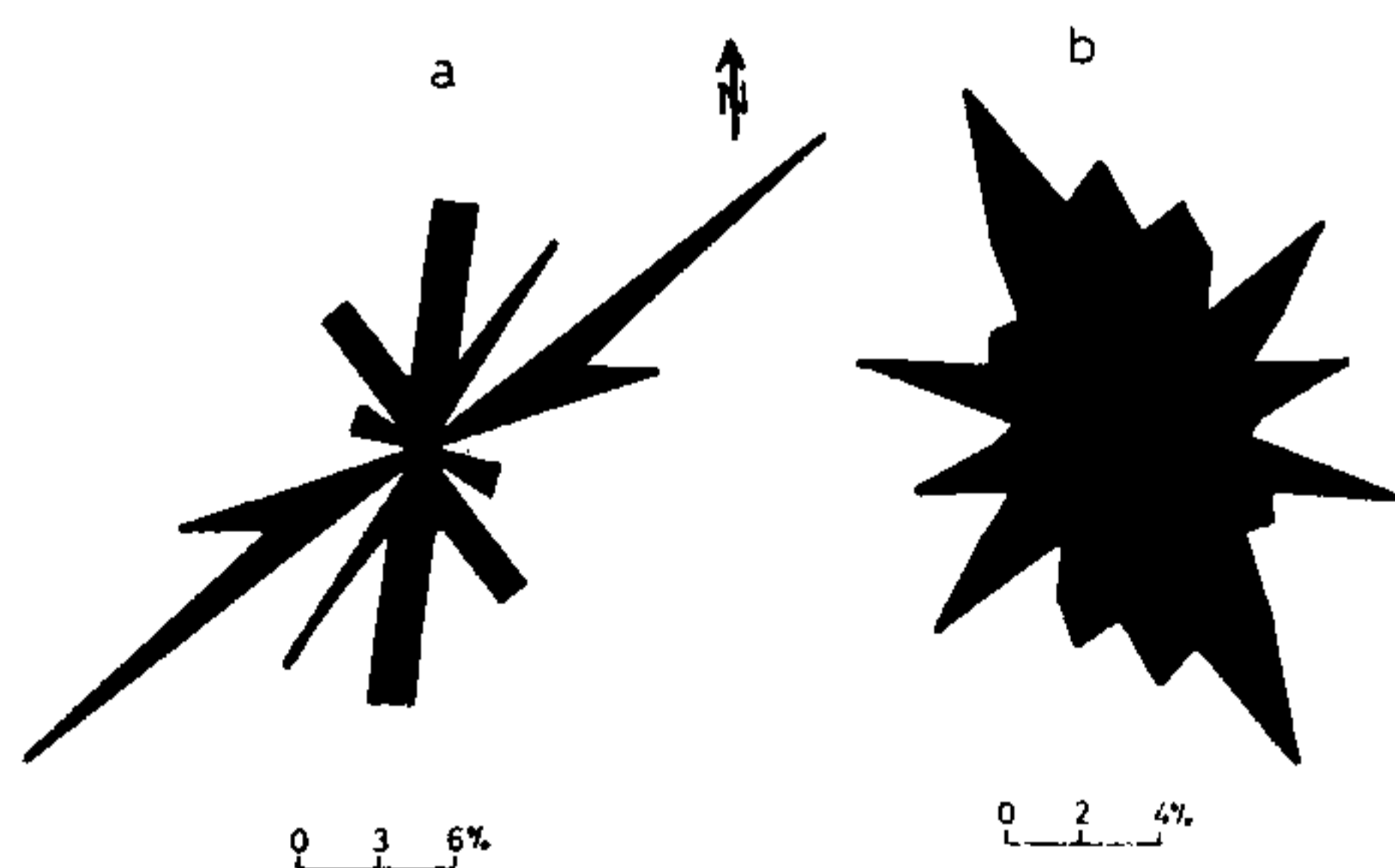


Figure 2. (a) Trend of 33 third order streams. (b) Strike of 253 joints.

From the analysis it can be concluded that the formation of third order basins and the sudden change in the course of Bhavani towards NE at Mukkali are strongly controlled by the Bhavani lineament.

Laptal Formation exposed in the Shalshal Gad near the Sumna-Laptal mule tract.

The stratigraphic succession of the Laptal Formation¹⁰ is given in table I.

TABLE I

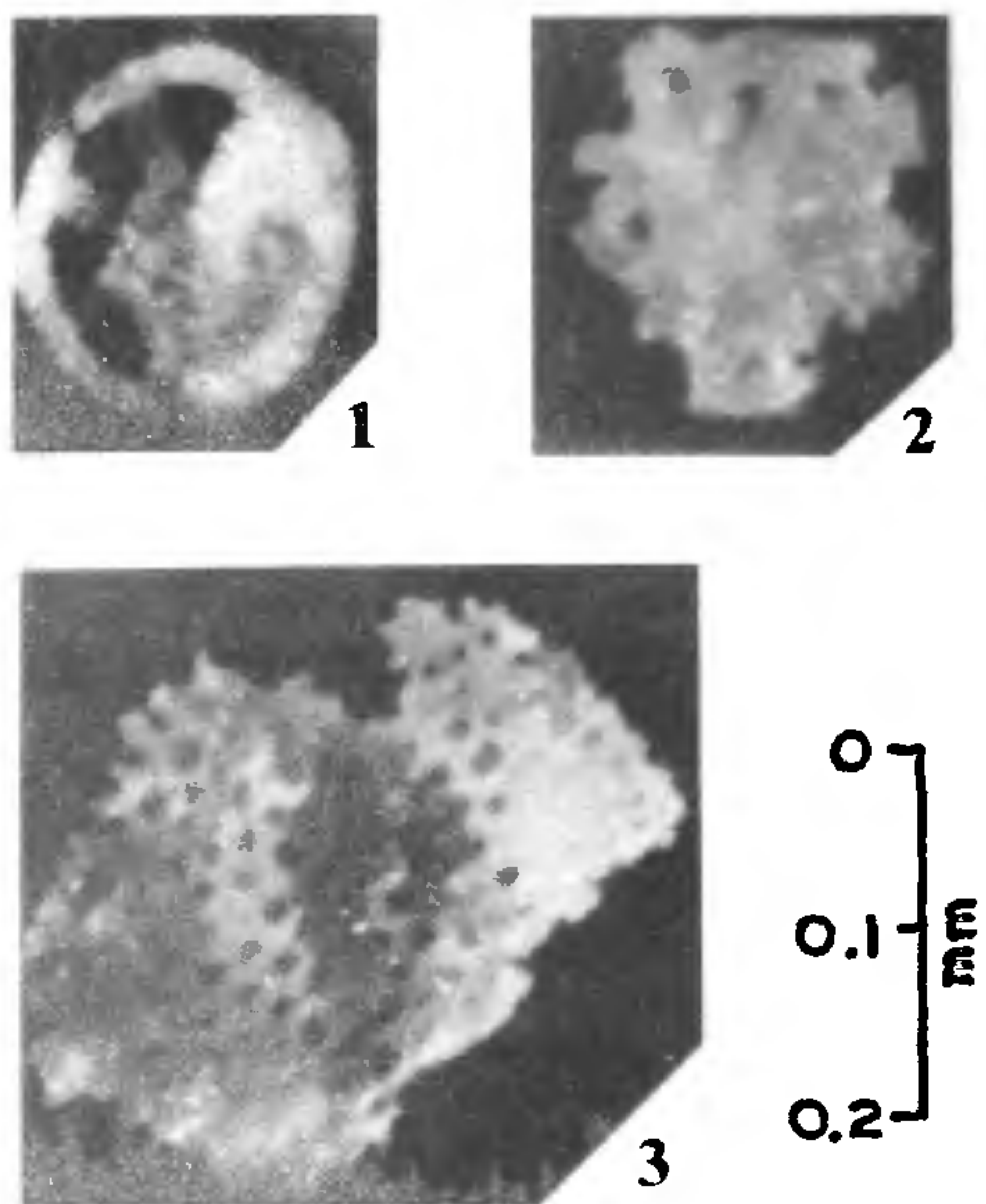
Stratigraphic succession of the Laptal Formation (Rawalibagar group-Malla Johar Supergroup)

Formation	Lithology	Age
Ferruginous oolitic Formation (10 m)	Ferruginous oolitic limestone and shale	Callovian
Laptal Formation (70 m)	Oolitic limestone Alternate limestone and shale Shell limestone Alternate limestone and shale Shell limestone	Liassic
Kioto limestone Formation (140 m)	Oolitic limestone Nodular limestone Shell limestone Limestone and shale	Rhaetic

A number of samples of hard limestones and shales belonging to the Laptal Formation were disintegrated both by boiling in water and by dilute acetic acid. These disintegrated samples have yielded a fair assemblage of holothurian sclerites in association with foraminifers and ostracods. The sclerite assemblages are represented by *Mortensenites* sp., *Theelia* sp. and *Priscopedatus* sp. The holothurian genera recovered from Malla Johar area are stratigraphically long ranging forms and on the basis of this meagre microfauna age cannot be assigned. Heim and Gansser¹¹ have given Liassic age to the Laptal Formation on stratigraphic grounds.

On comparison with sclerite assemblages from Jurassic rocks of Kutch²⁻⁴ and Jaisalmer⁹, the holothurian microfauna recovered from the Laptal formation of Malla Johar area appears to be different. The genus *Theelia* is common in both the Malla Johar area and Jaisalmer, while the other two genera *Mortensenites* and *Priscopedatus* recorded in Malla Johar are not yet known from Jurassic sediments of Jaisalmer and Kutch.

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Figures 1-3. (All figures ca $\times 104$) 1. *Theelia* sp. upper view of specimen No. LUG/MJH 501. 2. *Priscopedatus* sp. upper view of specimen No. LUG/MJH 505. 3. *Mortensenites* sp. specimen No. LUG/MJH 508.

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