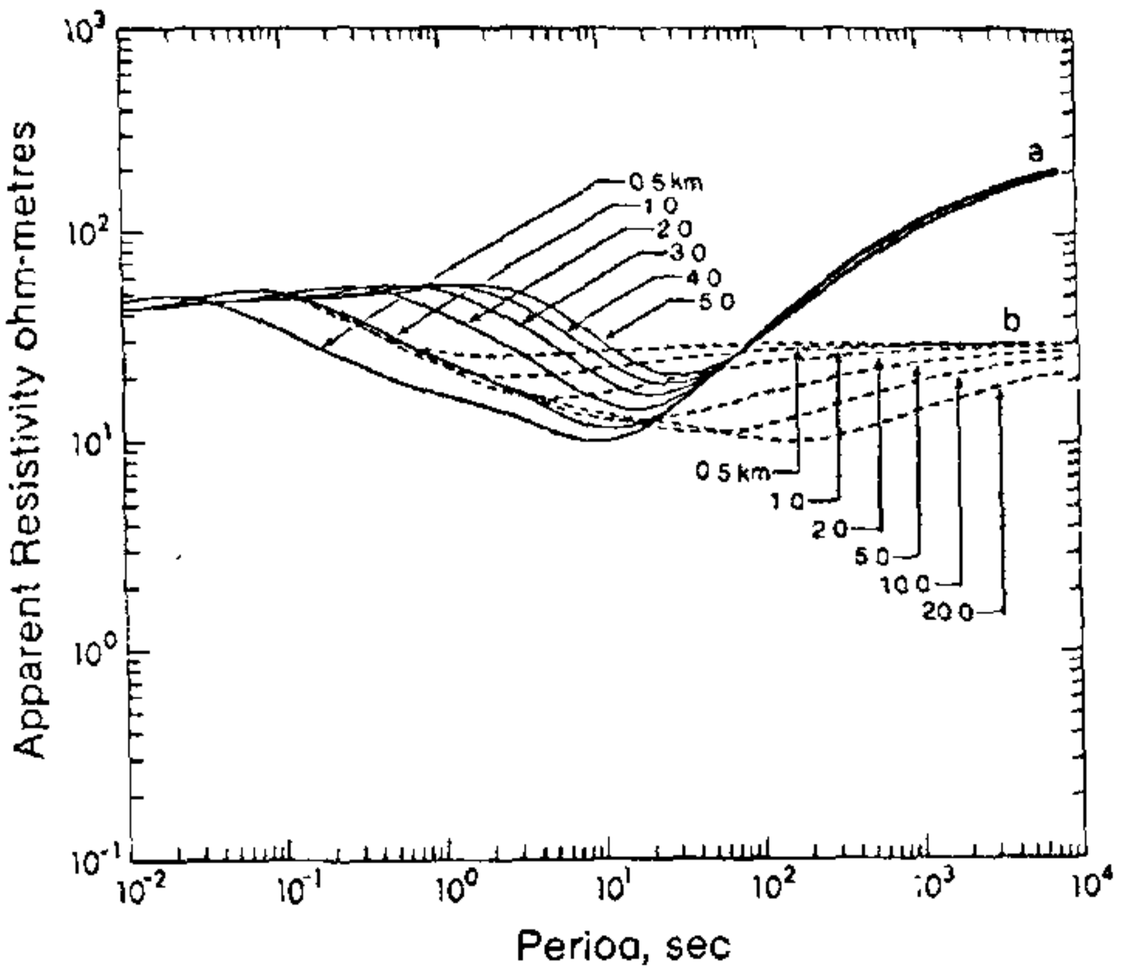

Figure 4. Variation of apparent resistivity with period for the models with the following parameters:

Layer	Group (a) Resistivity (Ω-m)	Group (a) Thickness (km)	Group (b) Resistivity (Ω-m)	Group (b) Thickness (km)
1	20	0.02	20	0.02
2	50	0.5, 1, 2, 3, 4, 5	50	1.0
3	10	5.0	10	0.5, 1.0, 2.0, 5.0, 10.0, 20.0
4	300		30	

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1. Narain, H. and Gupta, H. K., *Nature (London)*, 1968, **217,** 1138.
2. Sarma, S. V. S., Kumar, R., Harinarayana, T. and Sanker Narayan, P. V., *Geophysical Res. Bull.*, 1982, **20,** 243.
3. Bhaskara Rao, V., Murty, B. V. S. and Satyanarayana, A. V. S., *Tectonophysics*, 1969, **7,** 265.
4. Brahmam, N. K., *Geophysical Res. Bull.*, 1975, **13,** 89.
5. Kaila, K. L., Reddy, P. R., Krishna, V. G., Chowdhury, K. R., Tewari, H. C., Murty, P. R. K. and Tripathi, K. M., *Geophysical Res. Bull.*, 1979, **17,** 273.
6. Kailasam, L. N., Reddi, A. G. B., Rao, M. V. J., Sathyamurthy, K. and Murty, B. S. R., *Curr. Sci.*, 1976, **45,** 9.
7. Goubau, W. M., Gamble, T. D. and Clarke, J., *Geophysics*, 1978, **43,** 1153.
8. Rankin, D. and Pascal, F., *Geophysics* (submitted) 1984.
9. Rankin, D. and Pascal, F., *Geophysics*, 1983, **48,** 736.

PRECAMBRIAN FOLDED UNCONFORMITY IN RAJASTHAN

S. SINHA-ROY
Geological Survey of India, A-4 Vijaipath, Jaipur 302004, India.

A GROUP of low to medium grade metamorphic rocks occurs in SE Rajasthan in an arcuate belt between the Vindhyan rocks on the east and the Banded Gneissic Complex on the west. The dominant rock component of this group was considered to be equivalent to the Aravalli sequence[1] and was also correlated with the Gwalior sequence[2]. These rocks are overlain in the Jahazpur sub-belt in the north-central part of the above belt by a dominant carbonate and orthoquartzite sequence which was correlated[1] with the Raialo sequence, and hence considered post-Aravalli. In the revised stratigraphy of Rajasthan (GSI[3]) the Gwalior type rock sequence has been designated as the Hindoli Group and the overlying sequence, the Jahazpur Group, both being contended as pre-Aravalli. Thus a controversy exists on the positions of these rock sequences in Rajasthan stratigraphy.

The Hindoli and the Jahazpur rocks have contrasting lithologies. The former, containing metabasics, metagraywacke and metapelites, is a turbidite sequence, while the latter is principally a metamorphosed dolomite-orthoquartzite sequence with local conglomerate and banded iron formation. Although a profound unconformity between the Raialo and the older formations has been mentioned by Heron[4] from elsewhere, the stratigraphic and structural relations between the Jahazpur Group (= Raialo of Heron[4]) and the Hindoli Group have not yet been worked out. The author describes here an unconformable relation between these rock groups,

and record the feature of folded unconformity, probably the first example from Rajasthan.

The Jahazpur Group rocks occur in two narrow belts of westerly overturned synforms pinched in the Hindoli Group. These belts extend for *ca* 80 km from Rajkot (25°44′:75°36′) in the NE to Nayagaon (25 17′:74 50′) in the SW in the Bhilwara, Bundi and Tonk districts of SE Rajasthan. The unconformity between these two rock groups has been identified in Amalda (25°29′:75°00′) and Jawal (25°22′:74°50′).

In Amalda area the Jahazpur Group containing dolomite, quartzite with ironstone bands and conglomerate overlies the chlorite phyllite of the Hindoli Group (figure 1). The unconformity is marked by an upward fining sequence of conglomerate and current-bedded gritty quartzite. The pebbles of the conglomerate are deformed and comprise black, grey and green quartzite and vein quartz. The thickness of the conglomerate is variable, especially of the basal gritty quartzite, both often pinching out. Such stratigraphic pinching has brought various lithologies of the Jahazpur Group against the Hindoli Group along the plane of unconformity. The lithounits of the Jahazpur Group show a series of westerly overturned folds within the major synformal structure which has folded the unconformity.

The structural relations of the folded unconformity are best studied in the Jawal area where the grey and purple phyllites of the Hindoli Group are overlain by 10 m (maximum) thick conglomerate bed interlayered with current-bedded quartzite and graded grit beds (figure 1). The thickness of the conglomerate bed is variable, and at places it disappears where the overlying quartzite unit comes in contact with the Hindoli sequence. The conglomerate consists of deformed pebbles (30 cm to 1 cm, long axes) of augen and banded gneiss, and dominant Hindoli components of black quartzite, quartz schist, variegated phyllite and vein quartz with malachite stains, set in a quartzose matrix. Channelling features and modified pebble imbrication structures are common.

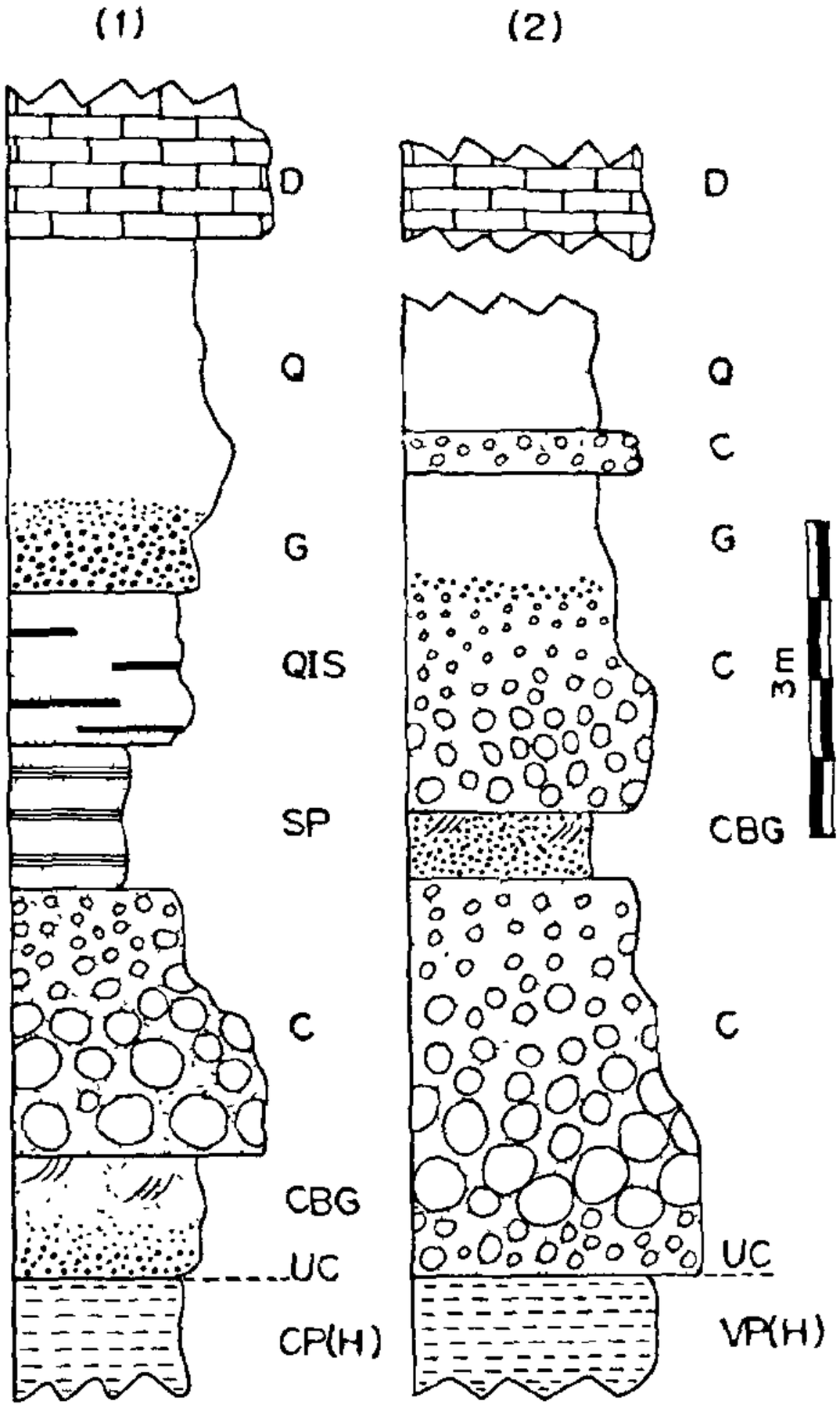

Figure 1. Stratigraphy of the Jahazpur sequence at the unconformity with the Hindoli sequence at Amalda (1) and Jawal (2). UC—Unconformity. Lithologic legend: Hindoli Group: CP(H)—chlorite phyllite, VP(H)—Variegated phyllite; Jahazpur Group: CBG—current-bedded grit, C—conglomerate, SP—semipelite, QIS—quartzite with ironstone bands, G—grit, Q—quartzite, D—dolomite.

Figure 2 shows the folding pattern of the conglomerate and its relation with the substrate. The Hindoli substrate shows isoclinal folds on the bedding (HS_0) preserved in the phyllites which is subparallel to the schistosity (HS_1). These folds and the schistosity are absent in the overlying Jahazpur conglomerate and the associated quartzite which show an open to close synformal structure on the bedding (JS_0) with an axial planar slaty cleavage (JS_1). This slaty cleavage continues into the Hindoli substrate as a crenulation cleavage (HS_2) at an acute angle to HS_1. Clearly, at least one deformation phase (F_1) preceded the Johazpur sedimentation, and another (F_2) followed it, and folded the unconformity surface. The relationship between the different structural elements across the unconformity is shown in figure 3. The structural discordance between JS_0 and HS_0/S_1 is evident. The mean stretching lineation given by the long axes of the deformed conglomerate pebbles plunges 45° toward 110°. The pebbles are flattened on JS_1, the average

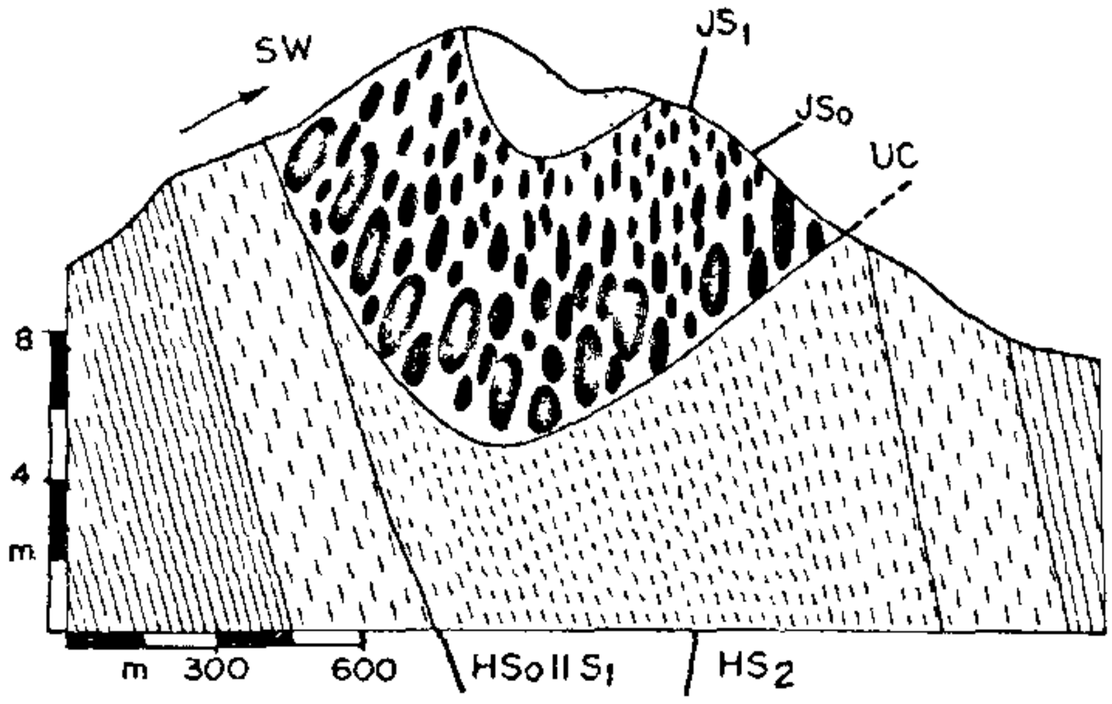

Figure 2. Profile across unconformity in Jawal. Legend: UC—unconformity, solid ellipse—deformed Jahazpur conglomerate, stippled—Jahazpur quartzite, ruled—Hindoli chlorite phyllite, dot-dash—Hindoli grey phyllite, dash—Hindoli purple phyllite, (For explanation see text).

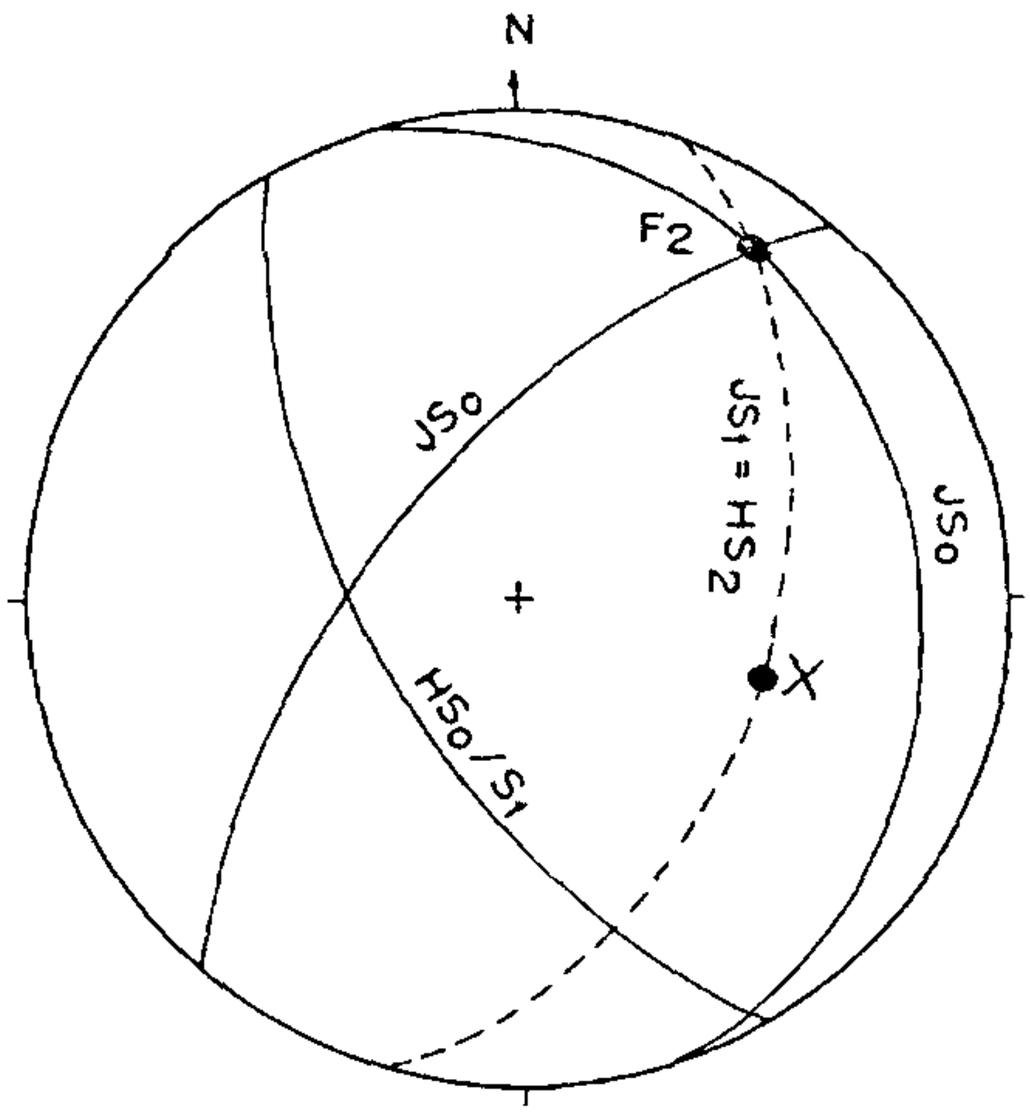

Figure 3. Structural relations across the unconformity, data plotted on equal area net (lower hemisphere). X—mean stretching lineation (long axes of deformed pebbles). (For explanation see text).

axial ratio being 7:2.5:1, which indicates a strong stretching (*ca* 270%) in the X direction under plain strain condition.

In many places of this belt where the conglomerate pinches out and where a strong post-Jahazpur deformation caused transposition of pre(F_1)- and post(F_2)-Jahazpur structural elements the unconformity is likely to be missed or misinterpreted.

If the Hindoli and probably also the Jahazpur rocks are pre-Aravalli[3] and if these are pre-Berach Granite[5], then taking the age of the Berach Granite as 2580 Ma[6], the deformed unconformity reported here is one of the oldest in India.

Shri A. L. Mathur and Dr R. N. Singh helped in the field.

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1. Heron, A. M., *Mem. Geol. Surv. India*, 1936, 68.
2. Pascoe, E. H., *Misc. Publ. Geol. Surv. India*, 1950.
3. Geological Survey of India (GSI), 1981, *Explanatory Brochure to Geological Map of the Aravalli Region, Southern Rajasthan and NE Gujarat.*
4. Heron, A. M., *Mem. Geol. Surv. India*, 1953, 79.
5. Prasad, B., *Rec. Geol. Surv. India*, 1982, **112,** 26
6. Crawford, A. R., *Can. J. Earth Sci.*, 1970, **7,** 91.

LATE NEOGENE FOSSIL WOOD FROM BIKANER GRAVEL BED

R. K. GANJOO, R. HEMA, S. N. RAJAGURU and CLAIRE GAILLARD
Deccan College, Pune 411006, India.

QUATERNARY deposits in the Thar desert are of fluvial, fluvio-lacustral and aeolian origin and they rest unconformably over Pre-Cambrian to the Early Tertiary rocks. These surficial formations are almost devoid of megafossils and lack distinct lithological characters suitable for building geochronological framework. Recent geo-archaeological investigations in the eastern margins of the "Thar" and a few C-14 dates on continental carbonates[1] and on organic material from playa sediments[2] indicate that the major portion of the exposed surficial sediments are of Late Pleistocene age, approximately covering a time span of last 100,000 years. Pre-Late Pleistocene continental deposits, have not been properly dated due to paucity of suitable palaeontological, archaeological materials. Detailed geomorphological, archaeological and preliminary geo-chronological (U/Th series, Tl, C-14) studies of fossil dunes, calcareous pan deposits and conglomerate beds in Nagaur district have revealed