

per molecule of hemocyanin as determined from difference spectra and protein content. Antibodies were raised in three rabbits, using LPH-dpA as immunogen and the dpA antibodies were purified on AH-Sepharose-dpA affinity column by dpA elution⁹. Binding of ³H-dpA to the antibodies was assayed by the nitrocellulose filter method⁸.

Figure 1 shows the percentage inhibition of ³H-dpA binding to purified dpA antibodies at different concentrations of pyridine in TBS. Ten percent (1.24 M) pyridine brings about 95% inhibition of the binding. The inhibition was then studied at four pyridine concentrations using at each pyridine concentration the same amount of antibodies and varying inputs of ³H-dpA. The results are given in figure 2 as double reciprocal plots. At different pyridine concentrations the intercept remains constant but the slope changes, showing that the inhibition is of competitive type.

The above findings that pyridine is a competitive inhibitor for ³H-dpA binding to anti-dpA antibodies mean that some antigenic determinants of dpA have structural similarity to pyridine. The planar pyrimidine ring of adenine is likely to be this antigenic determinant.

2 May 1984

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SURMASPORA, A NEW PTERIDOPHYTIC SPORE GENUS RECOVERED FROM THE TERTIARY SEDIMENTS OF MEGHALAYA AND ASSAM

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DURING the course of palynological investigations of the Barail-Surma (Oligocene-Lower Miocene) sediments of Sonapur-Badarpur Road Section, Meghalaya and Assam, the present authors recovered quite a number of specimens of trilete miospores from the Upper Bhuban Formation (Dona Member) near 165.6 km stone on the Jowai-Badarpur Highway. This road section is located in the south east of Shillong. The miospores referred to the newly established spore genus *Surmaspora*, consists of a single species viz. *S. sinuosa*. In morphological characters *Surmaspora* has trilete rays surrounded by a thick labra having globular thickenings at the ray-ends. Exine is verrucose; verrucae are generally sparsely-spaced.

The slides and negatives are housed at the Birbal Sahni Institute of Palaeobotany, Museum, Lucknow.

Surmaspora gen. nov.

Type species—*Surmaspora sinuosa* gen. et sp. nov.

Generic diagnosis—Miospores triangular-subtriangular with broadly rounded apices. Trilete, γ -rays extend up to 3/4 of the spore radius surrounded by a thick labra having globular thickenings at the ray-ends. Exine verrucose, verrucae generally sparsely spaced.

Comparison—*Surmaspora* gen. nov. remotely compares with *Verrucosisporites* Ibrahim¹ and *Verrutriteles* (V. D. Hammen) Potonié² in having verrucose type of exine but can be easily distinguished from the former two genera by the presence of globular thickening at the ray-ends and ribbon-like labra. *Surmaspora* is closely comparable to *Dandotiaspora*³ but differs from it in having verrucose exine and ribbon-like labra. *Garotriteles*⁴ possesses foveo-reticulate ornamentation and hence it is not comparable. *Dictyophyllidites*⁵ is different in possessing laevigate exine and distinct exinal thickening in close proximity to the trilete rays. *Biretisporites*⁶ differs by having raised trilete mark which is almost covered by the upturned exine together with laevigate exine. *Sestrosporites*⁷ possesses inter-radial thickenings along the trilete mark, thus it is not comparable. *Lycopodiumsporites*⁸, *Foteosporites*⁹, *Foteotriteles*²

and *Microreticulatisporites*¹⁰ do not compare with the present genus as they possess foveo-reticulate ornamentation of the exine and simple trilete mark.

Derivation of the name—After the Surma Group, Jaintia Hills, Meghalaya.

Surmaspora sinuosa gen. et sp. nov.

Holotype — Figure 2, size 60 μm , slide no. 8225/3

Type locality — 165.6 km stone, Sonapur-Badarpur Road Section, Meghalaya.

Type Horizon — Dona Member, Bhuban Formation, Surma Group, Lower Miocene.

Diagnosis—Miospores triangular to subtriangular. Size range 60–70 μm , Trilete γ -rays extending up to 3/4 of the radius, labra generally broad, ribbon-like having globular thickening at the ray-ends. Exine verrucose, verrucae generally sparsely spaced.

Description—Miospores mostly subtriangular in equatorial view, apices broadly rounded, interapical sides straight to convex. Trilete mark very distinct, reaching 3/4 of the radius, ray-apex raised, ray-vertex low, surrounded by broad, sinuous, thick, ribbon-like labra, 5–7 μm in width, up to 30 μm long, narrower at the centre (2.5 μm thick), broadening towards the ends, \pm globular thickening present at the ray-ends, sometimes bifurcating. Exine verrucose, verrucae irregular in shape, 2–4 μm long, 3–5 μm broad, sparsely spaced.

Occurrence—Dona Member, Bhuban Formation, Surma Group, Lower Miocene.

Number of specimens studied—About 30

Occurrence of specimens in a slide—About 6

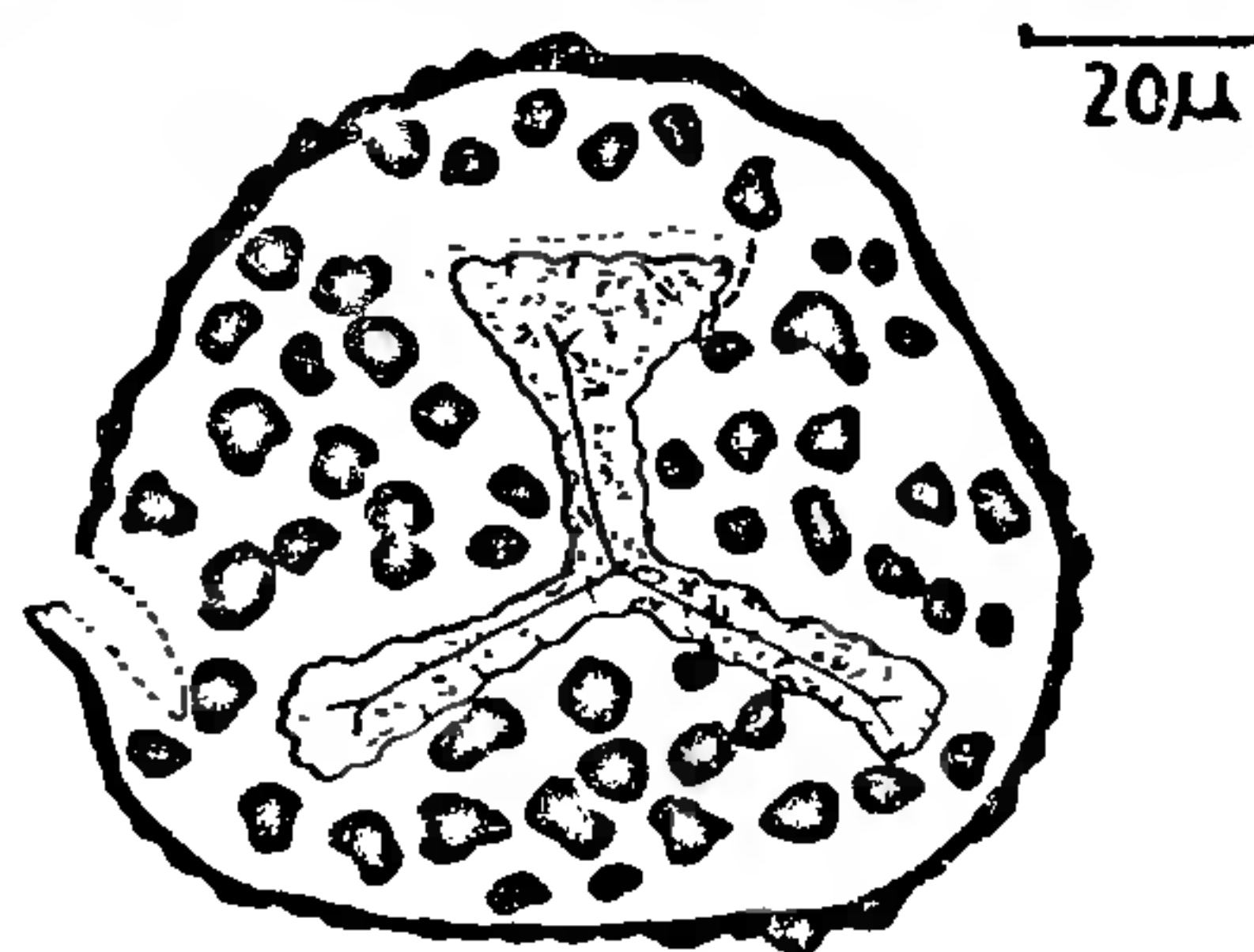
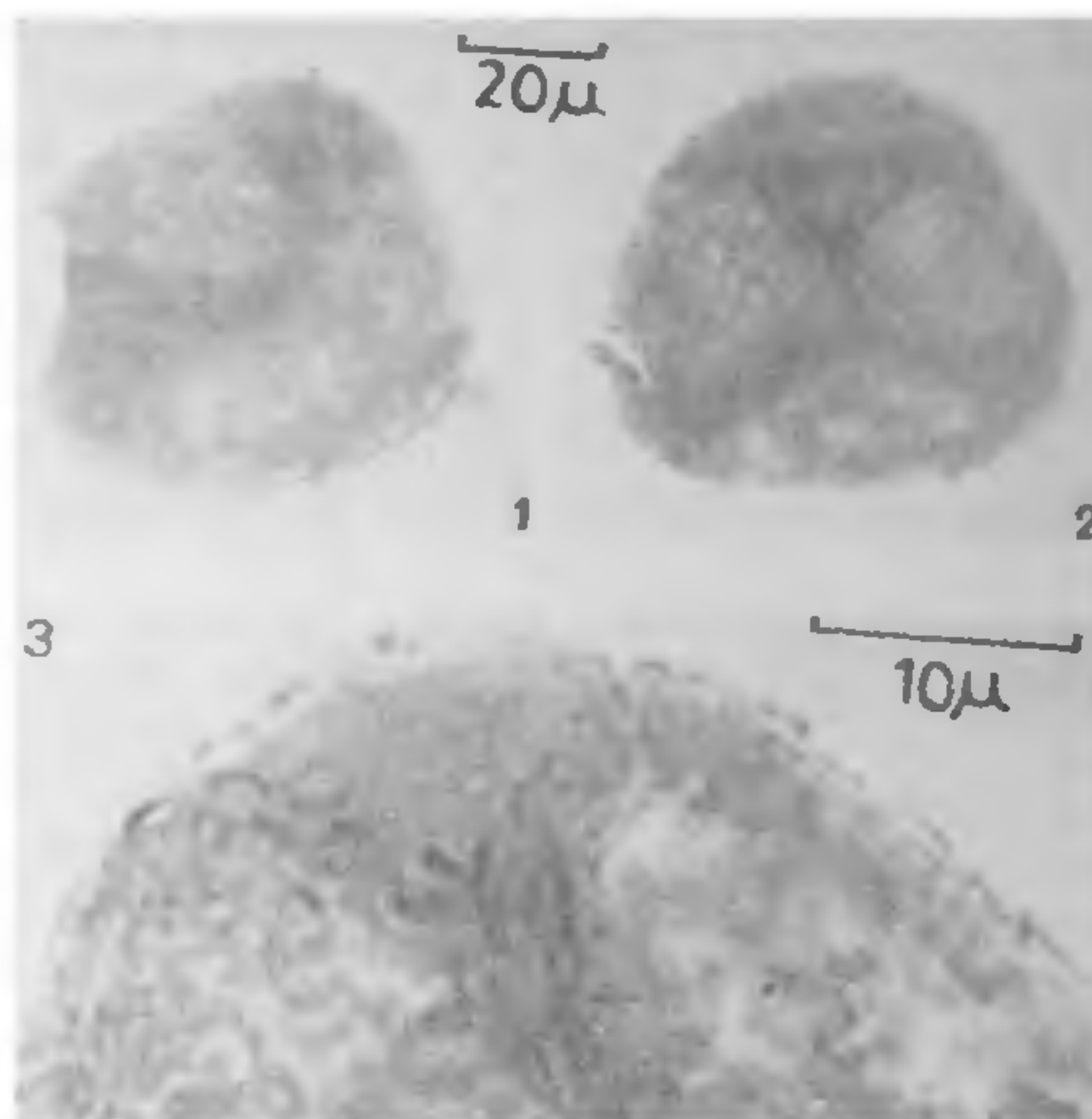
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Surmaspora (Dandotiaspora) verrucata
Kar & Saxena 1981, comb. nov.

Remarks—Kar & Saxena¹¹ described *Dandotiaspora verrucata* (figures 1–4) from a bore core, near Rataria, southern Kutch, Gujarat which closely resembles the present genus by its size, shape, organization and exine ornamentation.

Dandotiaspora spores are characterised by laevigate exine only. Therefore, those forms which possess verrucose exine have been transferred to *Surmaspora*. Specimens belonging to this species have not been found in the present assemblage.

Comparison—*Surmaspora verrucata* comb. nov. differs



Figures 1–4, 1 & 2 *Surmaspora sinuosa* gen. et sp. nov. slide nos. 8224/6, 52.2 \times 102.8; 8225/3, 69.5 \times 118.8 (Holotype). \times ca. 500. 3. Enlarged part of the same specimen. \times ca. 2000. 4. Text-figure of *Surmaspora sinuosa*. \times ca. 750.

from *S. sinuosa* gen. et sp. nov. by lacking a broad, thick, sinuous and ribbon-like labra.

17 January 1984; Revised 8 May 1984

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THE Khardi EARTHQUAKES, 1983

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THE township of Khardi (Lat. $19^{\circ}35'13''$; Long. $73^{\circ}23'02''$), located about 90 km northeast of Bombay, in the Shahapur taluka of Thane district, Maharashtra recently experienced earthquakes of magnitudes 4.0 and 4.8 on 17 August 1983 and 15 September 1983 respectively. These followed the first records of tremors in mid-May and initiated speculations regarding the possible relationship of the earthquakes to the filling up of the Bhatsa reservoir situated about 7 km to the southeast of Khardi. Analyses of satellite imageries and seismicity data, and extensive fieldchecks, support the view that the Khardi phenomena are cases of reservoir-induced seismicity.

The area around Khardi forms a part of the Deccan Volcanic Province and is constituted of basaltic flows of varying thickness. A study of LANDSAT-1 imageries in bands 4, 5 and 7, on scale 1:250,000, covering the region, reveals a structural fabric characterised by major lineaments dominantly trending $N330^{\circ}$ - $N340^{\circ}$, $N10^{\circ}$ - $N20^{\circ}$ and $N50^{\circ}$ - $N60^{\circ}$. While some of these lineaments represent basic dykes, others reflect fracture zones (figure 1).

The township of Khardi is located within a NW-SE trending belt, about 5 km wide, exhibiting a high density of lineaments largely oriented in the same direction. It is margined on the northeastern side by

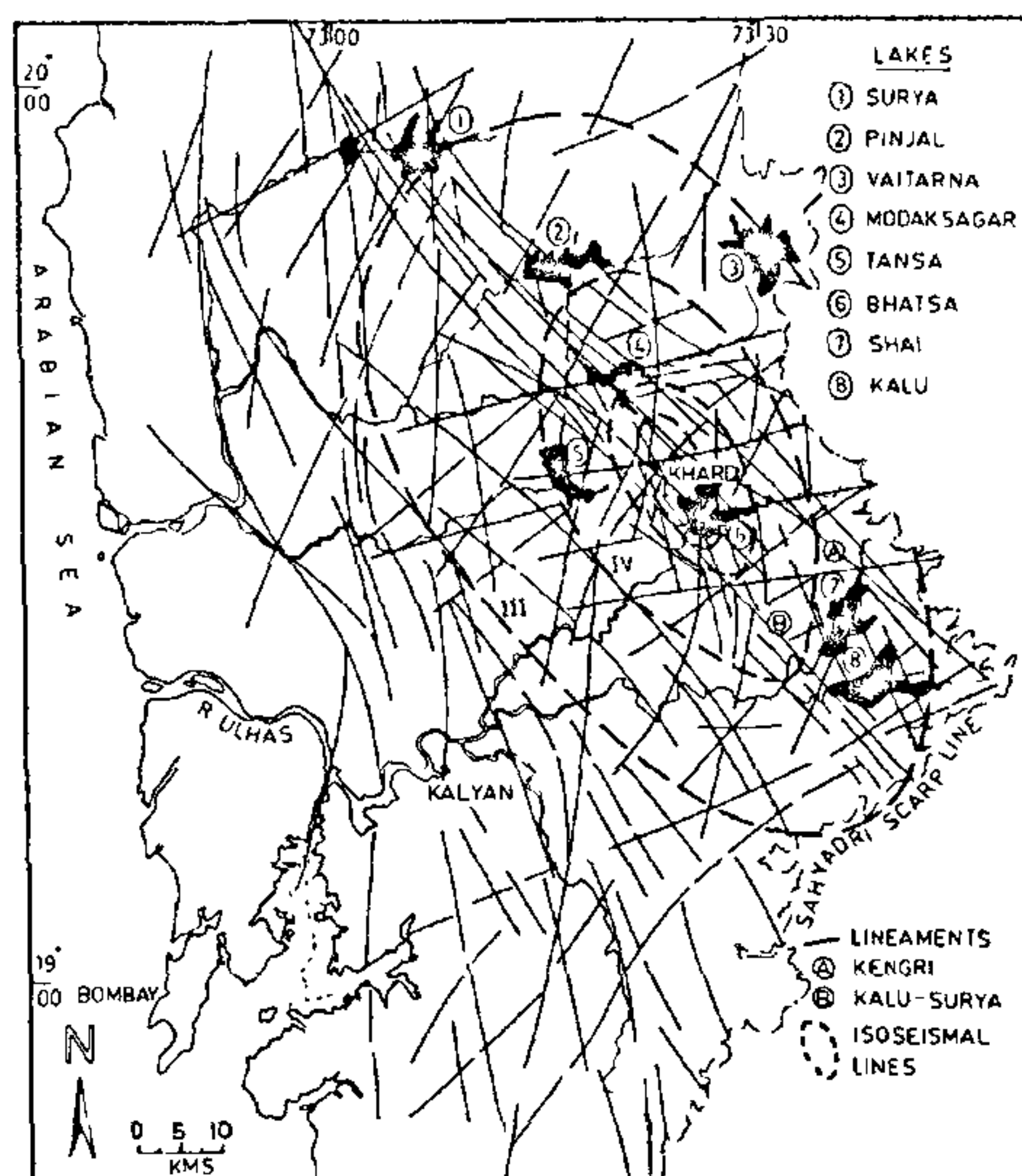


Figure 1. Generalised map of Khardi area showing lineaments and isoseismal lines.

the Kengri Nadi lineament and on the southwestern side by the Kalu-Surya lineament, both of which can be traced on LANDSAT-1 imageries over several hundred kilometres. The Kengri Nadi lineament appears to be a continuation of the Ghod lineament¹ of the Deccan Plateau region.

This lineament belt is intersected at Khardi by two lineaments trending $N15^{\circ}$ and $N75^{\circ}$. Field checks show that they correspond to gabbroic dykes, each about 40 m thick, which have evidently been emplaced along fracture zones. Khardi is thus located at the intersection of major fractures. Likewise, two lineaments corresponding to dykes, respectively trending N-S and E-W, intersect about 6 km south of the Bhatsa dam.

Interestingly, geomorphological evidences suggest that the Kengri Nadi lineament is a boundary between two geomorphological units. The area to the northeast of this lineament exhibits a youthful topography characterised by deep gorges, narrow 'V' shaped valleys, rapids and waterfalls. Southwest of this lineament the topography is in a mature to old stage with rolling water divides and broad 'V' to 'U' shaped valleys. This suggests that the northeastern block is