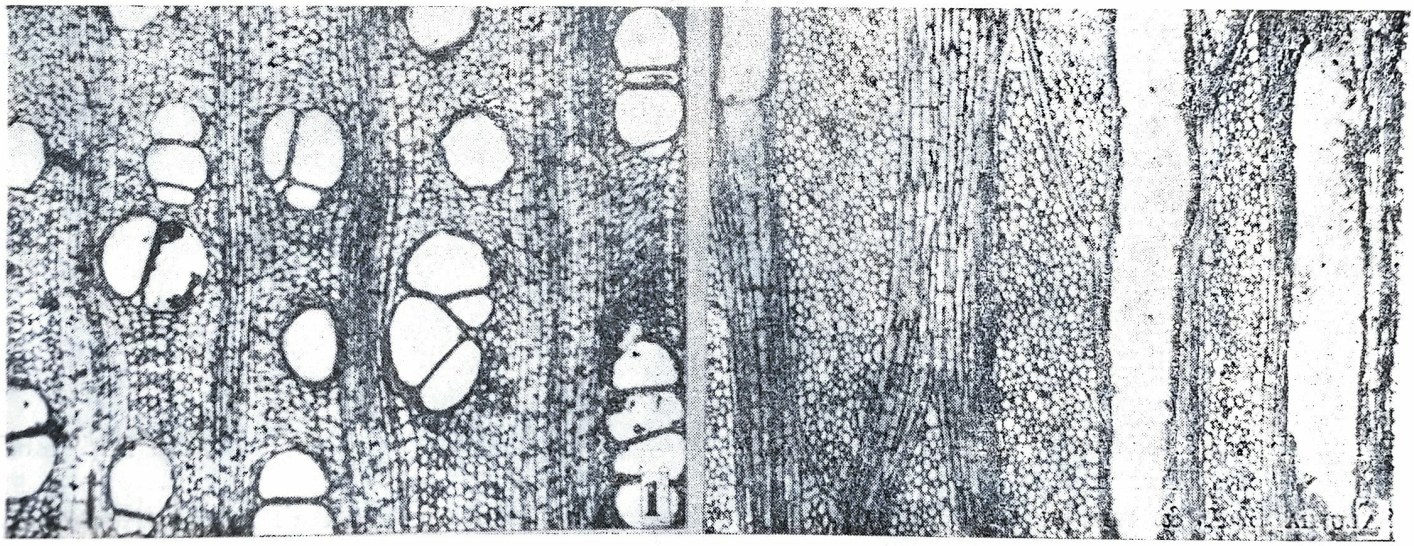
FOUR NEW FOSSIL DICOTYLEDONOUS WOODS FROM THE DECCAN INTERTRAPPEAN BEDS NEAR SHAHPURA, MANDLA DISTRICT, MADHYA PRADESH

Recently a new Deccan Intertrappean fossiliferous locality was discovered near Shahpura in Mandla District of Madhya Pradesh and a rich collection of fossil woods was made. A preliminary study of this material resulted in the finding of four new types which are described briefly in this short communication.

1—*Wood* diffuse-porous. *Growth rings* indistinct. *Vessels* small to large, t.d. 45-255 μ, r.d. 60-360 μ, rarely solitary, majority in radial multiples of 2-10, frequently in clusters, 5-12 per sq. mm; perforatoins simple ; intervessel pit-pairs alternate, bordered, 4-6 μ in diameter with linear-lenticular apertures. *Parenchyma* paratracheal and apotracheal ; paratracheal parenchyma 1-2 seriate vasicentric ; apotracheal parenchyma diffuse-in-aggregate forming 1-2 seriate tangential lines ; parenchyma cells storied. *Xylem rays* 4-5 per mm, heterocellular, of two distinct types, 1-22 seriate ; uniseriate rays made up of either upright cells only or both upright and procumbent cells; multiseriate rays made up of procumbent cells in the middle part with uniseriate extensions of upright cells at the ends and sheath cells along the flanks. *Fibres* libriform to semi libriform and non septate.

The fossil shows a close similarity to the woods of three extant species of *Sterculia* viz. *Sterculia foetida*, *Sterculia guttata* and *Sterculia campanulata* (Pearson & Brown 1932, pp. 146-152 ; Chattaway, 1937). As it differs from all the known species of *Sterculioxylon* Kraüsel (1939) it has been described here as *Sterculioxylon shahpuraensis* sp. nov.

Holotype—B.S.I.P. Museum No. 35368.



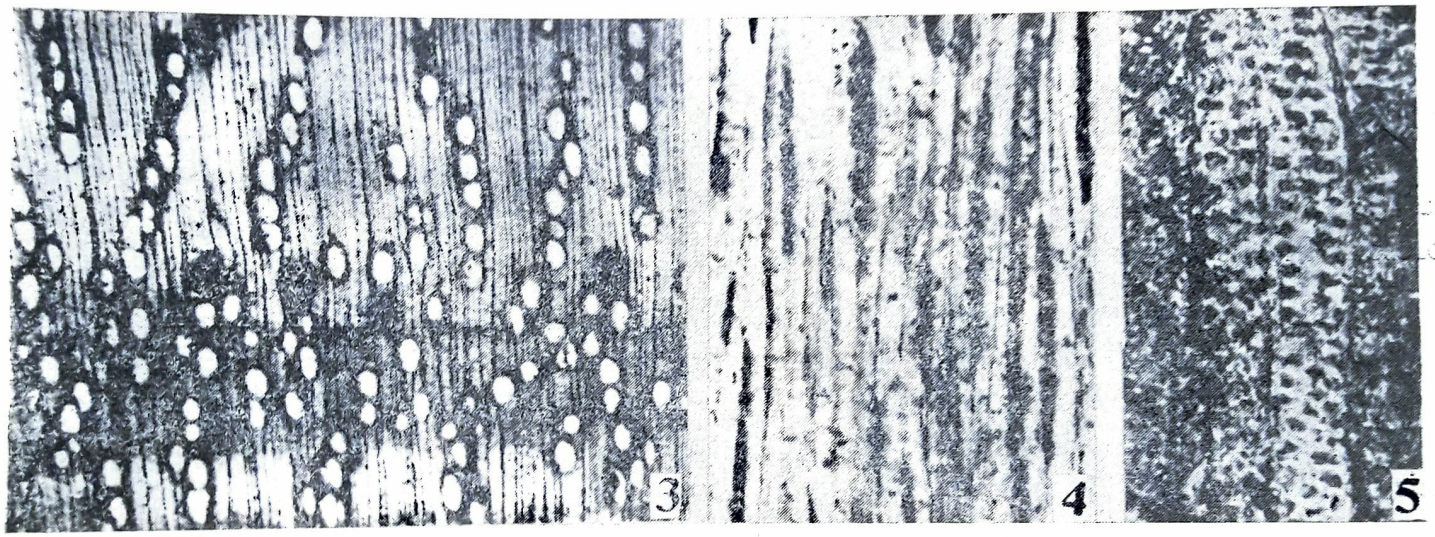
Sterculioxylon shahpurensis sp. nov.—Fig. 1—Cross section showing vessels, parenchyma and xylem rays. ×35. Slide No. 6139/35368. Fig. 2—Tangential longitudinal section showing xylem rays and storied parenchyma. ×30. Slide No. 6140/35368.

2—*Wood* diffuse-porous. *Growth rings* distinct demarcated by crowding of vessels. *Vessels* small to medium, t.d. 30-120 μ, r.d. 50-165 μ, mostly solitary, occasionally in radial pairs arranged in characteristic oblique pattern forming radial rows of 2-7 vessels, 10-40 per sq. mm.; perforatoins simple. *Tracheids* vasicentric; vessel-tracheid pits bordered, 4-6 μ in diameter with linear apertures. *Parenchyma* apotracheal forming widely spaced,

3-4 seriate tangential bands. *Xylem rays* 15-20 per mm, mostly uniseriate, rarely with paired cells, homo to heterocellular, made up of either procumbent cells only or both procumbent and upright cells, 2-22 cells high. *Fibres* semi libriform to libriform and non-septate.

Important anatomical characters of the fossil wood such as vessels arranged in characteristic oblique pattern, vasicentric tracheids, tangential bands of parenchyma and mostly uniseriate rays clearly indicate its affinities to the extant genus *Calophyllum*. Of the various species of this genus, the fossil shows maixmum resemblance to *Calophyllum tomentosum* and *Calophyllum spectabile* (Chowdhury & Ghosh, 1958 ; Metcalfe & Chalk, 1950 ; Pearson & Brown, 1932). As it also differs from all the earlier described species of *Calophylloxylon* Lakhnapal & Awasthi (1965) it has been placed under a new species *Calophylloxyon dharmendrae* sp. nov. This is the first record of *Calophyllum* from the Deccan Intertrappean beds.

Holotype—B.S.I.P. Museum No. 35373

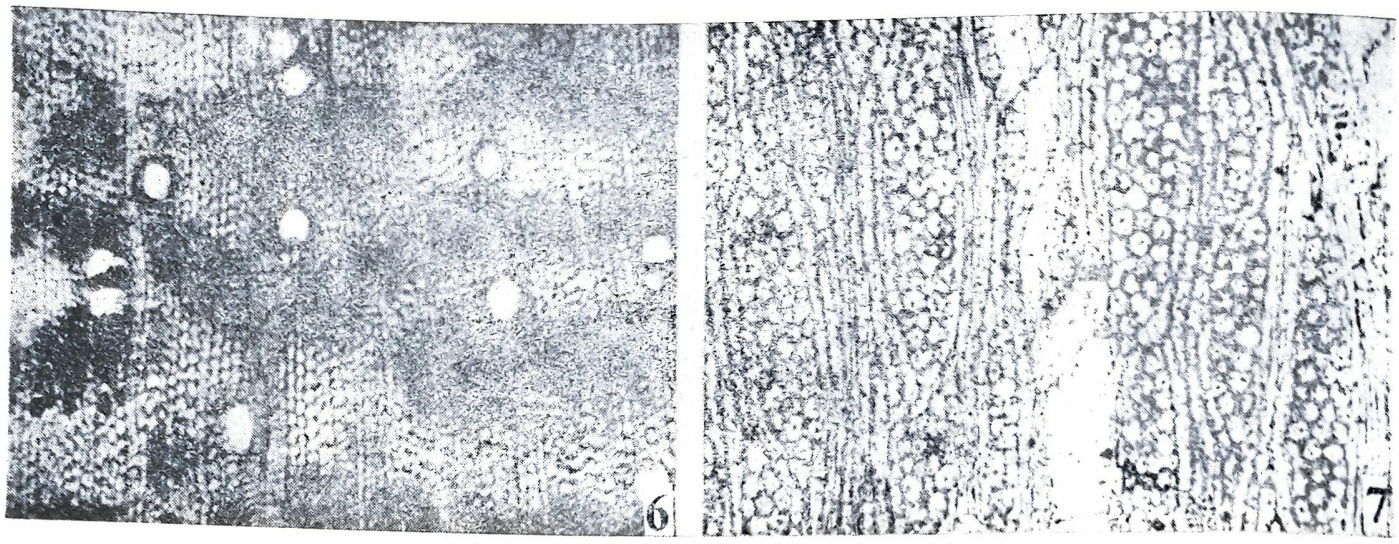


Calophylloxylon dharmendrae, sp. nov.—Fig. 3—Cross section showing vessels arranged in oblique radial rows. ×25. Slide No. 6150/35373. Fig. 4—Tangential longitudinal section showing uniseriate xylem rays. ×140. Slide No. 6151/35373. Fig. 5—Vasicentric tracheids with bordered pits. ×250. Slide No. 6151/35373.

3—*Wood* diffuse-porous. *Growth rings* demarcated by terminal parenchyma. *Vessels* small to medium-sized, t.d. 30-90 μ, r.d. 20-135 μ, solitary and in radial rows of 2-6, also in clusters, 6-13 per sq. mm; perforations simple ; intervessel pit-pairs bordered, alternate to opposite, about 4 μ in diameter with lenticular apertures. *Parenchyma* terminal and paratracheal, forming 3-10 seriate, continuous or interrupted, tangential bands. *Xylem rays* 1-6 (mostly 2-4) seriate, made up of both procumbent and upright cells, 1-42 cells in height and 6-9 per mm. *Fibres* rarely septate.

The present fossil shows a close resemblance to the wood of extant species *Heynea trijuga* of Meliaceae (Ghosh, Purkayastha & Krishna Lal, 1963, pp. 130-132, Pl. 44, Figs. 259-260). As this is the first record of *Heynea* in the fossil state, it is described as *Heyneoxylon tertiarum* gen. *et* sp. nov.

Holotype—B.S.I.P. Museum No. 35377

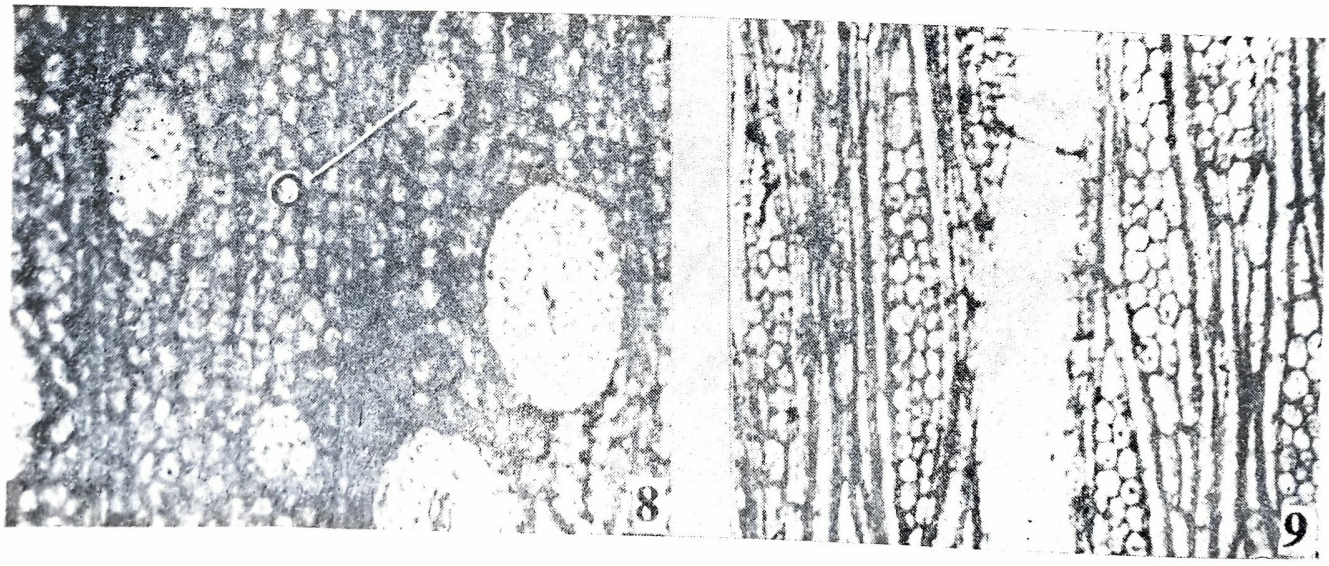


Heyneoxylon tertiarum gen. *et* sp. nov.—Fig. 6. Cross section showing vessels, xylem rays and tangential bands of parenchyma. ×40. Slide No. 6158/35377. Fig. 7. Tangential longitudinal section showing heterocelluiar xylem rays. ×65. Slide No. 619/35377.

4—*Wood* diffuse-porous. *Growth rings* indistinct. *Vessels* small to medium, t.d. 45-150 μ, r.d. 45-255 μ, almost exclusively solitary, rarely in pairs, 10-15 per sq. mm; perforations simple. *Parenchyma* scanty paratracheal to narrow vasicentric. *Xylem rays* 1-4 seriate, 2-40 cells in height, 6-8 per mm; ray tissue heterogeneous. *Fibres* septate. *Oil cells* present in the fibres and the xylem rays.

The presence of oil cells in fibres and xylem rays alongwith other characters, clearly indicates the affinities of this fossil with the woods of Lauraceae. As it also differs markedly from the earlier described fossil woods of this family, it has been described as a new species of *Laurinoxylon* Felix (1883) viz. *L. deccanensis* sp. nov. This is the first authentic record of this family from the Deccan Intertrappean flora of India.

Holotype—B.S.I.P. Museum No. 35378.



Laurinoxylon deccanensis sp. nov.—Fig. 8—Cross section to show vessels, scanty parenchyma and oil cells (0). ×130. Slide No. 6161/35378. Fig. 9—Tangential longitudinal section to show heterocellular xylem rays. ×105. Slide No. 6162/35378.

REFERENCES

CHATTAWAY, M. M. (1937). The wood anatomy of the family Sterculiaceae. *Phil. Trans. R. Soc.*, **228**: 313-366.

CHOWDHURY, K. A. & GHOSH, S. S. (1958). *Indian Woods, Their Identifications, Properties and Uses.* **1.** Delhi.

FELIX, J. (1883). Untersuchungen über fossil Holzer. 1. *Z. dt. geol. Ges.*, **85** : 59-91.

GHOSH, S. S., PURKAYASTHA, S. & KRISHNA, LAL (1963). Family Meliaceae in *Indian Woods, Their Identifications, Properties and Uses.* **2** : 81-159. Dehra Dun.

KRAÜSEL, R. (1939). Ergebnisse der Forsschungareisen Prof. E. Stromers in den Wüsten Ägyptens. IV. Die Fossilen Floren Ägyptens. *Abh. bayer Akad. Wiss, N. F.* . **47** : 5-140.

LAKHANPAL, R. N. & AWASTHI, N. (1965). Fossil woods of *Calophyllum* from the Tertiary of South India. *Palaeobotanist*, **13**(3) : 328-336.

METCALFE, C. R. & CHALK, L. (1950). *Anatomy of Dicotyledons.* **1 & 2.** Oxford.

PEARSON, R. S. & BROWN, H. P. (1932). *Commercial Timbers of India.* **1 & 2.** Calcutta.

M. B. BANDE & U. PRAKASH

Birbal Sahni Institute of Palaeobotany, Lucknow