AILANTHOXYLON MAHURZARII SP. NOV., NEW FOSSIL DICOTYLEDONOUS WOOD FROM THE DECCAN INTERTRAPPEAN BEDS OF MAHURZARI

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ABSTRACT

A fossil dicotyledonous wood *Ailanthoxylon mahurzarii* sp. nov., previously described as *Simaroubaceoxylon muhurzarii* by the author (SHALLOM, 1959), has been described here in detail from the Deccan Intertrappean beds of Mahurzari, a village about 8 miles north-west of Nagpur, Long. 79·0′E and Lat. 21·13′N. From India this has been the first record of a Simaroubaceous wood, now found to be showing closest resemblance to the living genus and species *Ailanthus malabarica* of the family Simaroubaceae.

INTRODUCTION

THE present paper deals with a fossil dicotyledonous wood of Simaroubaceous affinity from the Deccan Intertrappean beds of Mahurzari, a village about 8 miles north-west of Nagpur proper.

This is the third fossil wood to be described in detail by the author from this locality of Mahurzari. The first wood described from the above locality is referred to the family Burseraceae (SHALLOM, 1958) and the second one is assigned to the family Lecythidaceae (SHALLOM, 1960). The records of the fossil woods of the family Simaroubaceae so far known are from the Nevada County, California (PLATEN, 1908), from the Eocene beds of Eden Valley (KRUSE, 1954) and recently from the Deccan Intertrappean of Mohgaon-Kalan, District Chhindwara, in Madhya Pradesh, India (UTTAM PRAKASH, 1959). The present fossil wood also falls under the same family Simaroubaceae, the first record of which was made by the author (SHALLOM, 1959), though generic identification was then withheld for want of the required literature.

The specimen collected is a big silicified piece of secondary wood and ranges in colour from yellow to reddish brown. A large number of ground sections were prepared as making of peel sections after etching the pieces with HF did not yield successful results. The natural reddish stain of the petrifactions has made the study of this wood easy.

DESCRIPTION

Growth-rings, though seen faintly with the naked eye, are not very clear when seen microscopically. These growth marks are faint, limited by crowded and smaller vessels (PL. 1, FIG. 1).

The vessels are small to medium-sized, the radial and tangential diameters varying from 150 to 200 μ and 100 to 150 μ respectively. The pores are solitary or in radial rows of 2's or 3's (PL. 1, FIG. 1). The pore groups are rarely found. The vessels are thin-walled and are filled with tyloses (PL. 1, FIG. 3). The vessel segments are short to medium-sized. Intervessel pitting is typically alternate and bordered, widely spaced (PL. 1, FIG. 7), or closely crowded together (PL. 1, FIG. 5), and becoming hexagonal in shape. Vessel-parenchyma pits are similar to intervessel pits (PL. 1, FIGS. 6, 8). Vessel-ray pits also resemble the intervessel pits (PL. 1, FIG. 8).

Paratracheal parenchyma is abundant, frequently with tangential extensions (Aliform-confluent) as seen in the transverse sections, ending blindly (PL. 1, FIG. 2). The width of a parenchymatous cell varies from 22 to 44 μ. Metatracheal parenchyma is relatively sparse, occurring as scattered cells.

The rays are plainly visible to the naked eye and are variable in size. They are broad to fine, the broad rays are conspicuous and homogeneous (PL. 1, FIGS. 4, 5), consisting of procumbent cells of various sizes. They are 2-7 cells and 50 to about 150 μ in width and 1-70 cells and 60-1600 μ in height. The fine rays are very few, being uniseriate and homogeneous, made up of all procumbent cells (PL. 1, FIGS. 4, 5, marked by arrows).

The fibres are non-libriform and somewhat radially arranged (PL. 1, FIG. 2), forming

the bulk of the tissue between the vessels and rays, and are abruptly tapered with attenuate ends. They are highly variable in length (250-1100 μ), the maximum diameter being 11-22 μ, and the walls 3-4 μ thick. Interfibre pits are mostly abundant on the radial walls and are distinctly bordered (PL. 1, FIG. 9).

DISCUSSION

Comparisons with Modern Families and Genera — The fossil wood from Mahurzari shows the following important combinations of characters that are of great help in its identification:

1. Vessels small to medium-sized, solitary or in radial and tangential rows of 2's or 3's filled with tyloses.
2. Perforation plates exclusively simple.
3. Intervessel pitting typically alternate and bordered.
4. Vessel-ray and vessel-parenchyma pits similar to intervessel pitting.
5. Parenchyma fairly abundant about the pores with lateral extensions present (Aliform-confluent).
6. Fibres non-septate with bordered pits present on radial walls.
7. Rays broad to fine and homogeneous.

These above-mentioned characters are well seen in members of only a few modern families, viz. Rutaceae and Simaroubaceae (METCALFE & CHALK, 1950; PEARSON & BROWN, 1932; GAMBLE, 1922; and WEBBER, 1936).

Non-septate fibres and large rays of the family Rutaceae are some of the characters similar to the fossil wood. But the woods of Rutaceae differ from the fossil wood, mainly in the nature of the vessels, which in the Rutacean woods have a tendency to aggregate into multiples, chains or clusters. Difference is also found in the absence of tyloses, which are abundant in the present fossil wood (HEIMSCH, 1942).

The fossil wood in question resembles a Simaroubacean wood in all the above-mentioned characters, particularly the two modern genera *Simarouba* and *Ailanthus*.

The only species of *Simarouba* cut and studied at Dehra Dun is *Simarouba officinales*. The similarities are seen only in the nature of the vessels (C. HEIMSCH, 1942). The height of the medullary rays in the aforesaid species, however, differs from that of the fossil wood in question in having medullary rays less than 1 mm. in length, to those over 1 mm. in length in the fossil wood.

Comparable characters are found at least in two species of *Ailanthus*, viz. *A. excelsa* and *A. malabarica*, particularly with the latter one. *A. excelsa* is a local plant growing near about Nagpur, and hence studied well by the author from hand-cut sections, while *Ailanthus malabarica* has been studied at Dehra Dun from prepared mounts. Resemblances are seen in the nature of the vessels, particularly the intervessel pits, vessel-ray and vessel-parenchyma pits, which in the fossil wood are definitely bordered as seen in both the living species of *Ailanthus* with which the comparisons of the fossil wood are drawn up. Similarities are also seen in the nature and distribution of the fibres and medullary rays. The characteristic feature of the bordered interfibre pits as seen in *Simarouba* and *Ailanthus* is very clear in the present fossil wood (METCALFE & CHALK, 1950). Slight difference is, however, noted in the presence of fewer vessels per square millimetre in the living genus than in the fossil wood under consideration.

It is from these above-mentioned striking similarities that the fossil wood under consideration is placed under the family Simaroubaceae, coming closest to the genus *Ailanthus*.

It was previously placed under *Simarubaceoxylon* created by the author (SHALLOM, 1959) because Platen's paper (1908) was then not made available to her, and the generic identification of the fossil wood was still under consideration. After making a thorough study of the fossil wood in question it was found that it could not be placed under *Simarubinium* created by Platen (1908), which name includes all fossil woods in general of different genera of the family Simaroubaceae. In the meantime, Uttam Prakash (1959) described a piece of fossil wood from Mohgaon-Kalan for which he created the generic name *Ailanthoxylon* because of the resemblances he saw between his fossil wood and the living genus *Ailanthus*. Accordingly, the author has placed the present fossil wood under the same name *Ailanthoxylon* Uttam Prakash.

Some of the important characters, like alternate and bordered vessel-ray and vessel-parenchyma pits and bordered interfibre pits seen in the living genus *Ailanthus* and which form a characteristic feature of the genus, were not described by Uttam Prakash (1959). The author has, therefore, given below the emended characters of *Ailanthoxylon* Uttam Prakash, 1959.

Diagnosis of *Ailanthoxylylon* (Emended)

A diffuse porous wood.

Growth-rings faint.

Vessels small to medium-sized, mostly solitary or in radial rows of 2's or 3's; vessel segments short to medium-sized, filled with tyloses; perforations simple; intervessel pits alternate and bordered, widely spaced or closely crowded together, hexagonal; vessel-ray and vessel-parenchyma pits similar to intervessel pits.

Wood parenchyma paratracheal, abundant with tangential extensions present (Aliform-confluent type). Metatracheal parenchyma relatively sparse, scattered cells.

Xylem rays uniformly distributed, moderately numerous, mostly broad to very few uniseriate rays present, homogeneous, broad rays more than 1 mm. in length.

Wood fibres non-libriform, arranged in regular radial rows, particularly non-septate, short to medium-sized, interfibre pits definitely bordered.

Comparisons with Other Fossil Woods Described of the Family Simarubaceae — The present fossil wood has been compared with other fossil woods described of the family Simaroubaceae from abroad, namely *Suriana inordinata* (KRUSE, 1954) from the Eocene beds of Eden Valley, *Simaroubinium crystallophorum* and *S. Engelhardti* (PLATEN, 1908) from the Tertiary beds of Nevada County, California, and with *Ailanthoxylon indicum* (UTTAM PRAKASH, 1959) from the Deccan Intertrappean beds of Chhindwara, India.

Suriana inordinata (KRUSE, 1954) differs markedly from the fossil wood in question in the nature and distribution of the vessels and in the nature of wood parenchyma and rays. Pith, primary xylem, vascular cambium and phloem found and described by Kruse (1954) are not present in the fossil wood under consideration.

Platen (1908) has described two fossil woods, namely *Simarubinium crystallophorum* and *S. Engelhardti*. The latter is shown to be similar to *Simarubinium crystallophorum*, except for the absence of crystals in the medullary ray cells. The present fossil wood is, therefore, compared with *S. crystallophorum* and it is found that Platen's woods differ from the present specimen in the possession of tracheids, simple interfibre pits and crystals in both the parenchymatous and the medullary ray cells.

Ailanthoxylon indicum (UTTAM PRAKASH, 1959), described from India, resembles the present specimen, showing generic identification, except for simple vessel ray pitting which is definitely bordered in the fossil wood under consideration. Vessel-parenchyma and interfibre pits which also show bordered nature in the specimen described by the author have not been described in *Ailanthoxylon indicum* (UTTAM PRAKASH, 1959). It also differs from the present specimen in certain specific characters, viz. in the possession of large to medium-size vessels, 1-6 seriate and 4-54 cells high medullary rays.

This infers that the fossil wood under consideration from Mahurzari, though showing generic resemblance to *Ailanthoxylon indicum* except for few characters, falls into a new species of *Ailanthoxylon*. The new species is named *Ailanthoxylon mahurzarii*.

Diagnosis of *Ailanthoxylon mahurzarii* sp. nov.

A medium, coarse-textured, distinctly diffuse porous wood.

Growth-rings faint.

Vessels with radial and tangential diameters varying from 150 to 200 μ and 100 to 150 μ respectively, mostly in radial rows of 2's or 3's, pore groups rarely present, tyloses present. The vessel segments short to medium-sized, intervessel pits alternate and bordered, widely spaced or closely crowded together.

Parenchyma the maximum width varies from 22 to 44 μ. Rays 2-7-seriate, 50-150 μ in width, 1-70 cells or 60-1600 μ in height.

Fibres 11-22 μ in diameter, 3-4 μ in thickness of wall; interfibre pits bordered.

The wood described here is represented by two blocks 2/B which at present are kept in the Government College of Science, Nagpur.

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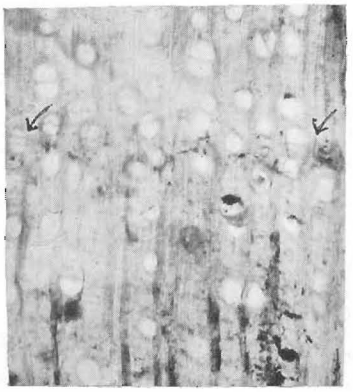
EXPLANATION OF PLATE 1

1. Transverse section showing the distribution of vessels. × 22.
2. Transverse section magnified showing parenchyma distribution about the pores with lateral extensions present (*p*) × 90..
3. Vessel showing tyloses. × 50.
4. Tangential section showing clearly the medullary rays. The uniseriate rays shown by arrows. × 90.
5. Intervessel pits hexagonal with a single medullary ray in contact. × 180.
6. Vessel-parenchyma pits. × 90.
7. Intervessel pits widely spaced, alternate and bordered. × 180.
8. Vessel ray and vessel-parenchyma pits similar to intervessel pits. × 180.
9. Interfibre pits bordered seen from radial section marked by arrows. Parenchyma cells seen on one side. × 360.



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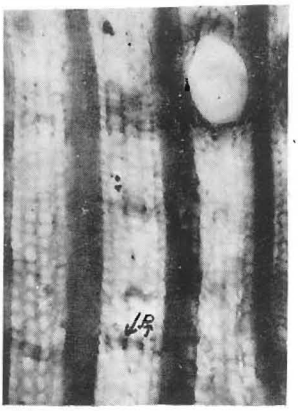

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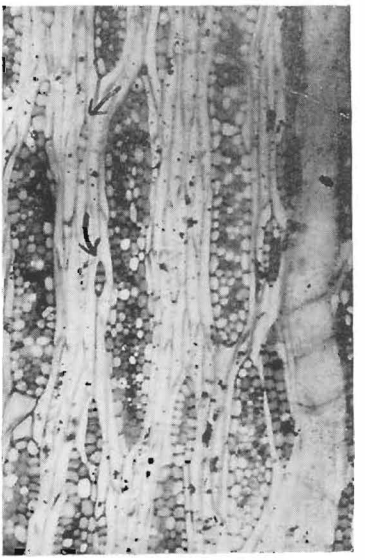

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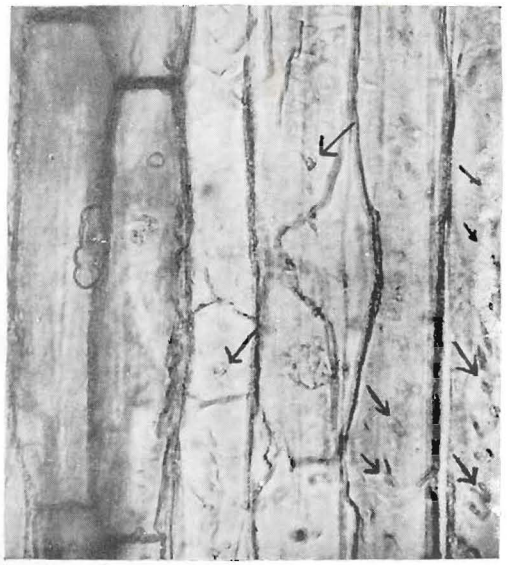

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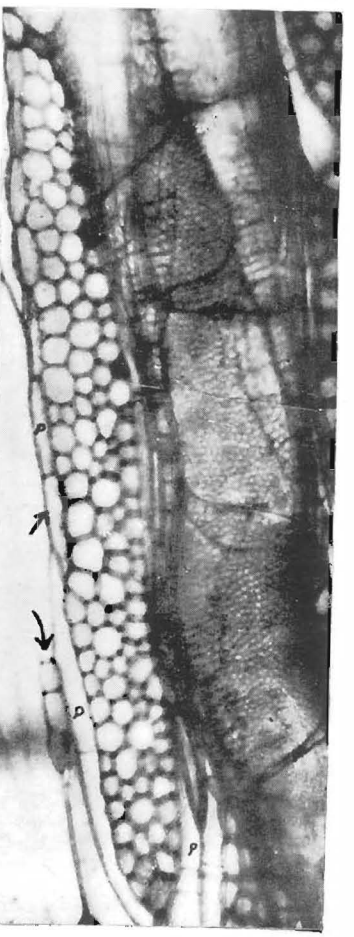

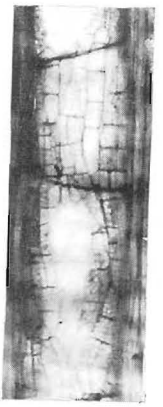

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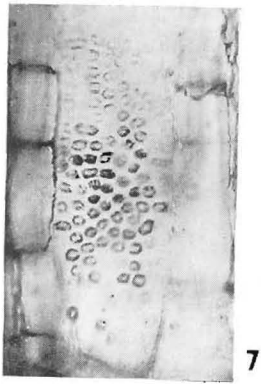

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