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“Indian Woods suitable for Engineering Purposes.”

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THE principal Indian woods suitable for engineering purposes are:—1. Bamboo; 2. Babul, or Keeker; 3. Deodar; 4. Ebony; 5. Sâl; 6. Teak; 7. Toon; 8. Tamarind, or Imli; 9. Shishan.

(1) The Bamboo (*Bambusa arundinacea*) is the most generally useful of all the vegetable productions of India. It forms the war-lance of the cavalry, and the deadly bow of the Bheel, as well as the pole of the dooli which carries the wounded soldier out of action. It is used for boat-oars, clubs, walking-sticks, and for scaffolding. It also forms a principal material in the thatched roofs of houses, in which it is employed for the net-like framework that supports the thatch. It is an ornamental as well as a useful garden-tree. The bamboo is of two distinct kinds, the small, hard, close-grained variety, and the large hollow one, generally used for the uprights in scaffolding. The bamboo is very tough, and is stronger than any of the Indian woods.

(2) The Babul (*Acacia Arabica*) is found on sandy and clayey plains and waste-lands. It thrives best on the poorer soils, as it is generally found on all the uncultivable lands around Indian villages. The tree seldom attains a greater height than 30 or 35 feet, or a greater thickness than 2 feet. The heart-wood is of a light red colour, close-grained, hard, tough, and of great durability. It is preferred for cart-wheels and ploughs; also for the beams of sugar-mills, and for roofing purposes. It is in general request for the manufacture of tent-pins, for which it is admirably adapted by its toughness and hardness, combined with lightness, which is a point of greatest importance to the traveller. The bark of the wood is extensively used as tan.

(3) The Deodar (*Cedrus deodara*) is generally supposed to be a variety of the cedar of Lebanon, used in the building of Solomon's temple. It has great stiffness, strength, hardness, and durability, and on this account is well adapted for engineering purposes. It grows in large quantities in the Himalayan forests, and is brought down to the plains by river. It comes down the Ravi, Jhelum,

and Chenah, in large logs, varying from 20 to 60 feet in length, and from 2 to 12 feet in girth. It takes a long time to season, and is never well-seasoned for joiner's work under eight or ten years. For engineering purposes it is said to season sufficiently in three years.

(4) The Indian Ebony (*Diospyros ebenaster*) is of a small size, not more than 8 to 12 inches in thickness. The natives use it for axles of carts, for which purpose it is admirably fitted by its extreme hardness, toughness, and strength. The sap-wood is much used for door-frames and for wheels; but the heart-wood alone is used for furniture. It is the heaviest Indian wood yet known, being superior to Sâl in this respect. The heart-wood is of a very dark colour, approaching to black, and takes a good polish. On this account it is used for ornamenting furniture, for wood carvings, and for ornamental ceilings.

(5) Sâl-wood is obtained from the principal forests along the Tarai, at the foot of the Himalayan mountains, and in the Vindhyan hills near Gaya. The Sâl (*Vatica robusta*), one of the most celebrated of the Indian trees, as well as one of the most useful, is close-grained and of straight fibre, possessing great stiffness, hardness, strength, and durability, and is the chief building timber in the North-West Provinces of India. It is the heaviest Indian wood except ebony. It can be obtained from 40 to 50 feet in length, and from 1 foot to 5 feet in thickness. The logs are almost straight, without any knots, flaws, and cracks; but the wood dries so slowly that it continues to shrink for several years after other woods would have become quite dry. Small scantlings and planks are very liable to warp in drying, unless some means are employed to prevent it. Sâl-wood is very heavy and coarse-grained, and is particularly straight and even in fibre. It is superior to almost all woods in strength, and is well adapted for engineering purposes.

(6) Teak (*Tectona grandis*) is not procurable in the Punjab, nor in the North-West Provinces, but is obtained from Burmah, Bombay, and from the Central Provinces. The tree does not reach any great size; the largest timbers not being more than 16 feet long by 12 inches in breadth. It is used in small scantlings for railway-carriages and for flooring. Beams for roofs are seldom obtained exceeding 20 feet in length. Indian teak is much superior to Burmese teak in strength and beauty. The weight is about the same; but the deeply marked, and wavy irregular veins of the Indian tree afford a much handsomer cabinet wood than the straight-grained and faintly-marked timber of the Burmese

variety. It is almost straight, close-grained, and of even fibre, and is on that account well fitted for engineering purposes. Doors and windows are also made of it.

(7) The Toon (*Cedrela Toona*) is another of the more useful Indian woods. It resembles mahogany, and has been brought into general use by Europeans. It is a very excellent substitute for mahogany for making tables, chairs, book-cases, frames, and furniture of all kinds. It is also used for doors and windows of houses, but not for beams and joists of roofs, as it is not strong enough, and is also costly. It becomes rapidly browner with age, unless it is kept well waxed. The toon tree is grown in most gardens, of which it forms an elegant ornament.

(8) The Tamarind (*Tamarindus*) is found chiefly on hard dry soils, occasionally also on black soils, but never on hilly or rocky ground. A full-grown tamarind presents the finest appearance among Indian trees, both for size and beauty. The young tamarind, of from twenty to fifty years' growth, is much used for door-frames, but is subject to the attacks of worms unless well seasoned. The wood is of a crooked grain, and is therefore not fitted for roofs. It affords a profusion of fruit.

(9) The Shishan (*Dalbergia latifolia*) is another popular Indian wood, but it is never obtained in long lengths, and is therefore not fitted for roofs except for small spans. It is used for furniture of all kinds, being very hard and tough, and taking a good polish. It is found all over the plains of India. The heart-wood is heavy and of a reddish colour, and is employed for structures where hard wood is required. It is in general use by the natives as well as Europeans. It is the only wood adopted for furniture in the Punjab.

Of the above nine kinds of woods, the most useful for engineering purposes, are Deodar, Sâl, and Teak, as they possess great strength, hardness, stiffness, and durability. These qualities are generally found in timbers which are free from large and loose knots, and straight-grained, and which are least affected by being soaked in water.