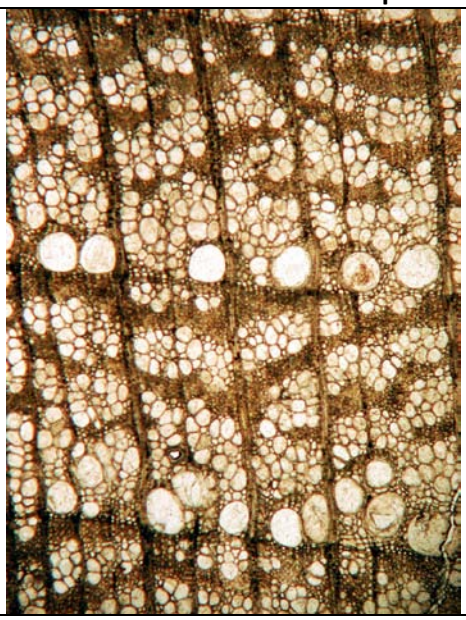
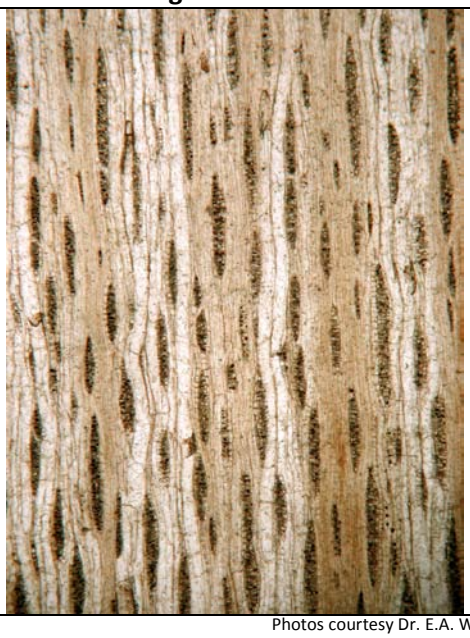
Ulmus miocenica **(elm, 'hard elm')**

Family: Ulmaceae

Naming reference: Prakash, U. & E.S. Barghoorn. 1961. Miocene fossil woods from the Columbia basalts of central Washington, I. Journal of the Arnold Arboretum XLII, 165-199.

Other references: Wheeler, E.A. & T.A. Dillhoff. 2009. The Middle Miocene wood flora of Vantage, Washington, USA. IAWA Journal, Supplement 7. 101p.

Transverse section	Transverse section closeup	Tangential section
		

Photos courtesy Dr. E.A. Wheeler

Diagnostic features: Growth rings distinct, ring porous vessel arrangement. Earlywood vessels avg. 118µm, in a single row. Latewood vessels in clusters, arranged in wavy tangential bands. Thin walled tyloses are present in vessels. Perforation plates simple, narrow vessel elements have spiral thickenings along entire length. Rays 1-4 seriate, homocellular, uniseriate rays uncommon. Axial parenchyma paratracheal, mostly four cells per strand. Crystals present in axial chambered parenchyma.

Discussion: Prakash & Barghoorn described three species of elm from the Columbia River Basalts. *Ulmus miocenica* is separated from the other two types by virtue of its earlywood vessels found in a single row, rays 1-4 seriate, and the presence of crystals in chambered axial parenchyma (this feature is also found in *U. baileyana* . Prakash & Barghoorn considered this type to be mostly closely related to the modern hard elm *Ulmus americana*, but there are a number of other related hard elms that show similar features. In the author's experience, *Ulmus miocenica* is the elm type most commonly encountered in the fossil woods of eastern Washington.

Elm woods are a common constituent of many Columbia River Basalts wood deposits. Beck (1945) reports them as abundant from Vantage, common at Squaw Creek and Saddle Mountains, and rare at Slide Ranch, Roza Creek, and Lookout Point. This author has also seen elm specimens from Yakima Ridge, Yakima Canyon, Sunnyside, Asotin Creek, and Roosevelt. In modern times, elms are extinct in the Pacific Northwest but native to many other areas of the northern hemisphere, including eastern North America and Eurasia.