

## LYGINOPTERID SEED FERNS IN BASAL UPPER CARBONIFEROUS MARINE BLACK SHALE DEPOSITS OF MIDCONTINENT NORTH AMERICA.

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Permineralized plant remains occur individually and in small mats within anoxic and dysoxic marine black shales deposited seaward of the Wedington delta (Fayetteville Formation, Middle Chester) in northwestern Arkansas. Plant debris and associated cephalopods occur within 20 km of offshore bars that developed at the mouths of delta distributary channels. The bars were produced by longshore paleocurrents flowing eastward along the southwestern margin of the Ozark Dome. The flora includes several genera of arborescent lycopods, zygopteridalean ferns, filicalean ferns, calamites, medullosan seed ferns and seed fern remains with features that are characteristic of the Lyginopteridaceae. Among the lyginopteridalean stems are specimens that have been described as Megaloxylon wheelerae, an arborescent form, as well as several undescribed species.

Two stems with prominent leaf scars represent one species of a new genus. The stems measure 35 cm and 34 cm long, and are approximately 2.5 cm in diameter. Leaf arrangement is helical, approaching a 3/8 phyllotaxis, with internodal lengths of about 3 cm. Stems are eustelic with a polygonal primary body 3-4 mm in diameter. Each leaf trace diverges from the cauline bundle as a single strand. The strand trifurcates in the cortex to produce a distinctive configuration of two c-shaped lateral bundles separated by a tangentially elongated central strand.

Pith cells are large with prominent walls. Some show internal contents suggestive of secretory substances. The primary body is surrounded by a distinctive zone of wood 3-4 cm wide. Large rays 2-5 cells wide and more than 8 mm high separate wedges of tracheids that typically are 2-4 cells wide. *Secondary tracheids display multiseriate oval bordered pits on the radial walls.* Vascular cambium and secondary phloem are present, but incompletely preserved. The cortex is differentiated into an inner parenchymatous zone with horizontally elongated "sclerotic" nests, and an outer zone of alternating bands of vertically elongated sclerenchyma and parenchyma.

This material significantly increases our knowledge of Namurian floras inhabiting non peat-forming environments, and emphasizes the systematic diversity among hydrasperman gymnosperms at the base of the Upper Carboniferous.