tangential tracheid walls, pitting mostly uniseriate, rarely opposite biseriate, 2-5 (usually 3) small, oval or circular pinoid pits with rare borders per crossfield and smooth walls on its transverse tracheids. The latter character places this species in the haploxylon type of the Pinaceae. This species is compared with the similar living species Pinus balfouriana and P. edulis and various fossil species of Pinus and Pinuxylon to which it is closely related.

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TIFFNEY, B. H. and M. E. COLLINSON. Peabody Museum of Natural History and Dept. of Biology, Yale Univ., New Haven, CT 06511 and Dept. of Plant Sciences, King's College, Univ. of London, London, SE24 9JF England. NYMPHAEACEAE from the ?Oligocene Brandon Lignite of west-central Vermont, U.S.A.

Over 50 specimens of a seed closely resembling those of extant Nymphaeaceae have been found in the "silt" facies of the Oligocene or possibly early Miocene Brandon Lignite. The anatropous seeds are oval to elongate, averaging 1.7mm wide by 2.3mm long, and are terminated by a circular germination cap which intrudes deeply into the seed cavity. The micropyle passes through this cap, while the hilum sits atop a small projection to one side of the cap. The surficial cells of the seed are equiaxial and possess straight anticlinal walls. The testa comprises two layers of sclereids and averages 90 um in thickness; the tegmen is thin and attaches at both the basal and apical ends of the seed cavity. The fossil seeds are generally similar to those of extant Nuphar Sib. & Sm., but differ in particulars. In light of the level of morphological distinction present in seeds of the living members of the Nymphaeaceae, the Brandon fossil is treated as an extinct genus, provisionally named Pseudonouphar. This is the first report of fossil seeds of the Nymphaeaceae from the New World, and brings to 11 the number of extinct genera recognized within the family from fossil seeds.

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Probable gnetalean megafossils from the Lower Cretaceous Potomac Group of Virginia.

The lack of an accepted megafossil record for Mesozoic Gnetales contrasts markedly with an extensive pollen record. A probable gnetalean from the Lower Cretaceous Potomac Group of Virginia (Zone I, probably Aptian) provides the first Cretaceous report for Gnetales based on stems with attached leaves and reproductive structures. The stems are 1-2 mm in diameter, lack clear evidence of secondary growth, and show axillary monopodial branching. Leaves are opposite and decussate, borne at swollen nodes, and have clasping bases. Each leaf is oblong and has a dense network of longitudinally aligned subepidermal fibers. Leaf venation consists of three pairs of longitudinal parallel veins, which appear to form a reticulum at the apex, and interconnecting crossveins that form apically oriented chevrons. Seeds are borne in open, dichasially branched clusters, either apically on the main stem or on lateral branches. The seeds are flattened and each subtended by a pair of opposite, broadly ovate bracts. Characters that suggest a probable gnetalean relationship include opposite bracts subtending the seeds, a network of subepidermal foliar fibers, and the distinctive leaf venation, which is almost identical to that seen in the cotyledons of extant Welwitschia. Features consistent with a gnetalean relationship include opposite and decussate leaves, swollen nodes, and dichasial organization of the seed clusters. Masses of ridged, monosulcate gnetalean pollen also occur in the same bed with the megafossils. The apparent lack of secondary growth and the habit of associated ferns and angiosperms all suggest that the megafossils represent an herbaceous or possibly shrubby plant. If this habit was widespread in Mesozoic Gnetales it would partially explain the discrepancy between the extensive gnetalean microfossil record and the scarcity of gnetalean megafossils because herbs are less often preserved as megafossils.