Psilophyton is an extinct primitive non-seedbearing vascular plant. It is categorized as an herbaceous lycopod—in the plant division Lycopsidophyta. This is one of the earliest plant divisions that has descendant species living today, the clubmosses (although they are not mosses, but more closely related to ferns). First described in 1859, Psilophyton was one of the first fossil plants from the Devonian period to be found. It has true roots, stems, and true leaves, although the leaves were extremely small, known as microphylls. First appearing in the late Early Devonian, Psilophyton became extinct by the end of the Middle Devonian. Seen on Panel 3 of the Plant Evolution Mural

Sphenopteris is the form genus name given to particular forms of fern-like foliage. The term was applied to predominantly late Paleozoic foliage types, generally characterized by pinnules constricted at the base. However, this name has been applied to a variety of disparate plants, which have now been identified as including seed ferns as well as true ferns. Attempts have been made to define clusters or subgroups, but the individual species are not well understood and often the fossils are only fragments and not whole fronds. Natural variation inherent in foliage from different parts of the frond, or in different stages of development also confuse the foliage from different parts of the frond, or in and not whole fronds. Natural variation inherent in the Carboniferous, surviving into the Mesozoic Era.

Many thanks to the Beneski Museum of Natural History for the loan of the most of the plant fossils on display here and to John Nicholson for the loan of the Pagiophyllum fossil that he collected locally at the dam in South Hadley Falls. Special thanks are due to Kate Wellspring, Beneski Museum Collections Curator, for her sharing of knowledge and expertise and the willingness to work with us and lend us materials to create this wonderful paleobotanical showcase.

Sigillaria belongs to a group of extinct, spore-bearing, arborescent plants called tree lycopsods, which were prominent in the Late Carboniferous Coal Swamp Forests. They had long, unbranched main trunks, branching only once or twice at the top, unlike Lepidodendron, which branched profusely at the top. Sigillaria was also shorter, reaching heights of about 60 feet. Seen here is a bark fossil. Seen on Panel 5 of the Plant Evolution Mural

Williamsonia was part of an extinct group of gymnosperms called Cycadeoids, because they exhibited much resemblance in growth form to the cycads. Cycadeoids first appeared in the Triassic Period and had died out by the end of the Cretaceous Period. Williamsonia had slender, branching trunks and cones (strobiil) that were either unisexual or bisexual (with both seed and pollen-producing structures). Seen on Panel 6 of the Plant Evolution Mural

Alethopteris is an extinct genus of seed ferns or pteridosperms. Part and counterpart fossils here display a part of an Alethopteris frond. The fossils create planes of weakness within the nodules, which tend to split open so that one half reveals the upper surface of the plant (part), while the other half contains an impression of the upper surface (counterpart). Althopteris is not depicted in the Plant Evolution Mural, although another pteridosperm, Medullosa, is seen on Panel 5.

Calamites is a genus of extinct giant horsetails. They were arborescent with secondary growth and woody tissue, enabling them to reach heights of 60 feet or more. The stems were conspicuously jointed and ribbed and, unlike today’s horsetails, which have leaves reduced to small scales, Calamites had well-developed leaves. Seen on Panel 5 of the Plant Evolution Mural.

Annularia is the name given to one of the forms of Calamites leaves. Seen on Panel 5 of the Plant Evolution Mural.
**Callipteridium** is an extinct genus of seed ferns or pteridosperms. They were vascular plants that bore seeds on fern-like leaves, but they were not ferns, but rather gymnosperms. It was not until the early 1900s that much of the fern-like foliage found in Paleozoic rocks was recognized to belong to plants that bore seeds. Pteridosperms were particularly characteristic of the Carboniferous Period. Mature fronds are speculated to have been over 10 feet long.

Callipteridium is not depicted in the Plant Evolution Mural, although another pteridosperm, *Medullosa*, is seen on Panel 5.

**Cordaites** were an extinct group of gymnosperms that gave rise to the conifers, e.g., pine, spruce, hemlock, fir, and their relatives. These tall trees are estimated to have grown up to 100 feet tall and had large strap-shaped leaves. They first appeared in the latest part of the Late Devonian and the earliest part of the Early Carboniferous and became common in the Late Carboniferous, dying out by the end of the Permian Period. The name Cordaites was originally applied only to the foliage, but is now also used for the stems and the entire plant. Seen on Panel 5 of the Plant Evolution Mural.

**Cryptozoon** is the name given to a form of Cambrian and Precambrian reef-forming rocks. They are composed of alternating light and dark layers of sediment, thought to represent fossilized remains of ancient microbial mat communities growing in the sea. These are examples of trace fossils, which are indicative of activities of living organisms but which do not preserve any remains of the organisms themselves. Also known as Stromatolites, these laminated rocks were widespread during Precambrian times, when the world was dominated by microbial life. Some stromatolites have been found that date back 3.5 billion years ago, thus they are evidence of some of the earliest life on Earth. Today one can see living examples of stromatolite beds in Shark Bay on the west coast of Australia. Seen on Panel 1 of the Plant Evolution Mural.

**Ginkgo** is a permineralization fossil. This kind of fossil forms when a plant part becomes immersed in water containing a high concentration of dissolved minerals (most commonly silica), which then permeate all the cells and tissues of the plant. When the mineral is completely solidified, the plant fragment is essentially fragment is essentially entombed within solid rock. In these kinds of fossils, scientists can study the internal anatomy of ancient plants. Often this is done by making very thin sections of the fossil.

**Ginkgo** is the fossil on display here shows that pattern. Also shown is a fossil featuring smaller stems. Seen on Panel 5 of the Plant Evolution Mural.

**Glossopteris** comes from the Greek: γλώσσα glossa, meaning tongue, because of the large, tongue-shaped leaves on these 20 foot tall trees. Now extinct, Glossopteris is famous as the fossil that led Austrian geologist Eduard Suess to conclude, based on its distribution, that there had once been a large southern continent, which he named Gondwanaland. The past distribution of Glossopteris fossils constituted one of the most important pieces of supporting evidence for the theory of Continental Drift, the precursor to the modern theory of plate tectonics. Seen on Panel 6 of the Plant Evolution Mural.

**Lepidodendron** is among the extinct arborescent lycopsods. With their secondary growth (woody tissue) they grew to heights of 130 to 150 feet. The massive, erect trunks of some Lepidodendron species branched profusely to produce large crowns of leafy twigs. Some leaves reached three feet long, leaving conspicuous leaf bases on the stem surface when they dropped off. It was in fact the distinctive pattern of these leaf base scars that gave it its name—Lepidodendron or scale-leaf. The bark fossil on display here shows that pattern. Also shown is a fossil featuring smaller stems. Seen on Panel 5 of the Plant Evolution Mural.

**Psaronius** is the form genus name for the leaves of the marattialean fern *Psaronius*. The name is applied to tongue-shaped pinnules (lobes) of the fern frond, which are broadly attached to the rachis (the main axis of the leaf). This is one of the best known Paleozoic tree ferns. Seen on Panel 5 of the Plant Evolution Mural.

**Pecopteris** is the genus name for the lycopsods of the fern family, which today is restricted to the Southern Hemisphere. Large fan-like leaves reminiscent of Ginkgo leaves can be found in Carboniferous fossils and have been called Ginkgophytopsis, but fossils from that era can be very difficult to interpret. During the Jurassic Period, many species of Ginkgo were common, but today they are represented by only a single extant species—Ginkgo biloba, the maidenhair tree, so named because its leaves resemble those of the maidenhair fern. Ginkgo has distinctive broad leaves that have dichotomous venation. Although another ginkgophyte, *Sphenobaiera*, is seen on Panel 4 of the Plant Evolution Mural, Ginkgo is on Panel 5.

**Pagiophyllium** is an extinct member of the Araucariaceae family, which today is restricted to the Southern Hemisphere. This family includes the common houseplant, the Norfolk Island pine. The genus Pagiophyllium was extant between 290 and 85 million years ago, with a world-wide distribution. This fossil is approximately 190-200 million years old.

**Psaronius** is an ancient group of gymnosperms, thought to have originated in the late Paleozoic Era. Large fan-like leaves reminiscent of Ginkgo leaves can be found in Carboniferous fossils and have been called Ginkgophytopsis, but fossils from that era can be very difficult to interpret. During the Jurassic Period, many species of Ginkgo were common, but today they are represented by only a single extant species—Ginkgo biloba, the maidenhair tree, so named because its leaves resemble those of the maidenhair fern. Ginkgo has distinctive broad leaves that have dichotomous venation. Although another ginkgophyte, *Sphenobaiera*, is seen on Panel 4 of the Plant Evolution Mural, Ginkgo is on Panel 5.

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