RETURNING HOME: Plant Fossils of British Columbia
Winter 2014/2015 Self-Guided Tour
Contributed by Sunday Guides

Late in November, on a single night
Not even near to freezing, the ginkgo trees
That stand along the walk drop all their leaves
In one consent, and neither to rain nor to wind
But as though to time alone: the golden and green
Leaves litter the lawn today, that yesterday
Had spread aloft their fluttering fans of light.

From ***The Consent*** by Howard Nemerov

Native to China, cultivated at Buddhist monasteries and revered for centuries, remnant wild ginkgo trees may persist in the Dalou mountains of SW China. In late autumn in Asia, golden ginkgo leaves fall along tree-lined parkways, celebrated in a multitude of YouTube videos. Millions of years ago this famed tree of Asia grew on the land now called British Columbia.

This tour looks at plants in VanDusen Botanical Garden's collections that no longer naturally occur in British Columbia but are present in our fossil record. Plant fossils have been found at sites on Vancouver and Hornby Islands, near Princeton, Cache Creek (McAbee), Driftwood Canyon, Tumbler Ridge and other sites in British Columbia — mostly from the Eocene, Paleocene and Cretaceous Eras.

Geologic time is measured in millions of years, notated "**mya**" for "million years ago".
Mesozoic Era (251 mya to 65 mya): JURASSIC (213-145 mya) - CRETACEOUS (145-65 mya)
Cenozoic Era (65 mya to present): PALEOCENE (65-55 mya) - EOCENE (55-33 mya) - OLIGOCENE (33-23 mya)- MIOCENE (23.5-5 mya)

Take a garden map with you and follow the black and white number and arrow signs for this tour. From the Visitor Centre, look across the plaza near the lake's edge on your right, toward the collection of **1-maidenhair trees (*Ginkgo biloba*)**. This ancient gymnosperm of Jurassic forests reached its greatest diversity in the Cretaceous, with fossils of *Ginkgo* species found in Asia, Europe and North America. By the late Paleocene only one species remained in a small area of China.

Turn right on the boardwalk to the gravel path. On your left is the **2- Ohio buckeye (*Aesculus glabra*)**. Buckeyes or horsechestnuts are in the Soapberry Family (Sapindaceae), which includes maple (*Acer* species) and goldenrain trees (*Koelreuteria* species). *Aesculus* species have large palmately compound leaves, fragrant flowers in panicles, large seed capsules with 1 to 3 nut-like seeds, and large sticky buds in winter. They contain toxins harmful to cattle and humans. Eocene fossils of *Aesculus* have been found in Princeton and McAbee in British Columbia.

Continue to the next junction, turn left, then take the first right where you will find **3 – sweet fern (*Comptonia peregrina*)** native to eastern North America. Once widespread, this flowering plant (angiosperm) is no fern but is named for its sweet smelling, fern-like leaves.

On the right side of the floating bridge is a collection of **4 - bald cypress (*Taxodium distichum* var. *distichum*)** a deciduous conifer whose every twig is "bald" in winter. Native to the southeastern United States, fossils of this genus have been found in B.C. and Washington dating to 55 mya. The oldest fossils of this tree were found in North America from the late Cretaceous period, and the species was present in Europe until around 2.5 mya.

Across the bridge follow the bamboo-lined path to the towering **5- coast redwood (*Sequoia sempervirens*)**. The last surviving species of its genus, the coast redwood is now confined to a narrow range along the Pacific coast. The oldest known fossil of *Sequoia* is from Jurassic deposits in southern Manchuria. Late Cretaceous fossils have been found in Western North America. *Sequoia* trees retain high levels of water in their tissues, making them frost-intolerant. This and the evergreen habit of *Sequoia* were adaptive disadvantages when the cooling trends of the late Eocene, combined with three months of darkness in northern latitudes, pushed the range of *Sequoia* southward.

At the paved path turn left and just past the low bamboo look left at **6- London plane tree (*Platanus* x *hispanica*)** recognizable in winter by its mottled bark. Platanaceae is an old family of angiosperms from the early Cretaceous. The genus *Platanus* (sometimes called sycamore or buttonwood) may be the oldest genus of flowering plants still living today.

Notice the gap in B.C. fossils as you proceed on the paved path to the Southern Hemisphere Garden. Turn right to cross the zigzag bridge, head uphill, and turn right through the Grotto and the Heather Garden. Cross the stone bridge and turn left. At the junction, detour left to **7- goldenrain tree (*Koelreuteria paniculata*)**, a genus once widespread but now native only to Asia. It has yellow flowers, pinnate leaves and papery fruits dispersed by wind and water.

Backtrack to the Perennial Garden and at the farther end of its curved path look at the sharp winter buds of **8- weeping beech (*Fagus sylvatica* 'Pendula')**. Words for beech occur in ancient Indo-European languages. The oldest known fossils of beech are in the mid-Eocene McAbee shales of B.C.

Turn back to return to the junction and turn left up the hill. At the Haiku stone on the left, look right across the Great Lawn to **9- golden larch (*Pseudolarix amabilis*).** Named for its deciduous larch-like leaves and golden fall colour, it is native to coastal China. The genus may date back to the late Jurassic. Fossils in B.C. occur at McAbee.

Wander up the paved path to the junction and turn right to **10- gutta-percha tree (*Eucommia ulmoides*)**. Its fossils are found in North America, Europe and Asia, but the only surviving species of this genus is native to China and may be extinct in the wild. It is valued in traditional Chinese medicine.

Turn back to the junction, go right and on your left you will see **11- *Tetracentron sinense*,** now found only in China. A member of the Trochodendronaceae family, this tree lacks vessels in its wood, a feature unusual for angiosperms and also found in the wheel tree (stop #17), with which it is often found in Eocene lake bed fossils of B.C. and Washington.

At the next junction turn right, then left into the grove of **12- dawn redwood (*Metasequoia glyptostroboides*),** a deciduous conifer famous for its 20th Century discovery in China after it was presumed to be extinct. It is abundant in the fossil record in the northern hemisphere with fossils dating back at least 55 mya in B.C. and as much as 100 mya elsewhere.

Backtrack to the junction and bear right to **13- weeping katsura (*Cercidiphyllum japonicum* 'Morioka Weeping').** *Cercidiphyllum* is the only genus of its family – Cercidiphyllaceae. Today it is native to Japan and China. In B.C. *Cercidiphyllum* fossils at McAbee date to the Eocene.

Just beyond is **14- *Dipteronia sinensis***, a relative of the maples, with pinnate leaves and seeds in rounded samaras. Native to China, its fossils are recorded in B.C. at McAbee and Driftwood Canyon.

Continue on and enjoy the fragrance of witchhazel branches arching over the path. On your left is **15- Chinese tulip tree (*Liriodendron chinense*)**, a member of an ancient genus of angiosperms once circumpolar, but now living only in China and Vietnam (this species), with another species native to eastern North America.

At the sign take the small stone path into the Fern Dell. Turn left toward the **16- Chinese sassafras (*Sassafras tzumu*).** The genus *Sassafras* with its variable, often lobed, leaves is now found only in eastern Asia and eastern North America, where its root is the source of the original root beer. Fossils of this genus have been found in B.C. at McAbee and Driftwood Canyon.

Just beyond on the right is **17- wheel tree (*Trochodendron aralioides*),** native to Japan, Korea and Taiwan. Its flowers lack petals but have numerous anthers, which spread in a circle like the spokes of a wheel. In B.C. Eocene fossils of this genus have been found at the McAbee and One Mile Creek sites.

Turn left and look left at **18 - Chinese fir (*Cunninghamia lanceolata*).** A fossil of this genus of ancient conifers, found in Cretaceous deposits on Hornby Island, has been named *Cunninghamia hornbyensis*.

A palm often planted here at VanDusen is the hardy **19- windmill palm (*Trachycarpus fortunei*)**, not itself a B.C. fossil. In B.C. the Cretaceous period was about 7° C warmer than today and palms were widespread. Their soft tissue fossilizes poorly, so some palms are represented in B.C.'s fossil record only by fossilized pollen or by fossils of associated beetles. Coal seams in B.C. have yielded fossils of palms as well as ancient cycads, which today grow naturally only in warmer places. A large fossil palm leaf, *Phoenicites imperialis*, from Duke Point is on view at Vancouver Island University. To see living palms and cycads, please visit the Bloedel Conservatory.

Thank you for visiting VanDusen. Turn left onto the Rhododendron Walk to return to the Visitor Centre. To learn more about plant fossils of British Columbia please visit the Yosef Wosk Library in the Visitor Centre at VanDusen Botanical Garden.