



Prehistoric Plants and Dinosaur Trees: self-Guided Tour

Maps available from the Welcome Table or www.dartshill.ca: Summer or Fall Highlights

Make your way to the Meet and Greet area to begin the Prehistoric Plants and Dinosaur Trees tour. Start by walking around the **Native Loop, Bed 7n**, where you will find dozens of **(1) western sword fern (*Polystichum munitum*)**, one of our native ferns. Ferns are among the oldest land plants, arising ~360 million years ago in the Carboniferous Period. They are widespread and range in height from a few centimetres to several metres tall, the latter being tree ferns native to New Zealand.

Leaving the Native Loop turn right and head up the path alongside **Bed 8w**. First stop is the **(2) coast redwood (*Sequoia sempervirens*)**. The tallest coast redwood tree in the world, measuring over 115 metres, was named 'Hyperion' by the team that discovered it. Hyperion was found in Northern California in 2006. Coast redwoods can live for 2,000 years, with trunks up to 6.4 metres in diameter. Surprisingly, for a tree of such size, the cones are quite small, about the size of a nickel. Coast redwood are among the tallest and oldest living trees. *Sequoias* grew in the Jurassic Period ~160 mya (million years ago) when dinosaurs walked the earth!

Your second stop in this bed is the **(3) Wollemi pine (*Wollemia nobilis*)**, one of the world's oldest and rarest trees. It is a "living fossil". There are fewer than 100 Wollemi pines in the wild in Wollemi National Park in New South Wales, Australia. These trees were believed to be extinct, until they were accidentally discovered in 1994 and compared to fossil specimens. The king of the *Wollemis*, the Bill Tree, stands nearly 40 metres tall. The Bill Tree began life around 1,000 years ago, about the time the Vikings made first contact with Native Americans, the Romani people left India and the Chinese invented gunpowder. The Wollemi pine's ancestors thrived during the Jurassic Era. More dinosaur food!

Stop number **(4)** in **Bed 98** is a **giant Sequoia (*Sequoiadendron giganteum*)**. Giant sequoia specimens are the most massive individual trees in the world. They grow to an average height of 50–85 metres with trunk diameters ranging from 6–8 metres. Record trees have reached 95 metres tall. Giant sequoias are among the oldest living organisms on Earth. The oldest recorded lifespans of these trees are 3,200–3,266 years. Giant sequoia bark is fibrous, furrowed, and may be almost a metre thick at the base of the trunk. The thick bark provides protection from fire damage. The stubby egg shaped cones reach 8 cm in length. A large mature tree may produce as many as 10,000 cones containing 300–400 thousand seeds each year! Prehistoric insects may have found these seeds delicious! The ancestors of giant sequoias thrived in the Carboniferous Period (~360-300mya).

Keep walking along the crushed gravel path and cross the **Tractor Road to Bed 49**, the **pond and waterfall**. There are three or four different **(5) water lily cultivars (*Nymphaea cvs.*)** in the pond. Water lilies are considered a "primitive" group of flowering plants. Frogs and insects love them today but in the late Cretaceous Period, about 60 million years ago, their ancestors would have made a tasty dinosaur snack.

Continuing along the basalt stepping stone and grass path to the south end of the pond you will find a deciduous **(6) bald cypress (*Taxodium distichum*)** in **Bed 20** with its feathery pale green foliage and distinctive



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knees. These beautiful conifers were widespread on earth as far back as the Jurassic Period ~160 mya. Take a moment to read the interpretive signage about Trees Knees!

Turn right just past the bald cypress and follow that path to **Bed 11** and the **Gunnera Walk**. There is a spectacular clump of **(7) giant rhubarb (*Gunnera manicata*)** on your right near where the paths meet. These have one of the largest leaves of any plant in the world! The leaves are extremely rough. The flower stalks are enormous (they are underneath the leaves) but their tiny red flowers are inconspicuous. *Gunnera* species date back nearly 100 million years to the middle of the Cretaceous Period. One of the fascinating things about these plants is that cyanobacteria live within their leaf cells. These single-celled organisms carry out photosynthesis and “fix” nitrogen, converting it from an inert gas to nitrate or ammonia, forms of nitrogen which plants can use. Because of this “in house” nitrogen supply, *Gunnera* can grow in nitrogen-poor swampy areas. In turn, the cyanobacteria have a sheltered place to live. An amazing thing about cyanobacteria is that their ancestors were among the first living things on Earth, dating back ~3.4 billion years! These ancestors colonized the leaf cells of early plants and evolved into chloroplasts, the organelles which carry out photosynthesis. Meanwhile, non-photosynthesizing bacteria colonized plant and animal cells and evolved into mitochondria, the organelles which obtain energy from food. Without these, the advanced forms of life on earth as we know them could not exist.

Look up behind the *Gunnera* to see the first of the three true cedars on this tour **(8) Atlantic cedar (*Cedrus atlantica* ‘Glauca’)**. Three of the four species of *Cedrus* are represented in Darts Hill Garden Park with a few with glaucous or bluish foliage.

Walk to the foot of the basalt stairs leading through the **Woodland Garden Beds 10** and **Bed 22**. Behind you is a narrow path between **Beds 19** and **21**. Tucked into **Bed 19** is a **(9) cedar of Lebanon (*Cedrus libanii*)**. **Bed 18** is 35 metres further along this path where you will find a **(10) deodara cedar (*Cedrus deodara*)**. These cedars are not to be confused with our native Western red cedar, which isn’t a cedar at all but a species of *Thuja*. True cedars have whorls of ~15 to 20 needles. A useful way to distinguish them is to remember that *Cedrus atlantica* has ascending branches *Cedrus libanii* has level branches, and *Cedrus deodara* has descending branches. True cedars belong to the pine family and arose in the Tertiary Period (66 million to 2.6 million years ago).

Now turn around and go back up the path. At the end of this path head to magnificent hybrid walnut (Buartnut tree) on your left and walk up the stairs. Walk past Darts House and just beyond the garage turn right down the path to **Bed 9w**. Here is a **(11) dawn redwood (*Metasequoia glyptostroboides*)**. This ancient tree species once existed in abundance worldwide. Due to glaciations, almost all *Metasequoia* have died out with the exception of a few populations in a restricted area of central China. Prior to the discovery of living trees, *Metasequoia* was thought to be extinct, as it had only ever been encountered in fossilized form.

If you care to make your way to the **Volunteer parking lot**, at its west end you will find a **(12) monkey puzzle tree (*Araucaria araucana*)** native to Chile and Argentina. The spiny leaves are extremely sharp! Ancestors of these trees lived 160 mya and, like *ginkgos*, the male and female reproductive structures are on separate trees. The sexes are distinguishable by the size and shape of their cones – the female cones are large and rounded while the male cones are smaller and more elongated.

Return to the garage and turn west on the asphalt driveway toward 168 Street. A lovely **(13) Antarctic beech (*Nothofagus antarctica*)** overhangs the driveway in **Bed 26** near the black entry gate. The story is that



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Mrs. Darts was given this tree as a bonsai but it has certainly grown beyond a tree in a pot! The genus *Nothofagus* has provided evidence to prove the theory of continental drift.

Today species of *Nothofagus* are found in South America, New Guinea, New Zealand and Australia. Pollen fossils have been found in Antarctica, indicating it must have existed on the super continent, Gondwana, between 180 and 510 mya.

Directly south across the driveway in **Bed 25** is a beautiful **(14) maidenhair tree (*Ginkgo biloba*)**. *Ginkgo* is another “living fossil”. Fossil records indicate the species has remained virtually unchanged for over 250 million years. The species name “biloba” refers to the double-lobed shape of their leaves. *Ginkgos* are dioecious, meaning they have separate male and female trees. Males produce pollen cones, while the females produce seed. The seeds have an unpleasant odour and thus female trees are not usually grown in public places. As its long history attests, this is a very resistant tree. Disease, pollution, cold weather and even radioactivity do not kill it – a *Ginkgo biloba* growing about a kilometre from the epicentre, survived the atomic bombing of Hiroshima!

Continue down the path and walk down the grassy slope to the **pasture**. You will find a **(15) Japanese umbrella pine (*Sciadopitys verticillata*)** in circular **Bed 43** (in the middle of the pasture). It is not a pine at all and has no close relatives amongst present day plants. It branched off from other conifers ~250 mya, spreading throughout Eurasia, northern Europe and northern North America. Today it is restricted to a small area in Japan but has become a very popular garden tree.

Head toward the huge hybrid walnut (Buartnut). Continue to the concrete block retaining wall behind it to **Bed 24e** and you will find another “living fossil”, **(16) horsetail (*Equisetum species*)**. The genus *Equisetum* is even older than *Ginkgo*, dating back to the Devonian period ~400 mya. During the Carboniferous period some horsetail relatives grew 20 metres tall, but they did not survive. Today horsetails are widely spread throughout the world, except for Australasia and Antarctica. Some are invasive and difficult to remove (evidence in front of you!). Gardeners consider them to be nuisance weeds, beautiful though they are.

Turn around, cross the path and head down the east side of Bed 33 towards 16th Avenue. Walk east along the bottom path to the **Tractor Road**. Go up the road and pick one of the many right turning paths to take you into one of the oldest parts of the historic garden. In **Bed 53w** you will find a **(17) southern magnolia (*Magnolia grandiflora*)**, native to the southeastern USA. *Magnolias* exhibit what is called a disjunct distribution. They were once widespread throughout the world but, due to climate change, are now restricted to two widely separated regions – Southeast Asia and southeastern North America and adjacent Central America. *Magnolias* evolved 60 million years ago, before bees evolved, and they are pollinated by beetles. This accounts for their very tough petals, resistant to crawling and chewing. This species produces large scented white flowers in summer.

This tour of Darts Hill Garden Park is based on a ***Geologic History of Plants***

(Edited by S. Murray, S. Lawson and P. Yokome DHGCTS, April 2021) (Original credit to VanDusen Botanical Garden Guides)