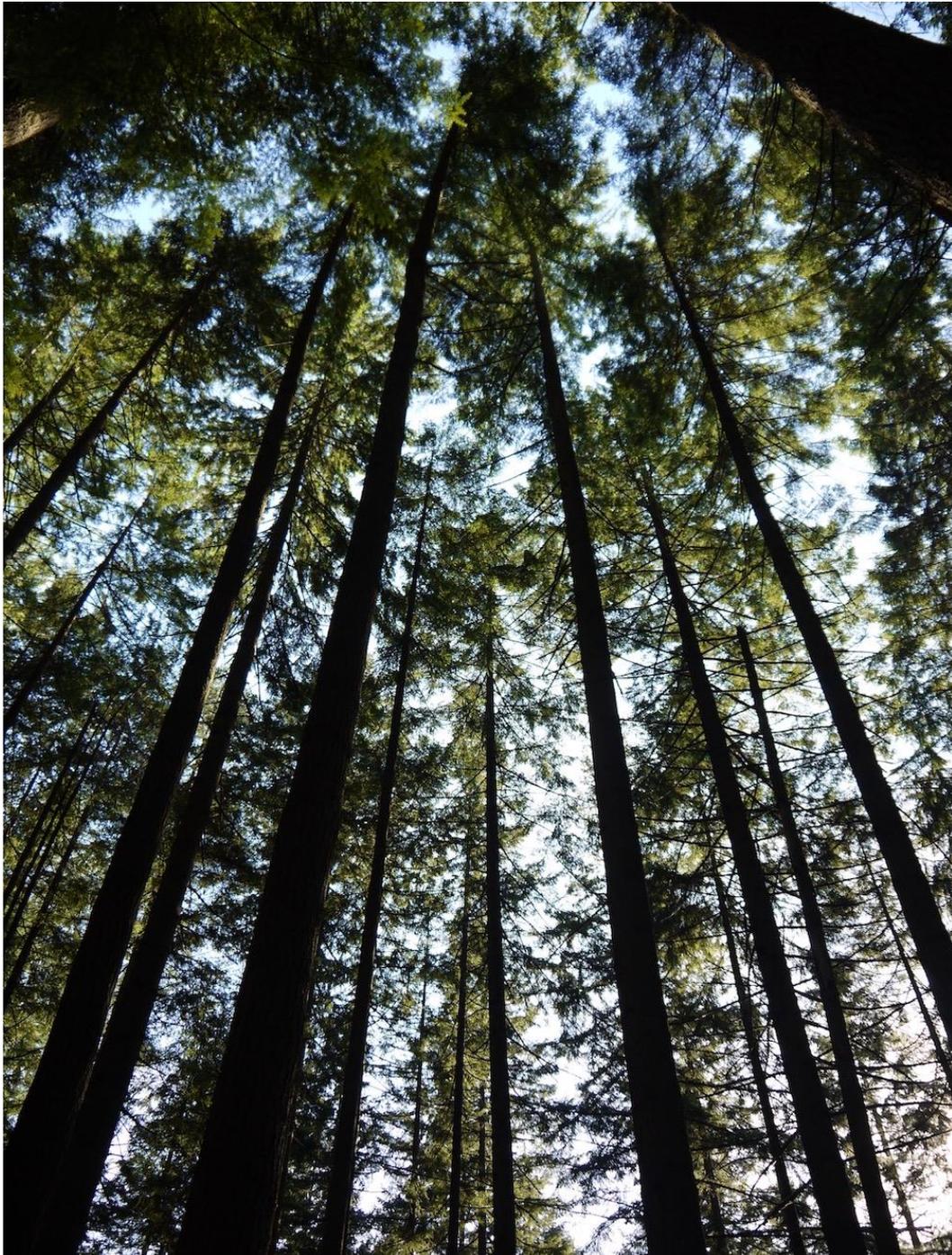


If You Go Down To The Woods Today...

A horticultural study trip to observe woodland species and habitats of British Columbia

July 2016



Pin Dix & Florence Duncan-Antoine

Botanical Horticulturists, RBG, Kew

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Andrew Luke, Gardens Supervisor: Grass Garden, Order Beds & Woodland Garden, RBG, Kew

Sam Phillips, India Pinnock & Crissy Mulrain, RBG, Kew

Michael Reece, Woodland Garden Volunteer, RBG, Kew

INTRODUCTION

This project involved a three-week horticultural studies trip to British Columbia (BC), Canada. Our aims were to study and observe the native flora of various areas, including Garry Oak reserves, temperate rainforests and sub-alpine regions along the West Coast of BC and on Vancouver Island, to see natural ecosystems and gain a greater understanding of the plants' environmental requirements with a view to seeing how this knowledge could be implemented within the horticultural displays at the Royal Botanic Gardens, Kew. Also, to make several garden visits, including to botanic gardens, to experience how plants can be used in the public arena to promote education and conservation.



British Columbia (BC) is Canada's westernmost province, bordered on the west by the Pacific Ocean and on the east by the Rocky Mountains and Alberta. The province extends from the Yukon and Northern Territories in the north to the United States border with Washington some 1,200km to the south. Geographically a very diverse province, BC's landscapes include rainforests, grassy plains, inland deserts, rocky coastlines, sandy beaches, lakes and mountains. Due to BC's distinct climate and topography, it is home to numerous different habitats, each creating unique conditions for differing plant communities to thrive. The province is home to a huge range of species including some 2,500 vascular plants, 1,000 bryophytes, 1,000 lichens and 10,000 fungi species.

The temperate rainforests of the Pacific Northwest are the largest on the planet, lying along the western side of the Pacific Coast, along the northwest region of North America from Prince William Sound in Alaska, through British Columbia's coast to Northern California. Temperate rainforests are primarily distinguished from temperate forests by the lack of fire, the presence of evergreen trees, and their complex structure. These structures consist of many canopy layers, as well as varying ages and sizes of tree. Because of this, other species within the forest such as epiphytes in the forms of ferns, lichens and mosses are able to flourish within the dense, shrubby understory. The dominance of conifers is what defines the North American temperate rainforests in relation to other temperate rainforests of the world. These trees grow to great heights due to extremely high annual rainfall and provide a unique habitat for both flora and fauna.

Garry Oaks and their associated ecosystems are among the most endangered in Canada. Once common in British Columbia's southwest coastal areas, less than 5% of these ecosystems remain in near-natural condition. Most remnants exist in isolated and fragmented colonies with no connection to other Garry Oak communities, thereby reducing population migration and mixing of genetic material from species of one area to another.

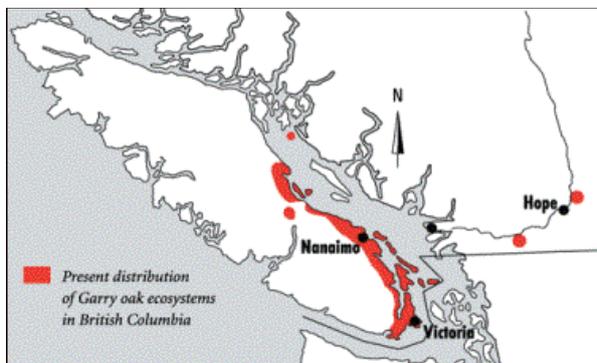


Figure 3: Population distribution of Garry Oak Ecosystems bis.geog.ubc.ca



Figure 4: Garry Oak Meadow www.royalbcmuseum.bc.ca

The focus of our trip was to observe endemic flora across various sites in BC with plans to visit Vancouver Island, Tofino, Meares Island, and other local botanical institutions to explore natural remaining ecosystems of *Quercus garryana* (Garry Oak), and the understory of woodland species such as hardy orchids (including *Cypripedium spp.*), mycoheterotrophs, and ferns including *Polypodium glycyrrhiza* (Licorice Fern) and the endangered *Polystichum scopulinum* (Holly Fern). Another primary aim was to build relationships between major botanical institutions and organisations to increase knowledge of threatened species across BC. A large number of species native to this area are severely threatened by deforestation and development, and many currently exist as tiny fragile populations.

AIMS:

- To expand our knowledge of hardy native woodland plants, including threatened species, both within the canopy and understory, by observing them in their natural habitat.
- To observe propagation techniques of Canadian flora in Botanical Gardens to increase personal development and to make that knowledge available to RBG, Kew on return.
- Acting as ambassadors for Kew, to establish relationships and improve horticultural collaboration with other botanical institutions, such as the University of British Columbia Botanical Garden & Centre for Plant Research (Vancouver), Tofino Botanical Gardens (Vancouver Island), and the Hardy Plant Group of Vancouver.
- To become aware of potential sites suitable for future seed collecting trips and research, with the hope of preserving threatened species through the work of the Millennium Seed Bank Project.
- To assemble a good photographic record to aid interpretation of horticultural collections and education for visitors to RBG, Kew.
- To gain experience in field botany, recording, and conservation work to support future conservation efforts in BC.

OBJECTIVES:

- To observe a range of threatened habitats such as mixed woodland species, temperate rainforest, low-elevation meadows and conifer forests, to study genera such as hardy orchids (including *Cypripedium spp.*), mycoheterotrophs and ferns, to identify potentially successful species to grow within Botanical Gardens. Knowledge gained from local experts, such as Andy Hill, UBC Botanic Gardens and Plant Research Centre, used as a guide to these areas.
- To research and observe conservation efforts to preserve ecosystems surrounding *Quercus garryana* by visiting various sites around BC, including Cowichan Garry Oak Preserve, with guidance from Daniel Mosquin from UBC Botanic Gardens;
- To discuss and record cultivation techniques to increase species diversity of horticultural collections and to discover potential new or differing propagation techniques for use within the Arboretum and Alpine nurseries at RBG, Kew; plans to visit UBC Botanic Gardens Nursery, VanDusen Botanic Gardens and Tofino Botanic Gardens.
- To further research association planting to assist in improving RBG, Kew's plant collections, to benefit the garden aesthetically and to improve public knowledge of British Columbian flora through interpretation.
- To complete a report of findings including photographs with the intention to present a lecture on the expedition to promote conservation of plants from this area and raise public awareness.

PERSONAL PROFILES:



Figure 5: Pin Dix at base of Lone Cone Mountain

PD: Having worked as a stage manager in the theatre for 17 years, I changed careers five years ago to train and work as a horticulturist. After volunteering for six months with several highly-regarded garden centres within London, and with the National Trust, I undertook the

Horticultural Traineeship at Inner Temple Garden in London before being accepted onto the one-year Traineeship in Botanical Horticulture at RBG, Kew, on completion of which I was offered a permanent position. Working in the Woodland Garden for the past two years has kindled a real passion for woodland flora, including cypripediums, erythroniums and ferns. I hoped that by observing such plants in the wild I could gain a much greater insight into how they behave and naturalise to inform both how we care for our existing collection at RBG, Kew and how we might increase that collection in the future. I also hoped to observe many native species that I have not experienced before, with a view to seeing if any might be suitable to add to our collection here.



Figure 6: Florence Duncan-Antoine between giants in Cathedral Grove

FDA: My horticultural life started as a volunteer in The Lost Gardens of Heligan in Cornwall after completing a degree in Garden Design. I soon realised that gardening was where my passion really lay. I soon became hooked and worked in many gardens across the country including

Chelsea Physic Garden and Deen Community Garden. In 2013 I started working at Royal Botanic Gardens, Kew. I began as a trainee within the Arboretum section. This was an incredible opportunity to discover my love of trees and to be able to plug in to all that knowledge within the team.

After the years traineeship I was extremely lucky to be given the chance to be a permanent member of staff within the arboretum nursery at Kew. I have now been working in the nursery for over two years where my knowledge and experience has grown dramatically from working alongside my manager. To add to my experience I was encouraged to travel to look at plants within their natural habitats and how we can implement this within the gardens to ensure the longevity of the collections here at Kew. One of my main aims of the trip was to see plants in their natural environment and what species were going nearby. I also hoped to gain new connections within nurseries and gardens to share our knowledge within propagation.

ITINERARY

DAY	DATE	DETAIL
1	Saturday 2 nd July	Fly from London Heathrow to Vancouver. Overnight in Vancouver YWCA.
2	Sunday 3 rd July	Travel from Vancouver to Sechelt on the Sunshine Coast. Meet Beverley Merryfield. Overnight in Sechelt.
3	Monday 4 th July	Trout Lake, Pender Hill & Smuggler's Cove w/Harry Hill. Overnight in Sechelt.
4	Tuesday 5 th July	Eva & Erwin Diener's Garden. Cliff Gilker Park for Indian Pipe. Sunshine Coast Botanical Gardens. Private gardens of Paddy Wales & Nancy Webber. Overnight in Sechelt.
5	Wednesday 6 th July	Travel to Lynn Valley, North Vancouver. Visit Lynn Canyon. Overnight in Lynn Valley.
6	Thursday 7 th July	Mt. Thynne w/Alan Tracey & Paul Krystof. Overnight in Lynn Valley.
7	Friday 8 th July	Margaret Charlton & Charlie Sale's Garden, Indian Arm w/Gillian Collins. Overnight in Vancouver.
8	Saturday 9 th July	Queen Elizabeth Park, Bloedel Floral Conservatory, VanDusen Botanical Gardens. Overnight in Vancouver.
9	Sunday 10 th July	Travel to Victoria, Vancouver Island. Government House Gardens and Garry Oak habitat. Overnight in Victoria.
10	Monday 11 th July	Collect hire car. Drive to Tofino stopping at Cathedral Grove en route. Overnight at Ecolodge, Tofino Botanical Garden.
11	Tuesday 12 th July	Research & writing up morning. Exploring Tofino Botanical Garden and Cox Beach. Overnight in Tofino Botanical Garden.
12	Wednesday 13 th July	Tour of Tofino BG w/curator George Patterson. Hike up Lone Cone Mountain in search of cyripediums. Overnight in Tofino Botanical Garden.
13	Thursday 14 th July	Travel from Tofino to Victoria, via Garry Oak Preserve at Duncan. Overnight in Victoria.
14	Friday 15 th July	Visit Port Renfrew w/Daniel Mosquin from UBC, BG. Botanical Beach. Big Lonely Doug. Overnight in Victoria.
15	Saturday 16 th July	Travel to Olympic Mountains, WA, USA w/Daniel Mosquin. Deer Park Road. Overnight at Heart O' The Hills campsite, WA.
16	Sunday 17 th July	Hurricane Ridge w/Daniel Mosquin. Campsite walk. Overnight at Heart O' The Hills campsite, WA.
17	Monday 18 th July	Drive back to Vancouver via ferry to Edmonds, WA. Evening tour of UBC, Botanical Gardens w/Daniel Mosquin.
18	Tuesday 19 th July	REST DAY.
19	Wednesday 20 th July	UBC Botanical Gardens: Meet & Greet w/staff. Tour of UBC Nursery. TreeWalk. Visit Nitobe Memorial Garden. Stanley Park.
20	Thursday 21 st July	Fly Vancouver to Toronto; Toronto to London Gatwick.

MAPS, ROUTES TAKEN & PLACES WE VISITED



Figure 7: Province of British Columbia on Canada's west coast

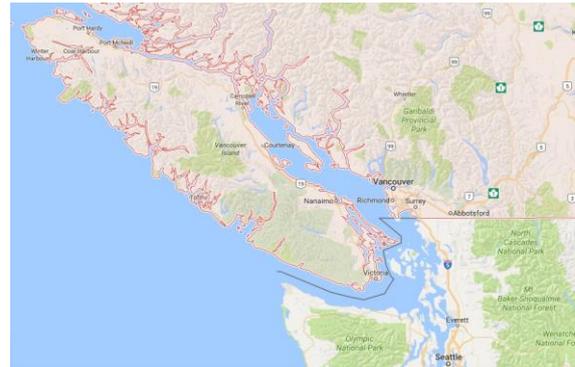


Figure 8: Vancouver region including Vancouver Island

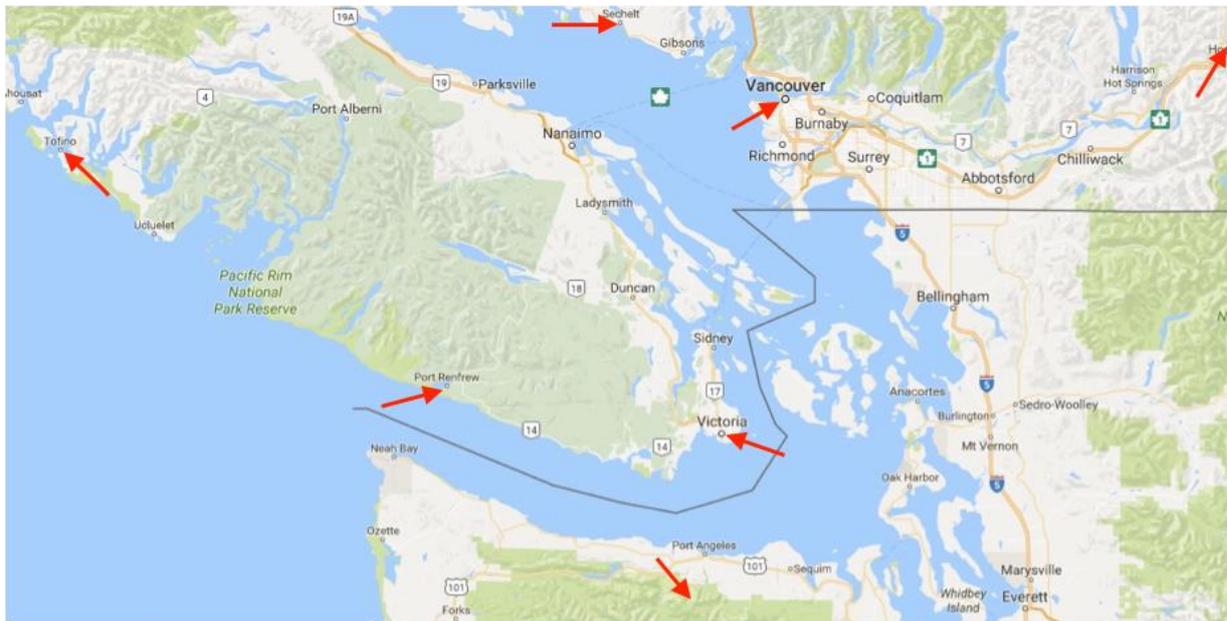


Figure 9: Close up of area covered including Tofino, Port Renfrew, Victoria, Sechelt, Vancouver City and northern Olympic Mountains.

PUBLIC PARKS & GARDENS:

- Cliff Gilker Park, 3110 Sunshine Coast Hwy, Roberts Creek, BC V0N 2W1 (<http://www.scrd.ca/Cliff-Gilker>)
- Sunshine Coast Botanical Gardens, 5941 Mason Rd, Sechelt, BC V0N 3A8 (<http://coastbotanicalgarden.org>)
- Lynn Canyon Park, North Vancouver, BC (<http://lynncanyon.ca>)
- Queen Elizabeth Park, 4600 Cambie St, Vancouver, BC V5Y 2M9 (<http://vancouver.ca/parks-recreation-culture/queen-elizabeth-park.aspx>)
- Bloedel Conservatory, 4600 Cambie St. Vancouver BC V5Z 2Z1 (<http://vandusengarden.org/explore/bloedel-conservatory>)
- VanDusen Botanical Garden, 5251 Oak Street Vancouver BC V6M 4H1 (<http://vandusengarden.org/explore/vandusen-botanical-garden>)
- Government House Gardens, 1401 Rockland Ave, Victoria, BC V8S 1V9 (<http://www.ltgov.bc.ca>)
- Cathedral Grove, Nanaimo F, BC (<http://www.cathedralgrove.eu>)
- Tofino Botanical Gardens, 1084 Pacific Rim Hwy, Tofino, BC V0R 2Z0 (<http://www.tbfg.org>)
- Hurricane Ridge, 600 E. Park Avenue Port Angeles, WA 98362 (www.nps.gov/olym/planyourvisit/visiting-hurricane-ridge)
- University of BC Botanical Gardens & Centre for Plant Research, 6804 Marine Dr SW, Vancouver, BC V6T 1Z4 (<http://botanicalgarden.ubc.ca>)
- Nitobe Memorial Garden, 1895 Lower Mall, Vancouver, BC V6T 1Z4 (<http://botanicalgarden.ubc.ca/visit/nitobe-memorial-garden>)
- Stanley Park, Vancouver, BC V6G 1Z4 (<http://vancouver.ca/parks-recreation-culture/stanley-park.aspx>)

WEEK ONE: SUNSHINE COAST AND VANCOUVER CITY

DAY ONE/TWO: Trains, planes, automobiles...and a ferry.

We flew into Vancouver arriving at our YWCA hostel accommodation with enough time to explore the Gastown district of the city. Not a horticultural hotspot but a lively part of town offering views of Burrard Inlet and the mountains beyond. After a hot and rather sleepless night we set off by bus to Horseshoe Bay to connect with a BC Ferry, crossing the mouth of Howe Sound to Langdale on the Sunshine Coast, which, although on the mainland, is island-like, cut off from the density of metropolitan Vancouver. This was our first real sight of the epic scenery of British Columbia. It was pretty breathtaking.



Figure 10: View from ferry of Burrard Inlet



Figure 11: View from Beverley's back garden!



Figure 12: Beverley Merryfield in her garden with Golly

Beverley Merryfield, who was responsible for founding the Hardy Plant Group of Vancouver and lives in the coastal town of Sechelt, was at the ferry terminal to meet us and drive us to her beautiful shore-side home where we were met by the inimitable Golly – short for Goliath and a rather fitting name for her Yorkypoo puppy, who made up for what he lacked in stature with seemingly boundless energy. Literally meaning ‘land between two waters’ in Coast Salish language, Sechelt is a strip of land between the Salish Sea to the south and the Sechelt inlet to the north boasting stunning views, abundant wildlife, and a bounty of nearby mountains and woodlands. We were treated to supper with some of Beverley's lovely friends, who couldn't have been more welcoming and interested in our little trip, and were very forgiving of our jetlag...

DAY THREE: Two kinds of Hill...

Our first day of exploring was with local expert Harry Hill who whisked us off to Trout Lake, west of Sechelt, to spot the rarely seen native *Rubus nivalis* or Snow Bramble. Low-lying with creeping stems and glossy leaves it was hard to spot among the mass of moss – notably *Hylocomium splendens* (Step Moss) and *Kinbergia oregana* (Oregon Beaked Moss), and *Blechnum spicant* (Deer Fern), *Mahonia nervosa* (Dull Oregon Grape) and *Cornus canadensis* (Bunchberry) seedlings but once spotted it was unmistakable. This was also our first glimpse of a beaver pond with trees standing deathly pale having been drowned in the dammed water, and the sight of the uncommon native *Drosera rotundifolia* (Roundleaf Sundew) and more common native aquatics *Nuphar polysepala/polysepalum* (Yellow Pond-Lily) and *Brasenia schreberi* (Watershield). The Tsimshian people used Yellow Pond-Lily for bleeding of the lungs and as a contraceptive by drinking an infusion from scrapings of the toasted rootstock.



Figure 13: *Rubus nivalis*



Figure 14: PD viewing *Drosera rotundifolia*



Figure 15: Typical beaver pond

The early part of the morning proved also to be a culinary exploration as we sampled berries from various species such as *Vaccinium parvifolium* (Red Huckleberry), *Rubus spectabilis* (Salmonberry), *Rubus ursinus* (Trailing Blackberry), *Rubus parviflorus* (Thimbleberry) *Gaultheria shallon* (Salal), some more delicious than others... Salmonberry is commonly among streams and wet spots and is so-called because its fruits appear at same time as the salmon run, glowing yellow-gold in the north of the province and red further south. Also sighted were *Linnaea borealis* (Twin Flower), *Tsuga heterophylla* (Western Hemlock), *Holodiscus discolor* (Oceanspray), *Spiraea douglasii* subsp. *douglasii* (Steeplebush), *Sedum oreganum* (Oregon Stonecrop), and *Pinus monticola* (Western White Pine) – threatened due to a blister rust.



Figure 16: *Vaccinium parvifolium*



Figure 17: *Holodiscus discolor*



Figure 18: Peeling bark of *Arbutus menziesii*

From Trout Lake we drove northwest (past Joni Mitchell's house!) to Pender Hill, dominated by a steep, dry, rocky ecosystem of *Arbutus* on one side, with associated shrubs such as *Juniperus*, and a slightly less steep woodland environment of second generation Douglas fir on the other. Sadly we were too late in the season to see the reputedly excellent displays of spring wildflowers but did see the remnants of the common early summer native species *Allium acuminatum* (Hooker's Onion or Tapertip Onion) and *Brodiaea coronaria* (Harvest Brodiaea) as we scaled the south-facing route to the summit through short, scrubby grassland and rocks dotted with *Cryptogramma crispa* (Parsley Fern) – also a British Native, *Achillea millefolium* (Common Yarrow), and *Polystichum imbrekans* (Narrowleaf Swordfern). As we climbed further we entered the shrubby habitat of *Mahonia aquifolium* (Shining Oregon Grape) – distinguishable from its relative *M. nervosa* by displaying a strong central vein; *M. nervosa* has several radiating veins, *Arctostaphylos columbiana* (Hairy Manzanita) and *Arctostaphylos uva-ursi* (Bearberry or Kinnickinnick). These *Arctostaphylos* species, the first a tall, upright shrub between 1 and 3 metres, and the second, a prostrate, creeping shrub reaching only 20cm or so, have hybridised to form *Arctostaphylos x media* in areas where they grow in close proximity. Little apple-like fruits give rise to the species name 'manzanita', a derivative of 'manzanilla', the Spanish term for 'little apple'. The red-ochre flaking bark of *Arbutus menziesii* (Pacific Madrone), along with the deep golden brown of the *Arctostaphylos columbiana*, gives the impression that a scorching bush fire has flashed through the woodland. The outer bark of these two distinctive British Columbian natives naturally flakes off in spring to reveal the smooth new bark underneath. *Arbutus menziesii* shows pistachio-green beneath, making the tree appear almost unreal.

On reaching the top, the hill opens up to a rocky expanse with golden dry moss and grasses surrounded by the beautiful structures of Shore Pine (*Pinus contorta* var. *contorta*) with their crooked trunks and irregular, pillowy crowns. The view from the top, overlooking Pender Harbour, was pretty special.



Figure 19: Top of Pender Hill overlooking the harbour

The descent led us through a completely different habitat to that of the dry *Arbutus* woodland. The winding path down is deeply shaded by second-growth *Pseudotsuga menziesii* (Douglas Fir) leading further into *Thuja plicata* (Western Red Cedar) with their bent trunks creating strange lines across the woodland. The forest floor changes also from sun-scorched and bare to damp and moss-covered, with a wealth of plants such as *Polystichum munitum* (Western Sword Fern), *Asplenium viride* (Green Spleenwort) – similar to UK native *A. trichomanes* but stipes and rachis are green, *Piperia unalascensis* (Alaskan Rein Orchid), *Spiranthes romanzoffiana* (Irish Lady's Tresses orchid) – also a British Native, and *Goodyera oblongifolia* (Rattlesnake Plantain orchid) with its incredible leaf patterns, pushing up through the deep moss like stars. This side of the hill also accommodates the uncommon *Polypodium glycyrrhiza* (Licorice Fern) of which we tasted the sweetly flavoured epiphytic roots to make sure we had identified it correctly.



Figure 20: *Cryptogramma crispa* showing sterile fronds



Figure 21: *C. crispa* showing fertile fronds



Figure 22: *Polypodium glycyrrhiza*

Towards the bottom of the hill we entered a new type of forest dominated by *Alnus rubra* (Red Alder), which were growing so tightly packed, straight and tall, it was like entering a sunlit cathedral. The trunks were clad in white lichen, giving the impression of Silver Birch. The canopy created a dappled light on the forest floor, lighting up the understory of predominantly young alder trees, *Holodiscus discolor* (Oceanspray) and *Rubus spectabilis* (Salmonberry).

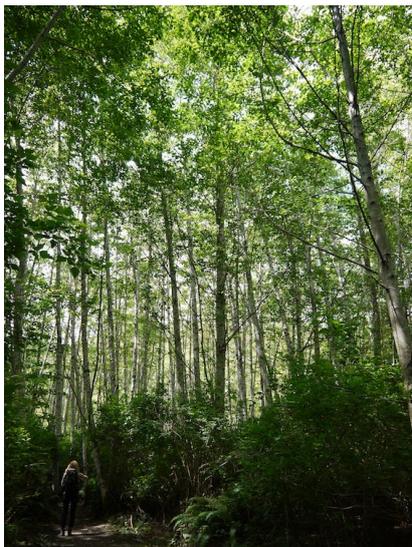


Figure 23: FDA in *Alnus rubra* forest



Figure 24: Lichen species on *Alnus rubra*



Figure 25: Interesting growth on *Thuja plicata*

Our final destination for the day was Smuggler Cove Marine Provincial Park. Sitting to the south of the Sechelt peninsula it is described as a wetland park with a very sensitive ecosystem. On entering the park we were met with *Tsuga heterophylla* (Western Hemlock) woodland with dramatic shafts of light coming through the fine needles. The lush green around us soon turned dramatically eerie and ghostly grey as we entered another area of beaver activity, the trees having been drowned due to a carefully built dam, enclosing the water and creating a territory safe from the predations of coyotes, wolves and bears. Within the wetland was a wealth of life such as the carnivorous *Urticularia vulgaris* (Greater Bladderwort), which have buoyant, valve-lidded bladders that trap small animals, which then decay and are absorbed by the plant, and *Typha latifolia* (Broadleaved Cat Tail). *Potamogeton natans* (Floating-Leaved Pondweed) dominated the beaver pond, within which were distinctive clear channels, which could only be beaver trails, a fact proved by the all-too-brief appearance of one such creature.

DAY FOUR: Great Gardens and Ghost Plants...

After another delicious breakfast at Beverley's we were taken, with Paddy Wales, to meet Eva and Erwin Diener who have created a wonderful woodland habitat in their garden of several acres, bursting with native and non-native plants. Twenty years in the making, we were treated to a guided tour by Eva herself, literally bouncing with excitement as she led us along winding paths and through many twists and turns. Her clear passion and enthusiasm for the plants she has brought together over decades in creating her garden was infectious and her desire to share it with us so generously was palpable. Among the throng of plants growing cheek-by-jowl in her woodland world, highlights were European species *Hacquetia epipactis* (Hacquetia), and the native ferns *Polystichum braunii* or *andersonii* (Braun's/Anderson's Holly Fern, or Vancouver Holly Fern), *Adiantum pedatum* (Five-Fingered Maidenhair Fern), and *Cystopteris bulbifera* (Bulblet Bladder Fern), forming bulblets on the underside of its fronds which drop to the ground when a few centimetres wide and already producing minute fronds of their own, to grow on into a new plant. It was also our first introduction to *Achlys triphylla* (Vanilla Leaf), a fantastic groundcover plant with spikes of small white, star-like flowers, given its common name after the delicate sweet smell of the dried leaves; a must for the Woodland Garden at RBG, Kew. More groundcover was supplied by *Asarum caudatum* (British Columbia Wild Ginger) from the west coast and *Asarum canadense* (Canada Wild Ginger) from the east coast, *Viola semperivens* (Evergreen or Redwood Violet) with pale yellow flowers, bearing maroon veins on lower petals, and *Vancouveria hexandra* (Northern Inside-Out Flower), with white flowers, distinguishing it from *V. chrysantha*, growing in the Woodland Garden at RBG, Kew, which has yellow flowers, as the specific epithet suggests. Both species are found in the Siskiyou Mountains of Oregon and California. Another non-native treat was *Diphylleia grayi* (Skeleton Flower) from Japan, so-called because its white starflowers turn transparent on contact with water. Stunning! We also saw *Iris douglasiana* (Douglas's Iris) found in the wild further south in the Pacific Northwest, the beautiful *Manglietia insignis* (Red Lotus Tree), native to China, Burma and the Himalayas, *Illicium anisatum* (Japanese Star-Anise or the Aniseed Tree) and the rare native *Rhamnus purshiana* (Cascara Buckthorn).



Figure 26: *Adiantum peltatum* w/*Asarum caudatum*



Figure 27: *Achlys triphylla*



Figure 28: Eva Diener in her ornamental garden

From the Diener's Paddy drove us to a forest path near Cliff Gilker Park for a hike with her and Beverley through a shaded native forest of second growth red cedar and Douglas fir, with an understory of sparsely scattered *Polystichum munitum* (Western Sword Fern) and decomposing logs with *Hylocomium splendens* (Step Moss) and *Climacium dendroides* (Tree Moss) slowly engulfing them. Here we saw our first patch of bright yellow *Fuligo septica* slime mould, commonly – and rather unpleasantly – known as 'Dog Vomit'!



Figure 29: *Hylocomium splendens*



Figure 30: Moss engulfed log w/*Polystichum munitum*



Figure 31: *Fuligo septica*

Representing classic lowland to mid-elevation coastal rainforest, it was in this location that we hoped to see the mysterious but beautiful Indian Pipe or Ghost Plant, *Monotropa uniflora*, and were not disappointed. Nothing, no amount of reading or perusing photographs in books, can prepare you for the sight of these plants in their native habitat. Delicate, ethereal, otherworldly, they push themselves up through the humus and stand with gently bowed heads in shades of almost translucent white, pink and blue, becoming darker and ink-stained with age. Known as mycoheterotrophic and particularly associated with Douglas fir, these plants of the Ericaceae family contain no chlorophyll and therefore do not photosynthesize, instead gleaning their nutrients from mycorrhizal fungi attached to their roots. We were also fortunate enough to see *Monotropa hypopitys* (Pine Sap) and *Corallorhiza maculata* (Spotted Coralroot), nosing their way up through the litter of Douglas fir needles. Despite the ground being dry the Douglas fir branches are cloaked with *Isoetes myosuroides* (Cat Tail Moss), common in most coastal rainforests, from sea level to mid elevations.



Figures 32-34 *Monotropa uniflora* at differing stages of maturity



Figure 35: *Monotropa hypopitys*

After a quick lunch stop in Sechelt, Paddy drove us to Sunshine Coast Botanical Garden, where she is one of several directors, who also include Douglas Justice, Associate Director of UBC Botanical Garden. A 40-acre former nursery tree farm, the site was neglected for twenty years before being bought in 2009 by the Sunshine Coast Botanical Garden Society, a non-profit registered charity formed in 2002. It has turned into the garden as it is today with the huge input of volunteers, which number around 100, and now boasts a membership of 800plus individuals. With one full-time and two part-time staff, the site is home to some highly important collections, giving visitors a special view of endemic plants that are in danger of becoming extinct in the wild due to habitat loss. The gardens include a Native Plant Garden representing several of the Sunshine Coast's ecosystems – a Rainforest Grove, the Rain Shadow area representing the drier habitat of the endangered native Garry Oak ecosystem sympathetically planted with meadow species found naturally under these wonderful trees, and a Pond and Wetland Garden. In addition, there is a Rhododendron Garden, Meadows, and Vegetable Garden, the produce being donated to local food banks. Also, the Wigfield Ravine, which offers a birds-eye view of *Acer macrophyllum* (Bigleaf Maple) woodland, with its epiphytic *Polypodium glycyrrhiza* (Liquorice Fern) and natural understory. The Society's garden volunteers, including Native Plants Co-ordinator Harry Hill, lovingly tend all these areas.



Figure 36: Sunshine Coast Botanical Garden



Figure 37: *Quercus garryana* w/native meadow species

The Garden's mission statement is "to create a Pacific Northwest Botanical Garden that inspires and engages the community in plant appreciation and acts as a catalyst for learning and research about horticulture, conservation and land stewardship" and provides opportunities and environments for people of all ages including a specific garden for senior citizens aimed at bringing together older members of the community keeping them physically active as well as offering important social interaction. It was fascinating

to see such a young botanical garden, already showing some fine horticultural displays and bursting with further potential, and to be given such insight into the development of the project from the very people creating it was an inspirational and humbling experience.

Our evening was spent exploring the very different yet neighbouring gardens of Paddy Wales and Nancy Webber, one bathing in glorious sunshine the other in dappled to deep woodland shade. Both are highly individual and beautifully accomplished. Favourite plants in Nancy's woodland garden included the cultivar *Athyrium felix-femina* 'Frizelliae' (Tatting Fern) and *Sanicula caerulea* (Blue Sanicle) from China. Paddy's sunny garden features an orchard and berries, plus flowers of a wide range of shape and colour to support wild pollinators, all ringed with native conifers and *Cornus nuttallii* (Pacific Dogwood), *Rhamnus purshiana* (Cascara) and many native berry-bearing shrubs such as *Gaultheria shallon* (Salal), *Rubus parviflorus* (Thimbleberry) and *Rubus spectabilis* (Salmonberry). Black bears visit during the fruiting season, kept somewhat in check by Paddy's yellow Labrador, Sunny.

DAY FIVE: The wrong suspension bridge...

With reluctance we left the wonderful folk of Sechelt and returned to the city, heading to Lynn Valley in North Vancouver planning to visit the 140m long and 70m high Capilano Suspension Bridge and the famous coastal forest surrounding it. It was only when we were standing on the much more modest 48m long and 50m high suspension bridge within the 616 acre Lynn Canyon Park that it became clear we were in completely the wrong place. That said, this bridge, originally built in 1912, was plenty long and wobbly enough for us and the valley gave us our first opportunity of really exploring coastal temperate rainforest alone, strolling among towering *Pseudotsuga menziesii* (Douglas Fir), *Thuja plicata* (Western Red Cedar), *Tsuga heterophylla* (Western Hemlock) and *Picea sitchensis* (Sitka Spruce) – mainly second growth and between 80 and 100 years old – with *Acer circinatum* (Vine Leaf Maple), *A. macrophyllum* (Bigleaf Maple) and an undercanopy of *Polypodium glycyrrhiza* (Licorice Fern), *Polystichum munitum* (Western Sword Fern), *Rubus spectabilis* (Salmonberry), *Rubus parviflorus* (Thimbleberry), *Mahonia nervosa* (Dull Oregon Grape) and the ever present *Gaultheria shallon* (Salal). The heat of the day induced us to paddle in the freezing waters of the Lynn River, which created this canyon-world before heading back over the knee-trembling bridge and home for the night.



Figure 38: *Polypodium glycyrrhiza*



Figure 39: *Acer circinatum*



Figure 40: Nurse log with inhabitant

DAY SIX: Bountiful plants – and a bear!

An early start heading across the city to meet Alan Tracey and Paul Krystof for a day of plant hunting on Mount Thynne, situated 175 miles east of Vancouver city centre south of the Coquihalla Highway (Highway 5), near the small town of Brookmere. Mount Thynne reaches 2027m at its peak and offers a wide variety of habitats from montane forest, through sub-alpine to alpine. The journey to the mountain took us through low elevation areas with a variety of tree species including *Thuja plicata* (Western Red Cedar), *Acer macrophyllum* (Bigleaf Maple), *Picea sitchensis* (Sitka Spruce) nearer the coast and *Picea engelmannii* (Engelman Spruce) further inland, *Populus balsamifera* subsp. *trichocarpa* (Black Cottonwood), *Tsuga heterophylla* (Western Hemlock), and *Pseudotsuga menziesii* (Douglas Fir) as well as shrubby species such as *Sorbus sitchensis* (Sitka Mountain Ash) and *Sambucus racemosa* (Red Elderberry). However, we also saw large swathes of forest cleared through

logging, a practice that has been occurring in BC since the late 19th century and continues today. First growth forest, with trees up to 1000 years old, is cleared leaving a few mature specimens to naturally reseed the cleared area but often areas are planted with faster growing species, which replace the wild forest species and within 50 years can be re-logged. Replacement trees at high elevation may be *Pinus contorta* (Lodgepole Pine), *Larix occidentalis* (Western Larch) or the quick growing Douglas fir, which, although a direct native replacement for the old growth, can be affected by dilution of the population if the new trees are not of the correct provenance. We also spotted *Calypso bulbosa* (Fairyslipper or Deer's Head Orchid), *Epilobium angustifolium* (Fireweed) and non-native *Chichorium intybus* (Chicory) washing the verges of the highway with pale blue.

As we continued along the Coquihalla Highway the vegetation changed on entering the drier habitat adjoining the remains of the Kettle Valley Railway, at the base of a classic U-shaped glacial valley. Here we saw the spectacular *Lilium columbianum* (Columbia Lily) – one of only two native species of lily in BC, *Penstemon fruticosus* (Shrubby Penstemon), *Lupinus bicolor* (Miniature Lupine), and the bright red daubs of *Castilleja miniata* (Slender Indian Paintbrush). In a dry gulch we saw *Pinus contorta* (Lodgepole Pine), which, after a fire, spring up as crowded seedlings, growing long, thin trunks that in the past were used for teepee construction, now for fenceposts, and *P. ponderosa* (Western Yellow Pine) with its distinct cinnamon-coloured bark. *Pinus ponderosa* is a large inland species growing on dry open sites. With needles of 10-20cm in length, in bundles of 3, its scaly, fissured bark smells of vanilla when baked in the hot sun; a truly spectacular tree. Surrounding the pines were meadows filled with *Erigeron speciosus* (Showy Fleabane), *Geranium erianthum* (Northern Geranium) and *Sedum lanceolatum* (Lance-Leaved Stonecrop).

Further verge-side sightings of *Aquilegia formosa* (Red Columbine) – magnificent with its nodding flowers of red and yellow, *Geum macrophyllum* (Large-leaved Avens), *Geranium viscosissimum* (Sticky Geranium), *Rosa acicularis* (Prickly Rose), and *Shepherdia canadensis* (Buffaloberry or Soapberry), which as the name suggests produces suds when the berries are mixed with water. Whilst gazing at these wonders as we began our ascent up the mountain we saw our first sight of a black bear. Probably a female, and more brown than black, she seemed utterly content sitting in amongst the trees stripping the *Shepherdia* of its berries and consuming them with great relish.



Figure 41: *Lilium columbianum*



Figure 42: *Shepherdia canadensis*



Figure 43: *Aquilegia formosa*

At 1440m we saw *Rosa sitchensis* (Sitka Rose), less spiny than *Rosa acicularis*, and with heavenly scent. *Pterospora andromedea* (Pine-Drops) – a saprophyte in the Ericaceae family, *Antennaria* sp. (Pussytoes), *Penstemon serrulatus* (Cascade Penstemon), *Pinus monticola* (Western White Pine) – the specific epithet meaning 'inhabiting mountains', *Abies lasiocarpa* (Subalpine Fir), *Mimulus moschatus* (Musk Monkeyflower) – yellow and the taller, pink *M. lewisii* (Lewis's Monkeyflower), *Collinsia parviflora* (Small-Flowered Blue-Eyed Mary), *Xerophyllum tenax* (Bear Grass), *Arnica cordifolia* (Heartleaf Arnica) – an indicator plant for moist coneforest as it grows in meadow-like communities and in open-canopy coniferous forests on high-elevation, water-shedding sites in the coastal interior – and *Valeriana sitchensis* (Sitka Valerian or Mountain Heliotrope). *Pinus monticola* grows in valleys to fairly open dry slopes, from near sea level to subalpine regions. The Kwakwaka'wakw people used the White Pine's gum to increase fertility in women who would chew it. It was even thought by some to cause pregnancy without intercourse. Unfortunately the tree is becoming rare with the introduction of White Pine Blister Rust, which reputedly came over from France on imported timber in 1910. Young trees die swiftly after contracting the rust but more mature specimens show signs of resistance.

1700m to 1825m: The area here was reforested in 1993 and offered us sightings of *Phlox diffusa* (Spreading Phlox), *Lomatium* sp. (Snow Parsley), *Pedicularis racemosa* (Sickletop Lousewort), *Saxifraga ferruginea* (Rusty Saxifrage) and *S. occidentalis* (Western Saxifrage), *Arabis lyallii* (Lyll's Rockcress), *Vaccinium scoparium* (Grouseberry or Little-leaved Huckleberry), *Eriogonum umbellatum* var. *subalpinum* (Sulphur Buckwheat – though this common name is confusing as the yellow form has not been seen in this area, instead flowers here are cream, pink or red), *Polemonium pulcherrimum* (Short Jacob's Ladder), *Saxifraga bronchialis* (Spotted Saxifrage) - a prickly, cushion-forming saxifrage of dry, rocky and gravelly places. The progression of coloured spots from purple or blue to yellow, from the tips of the petals inwards, earn this saxifrage its common name. At this elevation we spotted *Pinus albicaulis* (White Pine), a small, shrubby, twisted tree with short limbs that are surprisingly flexible. They grow in dry to moderately moist subalpine environments often singly or in widely spaced groups of trees. The flexible nature of the wood is an excellent adaptation for a tree that must deal with heavy snow and ice. Along with *P. flexicosa* (Limber pine), these trees are five-needle pines with wingless seeds that are removed from the cones by various small animals and often by a bird called the Clark's Nutcracker, a member of the crow family. With their strong beaks they remove the seed, stash what is not immediately eaten for later consumption, usually on a dryish bank. Forgotten stashes later germinate, which is how most of these trees begin their lives. Both these pine species rely heavily on these birds for seed distribution.

As we approached the tree line, a mist descended creating a thin grey blanket obscuring the beautiful view. It was suddenly cooler and damper, the trees were becoming thinner leaving large areas free for alpine flowers to flourish. It was impossible to move quickly, despite the significant dip in temperature, as at every step there was a fascinating flower staring up at us. Melted snowpack revealed new life burgeoning from the cold, wet ground – a magical thing to see.

Having been told repeatedly leading up to our trip that we would be very unlikely to see erythroniums in flower this late on in the season, Alan and Paul hinted fairly early on in the day that this might not be the whole truth... Once we reached 1925m and with the weather conditions becoming increasingly cool and inclement, we got our first glimpse of what at least one of us had travelled halfway round the world to see. So delicate and vulnerable-looking *Erythronium grandiflorum* (Glacier Lily) belies its appearance, proving itself to be hardy enough to bloom almost before its covering of snow has fully melted. This small patch was extremely distracting and included double-flowered specimens, but we were promised a greater show at the summit. Also at this elevation were *Cassiope mertensiana* (Merten's Mountain Heather), *Phacelia sericea* var. *sericea* (Silky or Alpine Phacelia), *Veronica wormskjoldii* (Alpine Speedwell), *Sibbaldia [Potentilla] procumbens* (Creeping Sibbaldia) and in wetter locations *Caltha leptosepala* subsp. *leptosepala* var. *leptosepala* (Alpine White Marsh-Marigold) and *Trollius laxus* (American Globeflower). On the hillside we spotted the rare white form of *Penstemon procurus* (Pincushion Penstemon), possibly only found at this location. In the wall of the roadside bluff were cushions of *Penstemon davidsonii* var. *menziesii* (Davidson's Penstemon), which was also a short distance higher in the screes along with diminutive *Penstemon procurus* var. *tolmei* (Pincushion Penstemon) in both the common purple and rather rare pure white form.



Figure 44: *Erythronium grandiflorum*



Figure 45: PD photographing *Erythronium grandiflorum*



Figure 46: *Pulsatilla occidentalis*

PEAK 2020m+: The cloud cover at the summit was so thick it was hard to see much beyond a few yards ahead. Some epic driving skills from Alan ensured we didn't have to climb any further than a few metres up to the peak itself and were rewarded with swathes of *Erythronium grandiflorum* emerging from beneath their snowy blanket along with *Pulsatilla occidentalis* (Towhead Babies – referring to the silky seed heads) and *Claytonia lanceolata* (Western Spring Beauty). Near the transmitter station we saw both *Phyllodoce empetriformus* (Pink

Mountain-Heather) and *P. glandulifera* (Yellow Mountain-Heather). We were lucky to see *Abies lasiocarpa* (Subalpine Fir) from 1440m to the very top of Mt. Thynne (2020m), both young to mature. The young trees were so abundant we had a brilliant view of the midnight-blue cones leaking with resin. The very top of Mt. Thynne gave us a completely different view of this fantastically striking tree: stunted and misshapen, with the tops dead and silver. The now-thick grey mist enveloped the trees like a cloak, showing only a hazy silhouette of these statuesque mountain guards.



Figure 47: Cone of *Abies lasiocarpa*



Figure 48: FDA photographing *Lilium columbianum*



Figure 49: Alan Tracey & Paul Krystof

DAY SEVEN: Gardening on the edge...

With Gillian Collins, who currently holds the role of co-chair of the Vancouver Hardy Plant Group, we drove to Indian Arm to meet a couple whose legendary garden was a talking point among nearly all those we met throughout our trip. Margaret Charlton and Charlie Sale have created an extraordinary garden on a dizzying slope nestled in the shadow of the surrounding temperate rainforest. Between them they have manhandled each rock and boulder into place and lovingly created a garden brimming with interest throughout the seasons with plants, both native and non-native, including between 75 and 100 epimedium (Barrenwort) species and cultivars, *Bomarea edulis* (Salsilla) native to Mexico and tropical South America, *Escallonia* 'Iveyi' (*Escallonia*) with its pretty panicles of white flowers, *Diplacus aurantiacus* red form (Monkey Flower), *Oxalis oregana* (Redwood Sorrel) a native found in coastal redwood and moist Douglas Fir forests, *Cornus omeiense* (Evergreen Dogwood), *Ampelopsis aconitifolia* (Monkshood Vine) from Mongolia, *Hydrangea integrifolia* (Evergreen Climbing Hydrangea) from Taiwan and the Philippines, and species of *Roscoea*, *Hosta* and *Trillium*. Other highlights in this exquisitely planted garden were beautiful *Hydrangea serrata* 'Shirofugi', *Oreocharis auricula* (*Oreocharis*), *Fothegilla gardenii* (Mountain Witch Alder), *Rhododendron argyrophyllum* subsp. *nankingense* 'Chinese Silver', *Meliiodendron xylocarpum* (Woodyfruit Meliiodendron), *Neolitsea sericea* (Japanese Silver Tree), *Nothofagus dombeyi* (Coigue), *Crinodendron hookerianum* (Chilean Lantern Tree) and *Dichroa febrifuga* (Chinese Quinine). Also, *Rubus* x 'Benenden' (Tridel Berry 'Benenden') – a hybrid of *R. deliciosus* x *R. trilobus*, *Asteranthera ovata* a fabulous woodland climber from Chile, the tiny shrub *Sorbus poteriiifolia* syn. *S. pygmaea*, *Rhododendron thomsonii*, *Vaccinium glauco album* (Himalayan Huckleberry), *Sinocalycanthus chinensis* (Chinese Wax Plant) and *Hydrangea involucrata* 'Viridescens'.



Figure 50: Margaret Charlton & Charlie Sale's Garden



Figure 51: Margaret & Charlie

A damp day but, as Charlie said, we were having the full temperate rainforest experience, and we could not fail to be impressed both by the plants and the sheer determination of the couple to create something so magical literally with brute force and endless passion. After a wonderful guided exploration we were treated to a delicious lunch before Gillian drove us back into the city to find our next lodging place.

So, we were at the end of week one and had already seen so much and met so many wonderful and inspiring people. Now we faced the part of the trip that would see us exploring largely unguided, in botanical gardens and key horticultural and wild destinations, both in Vancouver City and on Vancouver Island.

WEEK TWO: VANCOUVER AND ITS ISLAND

DAY EIGHT: Parks and Gardens

A fun day of exploring parks and gardens in the city. Vancouver is a city of stark contrasts between rich and poor, with affluent areas of commerce and retail rubbing shoulders with neighbourhoods displaying serious poverty and a disparate population of homeless people and migrant workers. We travelled by bus along the infamous and eye-opening East Hastings Street to Main Street, where we changed to head south to Queen Elizabeth Park. It is safe to say we were glad not to be travelling alone. Once at the park we climbed up to the peak (at 167m from sea level it represents the highest point within Vancouver) and were rewarded with panoramic views of the city and surrounding mountains. QEP is 52 hectares and claims to have every native tree in Canada amongst its collection. We didn't stop at each one to check but instead headed straight to the Bloedel Conservatory for a bit of tropical light relief. A triodetic domed glasshouse the conservatory boasts a roof made up of 1,400 individual 'bubble' panels and the display areas cover almost $\frac{1}{4}$ of an acre. Opened in 1969, the Bloedel is a joint venture operated by the Vancouver Park Board and the VanDusen Botanical Garden Association and houses 500 plants species and more than 200 tropical birds from macaws to zebra finches, which fly free throughout the specially climate-controlled zones. It's aim is to enable a "better appreciation and understanding of the world of plants", though it struck us that most of the visitors were more interested in the fauna than the flora. That said, the Bloedel Conservatory has three separate climatic zones and attempts to demonstrate the importance of plant conservation and habitat protection, with specific reference to biodiversity increasing nearer the equator, which houses many of the most endangered ecosystems in the world. The three habitats are:

Desert: An area of low humidity and home to many species of cacti and succulent, including *Euphorbia tirucalii* (The Pencil Tree).

Subtropical rainforest: Greater humidity but maintaining relatively high light levels, this zone is home to fig and banyan trees with associated orchids. Plants of interest were *Ficus lyrata* (Fiddleleaf Fig) and *Raphis excelsa* (Lady Palm).

Tropical rainforest: Perhaps the most diverse and complex ecosystem on the planet is represented in this zone with lower light levels and high humidity, housing species such as *Cecropia obtusifolia* (Trumpet Tree) and *Musa balbisiana*, *M. ornate*, *M. acuminata* (Bananas).

A brief stroll through the more ornamental areas of QEP saw us take in the sights of some 'interesting' bedding but sadly the lawns were roped off so exploration was somewhat limited. This rather uninviting area gave the impression that the plants were imprisoned with no possible chance of escaping the glaring, clashing colours of their bedding display. Not to our taste, we found ourselves pulling faces while strolling the immaculate paths, especially when we found a patch of *Sempervivum* cultivars clustered under chicken wire, apparently to stop them escaping though possibly more likely a theft prevention device. We tried to view the garden with non-judgmental eyes and to see it as an area with its own unique beauty. This was tough and we quickly walked away from the almost plastic and distinctly unrealistic garden with sympathy for the visitors that were walking through. It was impossible to show people what nature and gardens are for: not just for viewing from the sidelines but to educate with interpretation rather than 'Keep off the Grass' signs. That said, there were crowds enjoying the colours, each taking their turn for a 'selfie' in front of the fenced off display, so it just goes to show we all have different tastes.



Figure 52: Triodetic dome of Bloedel Conservatory



Figure 53: Queen Elizabeth Park



Figure 54: Bedding display in QEP

On to VanDusen Botanical Garden, a 55-acre site in the centre of the city, boasting a collection of 255,000 plants within 7,500 taxa. VanDusen's vision is that the Botanical Garden and Bloedel Conservatory "will be cherished locally and renowned internationally for their beauty and for their leadership in plant conservation, biodiversity and sustainability". The mission statement "to inspire understanding of the vital importance of plants to all life through the excellence of our botanical collections, programs and practices" is being clearly demonstrated through the exceptional interpretation within the smart Visitor Centre. Welcomed in to the newly built HSBC Arrival Hall, we were immediately struck by the inspiring panels, giving details about the garden, adorning the walls. A beautifully created glass panel with a silhouette of a tree named "*Planting the Seed*" showed the enormous list of donors who had given over \$5000 apiece to the garden. The Mission and Vision statements both had pride of place in the entrance showing the visitor the true importance of the garden's work before the space opened up into a wooden funnel named the "Solar Chimney". This natural ventilation system is assisted by a 13.5m high solar chimney, composed of an operable glazed oculus and an aluminium cone, which serves as a heat sink for direct solar radiation. On a sunny day, the operable windows located in the sides of the skylight open, the heat sink draws warm air up through the building and exhausts it out through the vents. This keeps the visitor centre cool and comfortable without using expensive and unnecessary machinery. Not only is the building aesthetically beautiful, the architects had to design it specifically to meet the Living Building Challenge, Canada's most rigorous set of requirements of sustainability, including systems aimed at creating a net zero water facility. Grey-water and black-water is collected, treated and filtered before recharging the aquifer through a percolation field. Rainwater doesn't go to waste either as it's harvested from the roof and reused for all building toilet flushing. This was clearly explained to the public in an engaging and accessible way.



Figure 55: VanDusen Botanical Garden w/Solar Chimney



Figure 56: Interpretation



Figure 57: *Gaultheria shallon* on display in the garden

The interpretation within the visitor centre also gave us a chance to learn about the ecosystems of British Columbia, with large photographs and informative explanations of each region, ensuring whoever read panels couldn't fail to come away with a love for British Columbia's natural habitats and incredible plant life. On leaving the visitor centre the garden opens up into a huge expanse of beauty. It would not have been possible to take in the every part in just an afternoon so we split up to make sure we covered as many corners of the garden as we could. It is not easy exploring a garden with no less than three weddings taking place; every time either of us rounded a corner we seemed to stray into someone's intimate moment and are sure to feature as unexpected guests in several photos. Nonetheless we spent a thoroughly pleasant afternoon seeing the numerous collections, highlights being the Fern Dell, Maples, and the lakes leading away from the Visitor's Centre. The Stone Garden, on the other hand, left a little to be desired... The interpretation within the garden was far less impressive and inviting than that within the Visitor's Centre; fading and old, it was a shame to see people noticeably walked past ignoring it. Another impressive thing about VanDusen, however, is that anyone can access its plant database (still somewhat under construction), to discover more about species of particular interest. Something RBG, Kew could do?

DAY NINE: To Vancouver Island

An early start needed as we headed via bus, train and bus to the Tsawwassen ferry terminal en route to Swartz Bay on Vancouver Island. Another day of stunning weather but sadly no whale sightings.

On arrival at Swartz Bay we jumped on our third bus of the day, taking us to downtown Victoria, the state capital of British Columbia and with an interesting take on BC in Bloom...

We had the afternoon spare (and just enough energy) to visit Government House and Gardens, the estate of the Lieutenant Governor of British Columbia who, as The Queen's representative, upholds the constitution. The house is set within 36 acres of both formal gardens and, more interestingly perhaps for us, rare Garry Oak woodlands.



Figure 58: Downtown Victoria.

The only whales we spotted on the whole trip...

The gardens were originally designed by Vancouver-based landscape architect G. K. Maclean in 1911 but were updated in 1957 by British-born Robert Savery to reflect the style of traditional English gardens, a design that largely survives today. Through the 1960s and 1970s up to 17 gardeners worked on-site, diminishing to just one following austerity measures brought in by the government in the 1980s. In the early 1990s the then Lieutenant Governor, David Lam, introduced the Garden Volunteer Program, allowing great improvements to the existing gardens, which had deteriorated in the previous decade, and the creation of new gardens as well as initiating a fundraising scheme. By the early 2000s public access was opened through the Woodlands, allowing visitors to experience the beauty of the native Garry Oak habitat – one becoming increasingly rare in British Columbia. Sadly the tearoom and interpretive centre were closed but we had a rewarding walk through the 22 acres of woodland, which is unique in providing an example of a Garry Oak ecosystem within the urban setting of Victoria. We were too late in the season to see the wildflowers including *Camassia* spp. (Camas), *Ranunculus occidentalis* (Western Buttercup) and *Erythronium oregonum* (Giant White Fawn Lily); it must be a truly stunning sight in the spring.



Figure 59: *Quercus garryana* ecosystem



Figure 60: *Quercus garryana* acorn

An early night required after a tiring day of travelling and the prospect of Cathedral Grove and the reputedly beautiful but winding drive to Tofino on the Island's west coast.

DAY TEN: Giants and Gems

Picked up the hire car and headed up Highway 1 towards Nanaimo before turning west onto Highway 4 for our first stop, Cathedral Grove. One of the only remaining and easily accessible stands of native old-growth forest remaining in British Columbia, protected by Macmillan Provincial Park, Cathedral Grove is bisected by the narrow highway running through it which can become congested with traffic as hundreds of visitors flock to see the majestic Douglas Firs and Western Red Cedars. At between 200 and 800 years old these ancient beauties tower to a dizzying 75m from the forest floor, boast circumferences of up to 9m and have attracted fascinated sightseers for more than 100 years having survived the ravages of a forest fire which destroyed the nearby region around 350 years ago and the colonisation of Vancouver Island by European settlers in the mid 19th century. We were told that Cathedral Grove avoided the fate of clearance as the trees have dry rot and were therefore not

valuable to the timber industry but it is also purported to be thanks to the efforts of countless conservationists who have campaigned for over a century to protect this biologically important habitat. We had a very jolly time exploring among the giants, clambering over, under and through the huge stumps, which gave many an opportunity for a photo. Sadly our picture of the largest tree in the park couldn't do justice to this epic Douglas fir, which had already been standing for 300 years when Christopher Columbus arrived in North America in 1492.



Figure 61: FDA in Cathedral Grove



Figure 62: The largest tree in Cathedral Grove



Figure 63: PD between two huge fallen trees

And on we drove, after a brief lunch stop at Port Alberni, to the fishing and surfing town of Tofino. Sitting on the end of a long narrow peninsula, Tofino can only be reached by one road, the increasingly winding and wonderfully picturesque Highway 4. A bustling little place, and originally the site of a First Nations Clayoquot village, Tofino was one of the first places in Canada to be visited by Captain Cook and remained unchanged for 100 years apart from inhabitation by whalers and fur traders. Primarily a fishing town it is now visited by hordes of tourists, who come to explore the Pacific Rim National Park and indulge in hiking, whale watching and seaplane rides.

DAY ELEVEN: Soggy day of study, strolling and the seashore.

We awoke to some real temperate rainforest weather so, after a delicious breakfast of freshly cooked oatmeal muffins in the Ecolodge, we settled down to a few hours of study, nosing through our flora books relating to the Pacific Northwest and writing up some notes on our adventures so far. Then, donning waterproofs we headed out into the gardens to explore.

Tofino Botanical Gardens covers twelve acres of cultivated gardens, forest and shoreline, designed to explore the relationship between the cultural and natural history of the region. A non-profit registered charity organisation, Tofino BG's mission is "to inspire conservation of the world's temperate, coastal rainforests". Short but sweet, the mission statement should not be underestimated; here is a small but highly dedicated team with the purpose to cultivate and display plants which are native both to the Tofino region but also the world's remaining coastal temperate rainforests. The gardens operate research and education programmes to improve the knowledge and understanding of the ecosystems of the UNESCO Calyoquot Sound Biosphere Reserve and the conservation requirements needed to maintain such a habitat. The gardens hold one of the last remaining old growth forests of Clayoquot Sound, which surrounds the cultivated parts, reaching down to the mudflats and shoreline. As you enter the gardens from the gravel drive, greeted by the warm welcome of nasturtiums flowing freely around your feet and the gentle sound of classical music, the Darwin's Café floods the air with the scent of coffee beans and cake. First stop! From here we begin to see just a glimpse of the wonderful gardens that George Patterson has created, with winding paths to go exploring and many opportunities to get lost amongst the undergrowth, evoking the child in us.

While sitting on the veranda of the café we noticed quirky sculptural elements within the flowerbeds and beyond. Instantly enticed into the garden, we resisted the urge to plunge headlong into the forest by first investigating the Productive Garden filled with colour from a wide range of vegetables and edible flowers. This area is also the site of Tofino's first community garden, giving local folk living in apartments or rented accommodation the chance to grow their own food. Once satisfied we had seen enough lettuce and chard we ventured off down one of many paths into the forest. Under the canopy, the mood changed. The dark forest appeared as if a storm had surged through it with trees stripped of

their tops, leaving silver-grey shards. But still it invited us in; we wanted to explore this mysterious place. The paths twisted around trees and stumps drawing us eagerly on to happen upon sculptures in small, enclosed room-like clearings. Some of these held remembrance art such as the large piece, created entirely from manmade objects washed up from the shore, in memory of the devastating tsunami that hit Tohoku, Japan in 2011. Other 'rooms' held beautifully crafted wooden dens used for storytelling and educating.



Figure 64: Tofino Botanical Garden



Figure 65: 'Swept Away' commemorating the Tohoku tsunami



Figure 66: Quirky artwork among the plants

As we ventured further we came across the start of a network of boardwalk paths disappearing into the now much higher and darker forest of *Thuja plicata* (Western Red Cedar), *Tsuga heterophylla* (Western Hemlock) and *Pseudotsuga menziesii* (Douglas Fir). The boardwalk gave us a view of the forest floor without needing to trample over the plants. We did spot *Taxus brevifolia* (Pacific Yew), this was the only Pacific Yew we saw in the wild and this one was too far from the boardwalk to get a good look at. The bark is flaky, in colours of deep golden reds and browns and the tree can happily tolerate deep shade. The wood from was used by First Nations' people for spoons, bowls and tools. The Haida would eat the fleshy seed coverings (arils) but only in small quantities as too many were said to make a women sterile.

Following the boardwalk further still, twisting and turning, we came to stairs down to the forest floor, the soggy spongy path following the mudflat shoreline. Being here enabled us to examine the forest understory and we found a huge array of moss and lichens such as *Leparia sp* (Dust Lichen) and *Cladonia sp* (Cladonia Scales) with the tiniest fungi we've ever seen growing off large Western Red Cedar stumps. Also, *Cornus canadensis* (Dwarf Dogwood) and *Prosartes hookeri* (Hooker's Fairybells), with its interesting 'clasped', stalkless leaves. From floor level we were able to see the unbelievable size and shapes of the *Thuja plicata* with their trunk-sized branches reaching out in all directions like the tentacles of a huge, up-ended brown squid. Another path led us out onto the rather odorous mudflats. Heavily draped in fog, we imagined wolves swimming from island to island and bears nipping out of the trees for nose along the seashore. Managing to resoundingly spook ourselves, we slipped and slid our way back into the forest and returned to the Ecolodge with rather nervous giggles.



Figure 67: *Prosartes hookeri*



Figure 68: *Taxus brevifolia*



Figure 69: George Patterson, Josie and Fanny the dog

After a heading into Tofino town for a bite of lunch we returned to meet up with George Patterson, curator of TBG, his wife Josie and their gorgeous dog, Fanny. A wonderfully generous man, the enthusiasm for the garden he has created was evident; it is clearly a real labour of love. The skies having cleared, we were encouraged to visit one of the many famous surfing beaches just south of Tofino itself, for breathtaking views of a vast open sea and skyscape. Tofino boasts of having some of the best spots for watching the sun rise and set and the place is literally dripping with tousle-haired,

sun-kissed folk, fuelling up in the many bars and cafes after a day catching the waves. Cox Bay did not disappoint and we emerged from a narrow stretch of *Thuja plicata* onto white sands stretching 1.5km and facing wide open to the west. Turning our backs on the waves we were met with the view of unrecognisable trees bent double and wildly contorted from the repeated thrashing of onshore winds, their bark desiccated to a silvery grey. At their base were sedge species and *Lathyrus japonicus/maritimus* (Beach Pea) with purple-blue flowers swaying above fleshy, glaucous foliage. Sadly our tummies were in need of filling so we abandoned thoughts of watching the sun dip below the horizon here and instead went back to town for fish and chips, eaten alfresco on a bench overlooking Meares Island, tomorrow's destination.

DAY TWELVE: Are we nearly there yet...?

Glorious weather greeted us on rising and we breakfasted with George and some of the staff from the Botanical Gardens. Knowing we had plans to head over to Meares Island, George gave us a brief but informative tour of the gardens and explained some of the history behind creating the spaces and the importance of the many artefacts housed within. Perhaps the most striking of all the artefacts is the 17-foot long Nuu-chah-nulth Cedar Canoe made in 1991 by Joe and Carl Martin of the Tla-o-qui-aht First Nations. Hewn from a single cedar log, with only the carved stern and bow pieces added, his incredible canoe was placed here for people to learn about the importance of First Nations culture. George has made it his personal mission to educate the public about the incredible life of the First Nations people and how they used plants for food, medicine and materials, as well as cultural rituals and mythology. The large interpretation boards had both English and a 'written' form of the language of the Nuu-chah-nulth people from this area of Vancouver Island. The plant labels also use this language securing the fact that the First Nations people are still very much in existence.

And so to the epic task ahead: climbing the infamous Lone Cone Mountain on Meares Island with the hope of spotting *Cypripedium montanum* (Mountain Lady's Slipper). The island is only accessible by water taxi, bookable from various companies operating out of Tofino. We went with Tofino Water Taxi at North Sea Pier, the boat ride taking 15 minutes to the foot of the mountain. The 6.6km hike to the summit and back, with an elevation gain of 730m, takes between four and six hours and apparently requires 'at least a moderate level of physical fitness'. They weren't kidding. 'Hiking' is an apt description for only the first kilometre or so of the ascent, after which scrambling, climbing and hauling oneself up would be closer to the mark, as after 1.8km or so the hike averages at an angle of 45 degrees. Possibly the most physically challenging climb either of us had undertaken in a long time – maybe ever?! – it wasn't long before we stopped taking photos, put the cameras away and focused simply on the task of getting to the top, even if it killed us. There were definitely moments of stopping to get our breath and wondering how much further we could possibly have to go, but the sight of cheery, ruddy-cheeked hikers on the return telling tales of the outstanding views was enough to keep us going. Once at the top, somewhat sweatier and more battered than we had been at the start of the hike, we were indeed rewarded with possibly the best views of the whole trip. Spectacular panoramic views over Tofino and the Clayquot Sound were just the things to sooth our aching limbs and reward us for the toughest of climbs. We sat and munched our sandwiches in silence, though whether that was because we were in awe of our surroundings or simply exhaustion it is hard to tell.



Figure 70: View of Lone Cone from Tofino



Figure 71: Typical of the terrain experienced



Figure 72: The view from the top

As the laws of gravity dictate, what goes up must come down. Do not be fooled into thinking going downhill is easy; on Lone Cone nothing is easy. Slipping, sliding, clambering over huge tree roots we eventually made it back to the base and proudly signed the visitors book adding our time of five hours for the round trip. Back at the shoreline we were greeted by the very welcome sight of our returning water taxi and dragged our heavy legs to Kuma, Tofino's **best** restaurant serving "humble Japanese-inspired comfort food". Several beers and two bowls of yummy ramen later we felt somewhat restored and euphoric after an epic day, despite no sightings of those elusive cypripediums.

DAY THIRTEEN: Leaving Tofino, Garry Oaks and Gin.

With heavy hearts we packed up and left the delights of beautiful Tofino and got on the road back to Victoria. The Botanical Gardens, George, Josie and their small team made a lasting impression on us. This was a story about educating and preserving this beautiful forest for generations to come and to include and appreciate the First Nations and learn from what they have done for thousands of years.

On the drive back along Highway 4 we encountered our second black bear of the trip. **Q:** How does a black bear cross the road? **A:** Without any hurry and with a glance back at the thrilled inhabitants of the passing 4x4. We were blessed with good weather until we got to Ladysmith, where we stopped at the Visitor Centre to get some information about The Cowichan Garry Oak Preserve (CGOP), within the Cowichan Valley, which has been created to preserve one of the outstanding and increasingly rare *Quercus garryana* (Garry Oak) wildflower communities. Garry Oak ecosystems support the highest diversity of plants in coastal British Columbia along with a highly diverse number of insect, bird and reptile species. They and their associated biodiversity are globally endangered, with less than 10 percent of the original ecosystems remaining and over 100 species at risk due to loss of this habitat. We continued on the road to Duncan in the pouring rain and took Maple Bay Road north east towards the coast not certain of what we were looking for. It wasn't long before we found it however, more by chance than decent signage.



Figure 73: Cowichan Preserve site



Figure 74: A watery sun breaking through the rainclouds behind mature *Quercus garryana*



Figure 75: An English landscape in Canada

The reserve is not open to the public except for one day of the year in late spring when visitors can enjoy a walk through the wildflower meadows at the height of the flowering season. These meadows of intact *Quercus garryana* (Garry Oak) communities are found in an area where housing development is active and widespread. Here, Vancouver Island's warmest climate creates an ideal environment for vineyards and pastures, attracting ongoing residential building and introducing invasive species, which frequently out-compete the more fragile native plants. In the spring it is possible to see tapestries of wildflowers growing between moss-covered rocks, and seas of intense blue *Camassia quamash* (Blue Camas) bordered by waving grasses and the blazing yellow flowers of *Ranunculus occidentalis* (Western Buttercup) and *Lomatium utriculatum* (Spring Gold), lighting up the meadow floor. Most Garry Oak meadow species are spring booming, with *Plectritis congesta* (Sea Blush), a winter annual, being the first to flower in February and continuing throughout the season if the conditions remain cool enough. *Dodecatheon hendersonii* (Shooting Stars) and *Erythronium oregonum* (White Fawn Lily) generally appear next, followed by Camas, *Fritillaria lanceolata* (Chocolate Lily), *Trillium ovatum* (Western Trillium), *Allium acuminatum* (Hooker's Onion) and *A. cernuum* (Nodding Onion) taking over the show from the earlier bulbs. Many native shrubs and climbers choose this season to bloom with *Arctostaphylos uva-ursi* (Kinnickinnick) and *A. columbiana* (Hairy Manzanita) coming into flower early

on, followed in late spring by *Philadelphus lewisii* (Mock Orange), *Sambucus racemosa* subsp. *pubens* (Red Elderberry) and *Lonicera ciliosa* (Western Trumpet Honeysuckle). Finally, grass species are often early summer flowering, leaving their brittle seedheads to ripen and shatter with the rest of the meadow species as the summer drought settles in and all but the toughest plants enter dormancy. Garry Oak wood was used by the Nuu-cha-nulth for combs, digging sticks and fuel; the acorns eaten, either roasted or steamed. The ecosystem was managed by the First Nations by underburning, in order to cultivate a supply of Camas bulbs, which were an important food source for many coastal groups. This practice involved relatively frequent, low intensity fires to eradicate quick-establishing shrubby species, which would otherwise suffocate the more fragile plants. Today the management of these ecosystems is vital as very quick growing invasive species such as *Cytissus scoparius* (Scotch Broom) would otherwise dominate these landscapes. Garry Oaks were considered sacred to the god of thunder and it was thought carrying an acorn could preserve a youthful appearance. Not being able to take one with us, we can't testify to this last fact.

In July there are no wildflowers to speak of and we managed to time our trip to coincide with persistent heavy rain so even the golden summer grasses failed to glow for us. Nevertheless, this was an incredible landscape to see and there were plenty of Garry Oaks laden with their small but perfectly formed acorns. The rain had freshened the air and, finally, the late evening sun poked through the clouds to reveal an open woodland scene, filled with steam rising through the gnarled old oaks. We stood transfixed and smiling – this was a very special and unexpected sight.

And so to Victoria, a hurried meal in Bubby's Kitchen, Cook Street, narrowly escaping the second set of the mightily foot-stomping, guitar-wielding songster, and home for a quiet night with a G&T in front of Midsomer Murders.

DAY FOURTEEN: Botanical Beach and Big Lonely Doug.

Dropping the car back to the hire centre, we were met by Daniel Mosquin from UBC Botanical Garden for a final day of exploring on Vancouver Island, heading along Highway 14 and the southwestern coast to Port Renfrew. Daniel is the Research Manager and photographer at UBC Botanical Garden, Vancouver, having studied at the University of Manitoba focusing in ecology, plant taxonomy, limnology and other biological sciences. He has an intimate knowledge of British Columbia and Washington State and was therefore a perfect guide for our next stage of the trip.

Our first stop was Botanical Beach within the Juan de Fuca Provincial Park, an intertidal marine habitat with numerous tide-pools formed of soft sandstone rock, approached from the parking area through a growth of rainforest. The southern cliffs provide one of the most picturesque landscapes on this part of Vancouver Island as ridges of shale and quartz jut through black basalt. Hundreds of plant and animal species can be found both in and around the many rock-pools and along the shoreline, all with the ability to adapt to the conditions of dramatically changing temperatures, predators, food sources and salinity. One particular species, a brown seaweed *Postelsia palmaeformis* (Sea Palm) survives in the tempestuous surf-zone by firmly attaching to the rocks and bearing erect yet flexible stipes that can bend with the force of the pounding waves. The huge impact of the waves is actually necessary for the species to develop; they are not found in areas of calmer water.

Heading away from the fascinating rock-pools with their populations of seastars, anemones and barnacles, Daniel took us along the shore and up onto a rocky outcrop where we saw *Prenanthes alata* (Western Rattlesnake Root) with nodding flowers in the Asteraceae family, *Castilleja affinis* subsp. *litoralis* (Seashore Paintbrush) and *Trifolium wormskoldii* (Cow's Clover), large-flowered here at sea level, becoming smaller-flowered in mountain habitats. At this higher level there were also pool-inhabitants – rarely seen salamanders! From here Daniel encouraged us to look out to sea to glimpse the Olympic Mountains in the distance across the Juan De Fuca Strait, which separates British Columbia from the United States. They were our ultimate destination.

On our way back through the forest to the car we spotted *Graphis scripta* (Script Lichen), *Boykinia occidentalis* (Coastal Boykinia), *Polypodium scouleri* (Coastal Polypody or Leather-Leaf Fern) – larger than *P. glycyrrhiza*, they are commonly found in fog-drip or salt-spray zones. Also, *Tiarella trifoliata* var. *trifoliata* (Foamflower) with very distinct tri-lobed foliage, *Triantha glutinosa* (Sticky False

Asphodel), and *Lysichiton americanus*, which we learnt are called Swamp Lanterns, not Skunk Cabbage, in this part of the world as they shine like beacons in the deep forest, heralding the arrival of spring.

From Botanical Beach we drove to see the second largest Douglas fir in the World. Whilst he may be only the 'second' largest, Big Lonely Doug is certainly the number one loneliest tree, standing solo amidst a sea of huge clear-cut stumps, which are all that remain of the giant red cedars and Douglas firs that once filled this area having been cut down and hauled away by loggers in 2012. It is not uncommon for a single tree to be left standing either as a wildlife tree or to provide cones to reseed the forest, though both these reasons seem a tall order in this bleak and barren landscape and perhaps Doug is a very stark reminder of the inadequacy of British Columbia's forestry regulations, designed to protect these old giants. The Ancient Forest Alliance have spent years campaigning to save ancient trees like Doug, estimated to be 1000 years old, and sent a team of climbers to scale his heady height in order to accurately measure him and to get some spectacular photographs used to highlight the need to protect British Columbia's rapidly diminishing old growth populations. It is estimated that 75 percent of the old growth forests on British Columbia's southern coast have been logged, including 99 percent of old-growth Douglas firs. At 66 metres tall, Doug literally towers over the landscape and is an all too sad reminder of the destructive nature of Canada's chief industry, reportedly worth \$17 billion annually, and the havoc it has reaped on the wilderness.

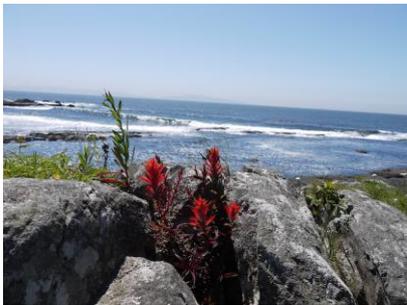


Figure 76: *Castilleja affinis* subsp. *litoralis*



Figure 77: *Polypodium scolieri*



Figure 78: Big Lonely Doug

Some areas are being designated as protected sites, one such being the fifty hectare Avatar Grove, which is now a tourist attraction and home to "Canada's gnarliest tree". We stopped off to explore amongst the moss-covered giants and were suitably spooked by the creaking and squeaking way over our heads as the trees swayed and rubbed against each other in the wind. As far as gnarly trees go, Britain's ancient oaks could give Avatar Grove's huge cedar a run for its money but as a visitor attraction it does its bit by highlighting the importance of this province's native elders.

An unexpected treat came in the form of the Fairy Lake Fir, a tiny bonsai Douglas fir clinging to a dead, semi-submerged nurse log, its only source of nutrients and support. This plucky little tree has attracted numerous photographers, no doubt moved by its tenacious struggle for endurance, and one of these, Adam Gibbs, was commended for his image in the Wildlife Photographer of the Year Award 2012. Having seen this image at the Natural History Museum's exhibition four years ago, it was humbling to see it in the flesh, though the photographs we took are unlikely to win such accolades.



Figure 79: "Canada's Gnarliest Tree"



Figure 80: Fairy Lake Fir

Heading back east from Port Renfrew we stopped off at the San Juan River Forest Recreation Site to see the San Juan Spruce, Canada’s largest specimen of *Picea sitchensis* (Sitka Spruce). When measured by wood volume this tree represents 333 cubic metres, has a base circumference of 11.6m and once stood at 62.5m from the ground before a lightning strike damaged the crown. No less impressive was the enormous *Acer macrophyllum* (Bigleaf Maple) towering above us less than 50m from the spruce, literally filling us with awe as we gazed up like Lilliputians into the branches above.



Figure 81: FDA under San Juan Spruce



Figure 82: Moss-draped canopy of *Acer macrophyllum*

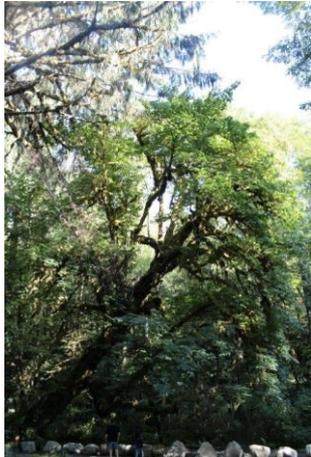


Figure 83: PD & Daniel Mosquin under *Acer macrophyllum*

WEEK THREE: OLYMPIC MOUNTAINS & UBC

DAY FIFTEEN: Heart O' The Hills

After the 'interesting' experience of getting through the rigorous U.S. immigration clearance process we took the ferry from Victoria to Port Angeles in Washington State getting ever closer to the Olympic Mountains, which were to be our playground for the next few days. Heading straight to Heart O' The Hills campground we found adjacent sites within the old-growth forest and pitched our tents before taking a drive up Deer Park Road.

This region represents drier forest up to 6000FT with plentiful *Pseudotsuga menziesii* (Douglas fir) and *Cupressus nootkatensis* (Alaskan Yellow Cedar) with its signature drooping limbs, but no *Tsuga heterophylla* (Western Hemlock), which require wetter environments. At 2500-3000FT understory highlights were *Pyrola asarifolia* (Liverleaf Wintergreen), with its spikes of delicate pink flowers held aloft over the leather, evergreen basal cluster of foliage, *Boschniakia hookeri* (Vancouver Ground-Cone) – unusual in that the host plant needs to penetrate the parasite for it to seed unlike most parasitic plants which penetrate the host, *Pterospora andromedea* (Pine-Drops), *Campanula scouleri* (Scouler's Bluebell) – rare in BC, the gorgeous summer-flowering *Chimaphila umbellata* (Western Prince's Pine or Pipsissewa), with its waxy, pinky-red cupped flowers, and, definitely plant of the day, *Allotropia virgata* (Candy Stick Plant). Also known as 'Barber's Pole' or 'Devil's Wand', these saprophytic plants are not found anywhere outside of Western North America. These species were found nosing up through drier leaf mould surrounded by *Linnaea borealis* (Twin Flower), *Gaultheria shallon* (Salal), and *Arctostaphylos uva-ursi* (Kinnickinnick).



Figure 84: *Campanula scouleri*



Figure 85: *Chimaphila umbellata*



Figure 86: *Allotropia virgata*



Figure 87: *Linnaea borealis*

Climbing higher we came across *Pyrola picta* (White-veined Wintergreen), *Piperia elegans* (Elegant Rein Orchid), *Castilleja hispida* (Harsh Paintbrush) – with distinctive deeply lobed bracts, *Sedum spathulifolium* (Broadleaf Stonecrop), *Nothochelone nemorosa* (Woodland Penstemon or Turtle Head), *Orthilia secunda* (One-sided Wintergreen) and *Peltigera canina* (Dog Lichen). *Hylocomium splendens* (Step Moss) and *Rhytidiadelphus triquestus* (Electrified Cat's Tail Moss) were prevalent at 4-5,000 FT growing with a white form of *Anemone lyallii* (Western Wood Anemone), foliage of *Clintonia uniflora* (Queen-cup), *Luina hypoleuca* (Silverback Luina) with further *Castilleja hispida*.

Higher still, at around 5500FT we saw *Juniperus sp.*, the uncommon *Delphinium glariosa* (Olympic Larkspur), *Allium crenulatum* (Olympic Onion), *Erysimum capitatum* (Western Wallflower), *Lomatium martindalei* (Martindale's Desert Parsley) and *Phacelia hastata* (Silverleaf Phacelia), also found on Mt. Thynne. Coming to the tree line, which represents the border between sub-alpine and alpine habitats, we saw *Polemonium californicum* (Showy Jacob's Ladder), *Polygonum bistortoides* (Western Bistort), *Veronica wormskjoldii* (Alpine Speedwell), *Phleum alpinum* (Alpine Cat's Tail) and *Campanula piperi* (Olympic Harebell), a species found only in the Olympic Mountains. We also spotted *Sedum stenopetalum* (Wormleaf Stonecrop), *Eriogonum ovalifolium* var. *nivale* (Cushion Buckwheat) and *Viola adunca* (Western Dog Violet). Here Daniel had the opportunity to demonstrate how to recognise an *Abies sp.* by its soft handshake, upward needles, thick branches and resin bubbles.

We had a fantastic day on the road with Daniel and his encyclopaedic knowledge. He also happens to be a great chef and host treating us to a feast of both Sockeye and Coho salmon, poached in foil at the campsite. Sitting in front of a campfire in the midst of the Olympic Mountains was an awesome experience and for once we were free of the midges, deterred as they were by the smoke.

DAY SIXTEEN: Hurricane Ridge

We awoke early after a pretty good sleep and were soon heading off to Hurricane Ridge, the most easily accessible mountain area within Olympic National Park, located seventeen miles south of Port Angeles. En route we took the Switchback Trail heading towards Klahhane Ridge, ascending steeply from Hurricane Ridge Road, gaining 1,500FT in 1.5 miles. As we parked up we were lucky to see our third bear of the trip, a young one heading off through the trees having stopped for a drink at the stream cascading down to the carpark. True to its name the trail climbs via switchbacks, or hairpin bends, through sub-alpine, mixed conifer forest. We only climbed a short way up but saw *Micranthes odontiloma* (Brook saxifrage), *Pinguicula vulgaris* (Common Butterwort), *Clintonia uniflora* (Queen-cup) in flower, *Rubus laciococcus* (Dwarf Bramble) and *Parnassia fimbriata* (Fringed Grass of Parnassus) in the Celastraceae family.

Heading up to Hurricane Ridge we were lucky to see the epic views in the morning as by mid-afternoon the clouds had descended and the mountains were obscured. We stopped at the busy and very informative visitors centre, which had maps and information about the region and, interestingly, pressed herbarium specimens and details of plants currently to be seen in flower.

Hurricane Ridge rises to 5242FT (1598m), but we gained an extra 1000FT taking the dirt track east from the Visitor Centre along Obstruction Point Road, the Olympic National Park's highest elevation road and described on the website www.dangerousroads.org as "probably, the Washington's scariest road" though, strangely, Daniel never mentioned this. After a few miles driving through trees, the road opened up and we picked our way along the ridge, as delicately as it's possible to do in a 4x4 truck. Fortunately the sweeping views of the Olympic Mountains distracted us from the sheer drop below...

The climate here was altogether wetter than we'd previously seen and gave the opportunity to spot some quite different flora. At the edge of a shallow, flowing ditch we saw *Pedicularis groenlandica* (Elephant's Head Lousewort – so-called as the upper lip of the flower is strongly hooded and beaked resembling the head and trunk of an elephant), *Cupressus nootkatensis* (Alaskan Yellow Cedar), with its characteristic drooping foliage and so named for the Nuu-chah-nulth First Nation people, *Platanthera dilatata* var. *dilatata* (White Bog Orchid or Bog Candle), *Fritillaria affinis* (Mission Bells) seed heads, and *Penstemon serrulatus* (Coast Penstemon) – one of three wet climate penstemons. Also, *Mimulus tilingii* (Mountain Monkeyflower), a pink form of *Heracleum maximum* (Cow Parsley) – the only member of this genus native to North America, and *Delphinium glaucum* (Tall Larkspur). Continuing higher we came across *Castilleja parviflora* (Magenta Paintbrush), *Orobanche uniflora* (Naked Broomrape) – parasitic on sedums, saxifrages and species of Asteraceae family, *Pedicularis racemosa* (Sickletop Lousewort), *Orthocarpus imbricatus* (Mountain's Owl Clover), and *Castilleja rhexifolia* (Rosy Paintbrush) among *Pinus monticola* (Western White Pine).



Figures 88 & 89: *Platanthera dilatata* var. *dilatata*



Figures 90 & 91 *Pedicularis groenlandica*

The best sight of the day was, without doubt, the grove of *Erythronium montanum* (Avalanche Lily) found at high elevation in a ditch below a scree slope at side of the dirt road. A 50m+ patch in among cut logs, *Juniperus* and *Lupinus* spp., it was incredible to see such large numbers tumbling down through the valley, their delicate white heads gently nodding in the wind. Magical!



Figure 92: *Erythronium montanum*



Figure 93: PD surrounded by *E. montanum*



Figure 94: *E. montanum* fading to pink

Higher still we saw the interesting grass *Carex albonigra* (Black and White Sedge) – alluding to its flowers, which are black w/cream tips, *Erythronium grandiflorum* (Glacier Lily) growing with *Ranunculus eschscholtzii* (Snowpatch Buttercup) and *Pedicularis bracteosa* (Towering Lousewort) – an Olympic form with burgundy flowers, rather than the usual greenish-yellow. Our final stretch, heading up to Obstruction Point through alpine habitat yielded *Douglasia laevigata* (Smooth Douglasia) – a pink-flowered mat-forming species within the Primulaceae family, *Geum triflorum* (Prairie Smoke or Old Man’s Whiskers), and a white form *Campanula piperi* (Olympic Harebell) only found at this specific spot in the Olympic Mountains. Surrounded by thick, wet mist we marched on, bent over to shield our faces from the chill. The noises up on the mountain were bone-chillingly eerie, a feeling heightened by the appearance of strange black silhouettes emerging from the gloom. We gave big sighs of relief each time these materialised as nothing more sinister than black-tailed deer.

A distant, delicate sound of water dripping was coming from a *Picea sitchensis* (Sitka Spruce), which we heard before seeing the tree. Daniel informed us that the trees catch the mist droplets on their needles to then drip down to the ground to the roots; a clever and convenient self-watering system in a very brutal landscape.



Figure 95: White form of *Campanula piperi*



Figure 96: Self-watering Sitka Spruce



Figure 97: Olympic Mountains in sunshine

Back to the campground, we took a walk through the woodland surroundings to be delighted by a carpet thick with ferns, mosses, *Maianthemum* sp., *Trillium* sp., *Actaea* sp., *Asarum* sp., plus *Achlys triphylla* (Vanilla Leaf, as we’d seen in Eva Diener’s garden) and *Oplopanax horridulus* (Devil’s Club). This last species is a large, spiny shrub, related to ginseng and still highly valued by First Nations people as a medicinal and protective agent. The roots were traditionally used to treat ailments such as arthritis, ulcers and diabetes with people still treating this last condition with a tea made from the inner bark. The heavily-spined stems were thought to ward off evil influences, the sticks being used as protective charms and the charcoal from burned Devil’s Club used as a protective facepaint. Flattened, bright red berries form in showy panicular clusters and, while inedible for humans, are a favourite with bears.

It was another absolutely fascinating day and, again, there was simply too much to take in on a single visit. Eating in Port Angeles, the massive portions were a reminder that we were now in the USA where

they sure like their food! We sat up late by the campfire reflecting on how much we've seen and done on this trip as it was drawing to a close. This is an extraordinary part of the world.

DAY SEVENTEEN: After-hours at UBC

Up and packed before breakfast, we headed along Highway 101 to Sequim for a quick coffee and muffin stop before continuing to Kingston to catch the 30 minute commuter ferry to Edmonds and then onto Interstate 5 back to Vancouver. Daniel dropped us at our final accommodation for a shower and freshen-up before collecting us again to give us an after-hours tour of UBC Botanical Gardens with his lovely wife Lisa.

The mission statement of UBC Botanical Garden and Centre for Plant Research is: "to assemble, curate and maintain a documented collection of temperate plants for the purposes of research, conservation, education, community outreach and public display". The garden supports a living and growing collection of plants representing the biodiversity of selected native and exotic temperate ecosystems, totalling approximately 120,000 accessioned plants, which represent some 6,000 taxa. It began life on this site 1916 having originally been created as a therapeutic garden within the hospital grounds of Essondale in Coquitlam by John Davidson, or 'Botany John', British Columbia's first provincial botanist. Having recently celebrated its 100th birthday it now holds the status of the 'oldest university garden' in Canada. The garden relocated to UBC Point Grey campus following the closure of the Office of the Provincial Botanist requiring John Davidson, with the aid of a few willing helpers, to move thousands of specimens forty kilometres along rough roads to the new site. From here the garden developed into a centre of research and a showcase for the rich diversity of British Columbia's flora and was given designated Botanical Garden status in 1951. Through the 1980s the Asian collection developed under curator of the Asian Garden, Peter Wharton, and UBC now holds the world's second largest Acer collection after the Arnold Arboretum at Harvard University in Boston. In 2002, the UBC Centre for Plant Research became the research arm of the UBC Botanical Garden, examining topics such as plant adaptation, genomics and phytochemistry. The Botanical Garden and the Centre for Plant Research are both encompassed by UBC's Faculty of Science.

The garden boasts beautifully maintained areas encompassing, in addition to the Asian collection, an alpine garden, food garden, physic garden and a Garry Oak meadow and woodland garden showcasing the delicate ecosystem the oaks support. Without doubt for us the garden's most impressive feature was its signature BC rainforest garden with its displays of locally native plants representing elements of the coastal rainforest of British Columbia's southwestern region. The majority of plants here are either naturally occurring or derived from plants in the wild and the collections include a wide variety of woody and herbaceous, terrestrial, marginal and aquatic species, as well as those of ethnobotanical importance to the First Nations. We were extremely lucky to have seen a wide variety of the native flora in the wild so to see how sensitively the collections have been put together was inspiring. This is an ongoing mission for the garden and research teams, with Douglas Justice, Associate Director and Curator of Collections, creating new interpretation for the garden's plant collections.



Figure 98 & 99: The Coastal Temperate Rainforest Garden



Figure 100: UBC Botanical Gardens new interpretation

The day ended with an epic picnic, provided by Daniel and including such culinary delights as four different types of smoked salmon, delicious cheeses and elk prosciutto, not forgetting the amazing – if unbelievably calorific – profiterole cake!

DAY EIGHTEEN: Sunset over Jericho Beach.

A day of rest, long-needed after wonderful weeks of plant hunting and garden visits. We headed to Granville Island to buy pottery, local gin and souvenirs for loved ones back home. Made our way to Jericho Beach for sunset before heading back to our digs with take-out pizza in front of Inspector Morse...

DAY NINETEEN: Zen and the art of garden maintenance.

Our last full day in Vancouver started with the important purchase of cinnamon buns by the box-load from Grounds for Coffee on Alma St. before heading to UBC for a meet and greet with some of the horticultural staff. Such a friendly and welcoming bunch, they were all eager to hear about our trip as we licked sugar and icing from our sticky fingers. Douglas Justice very kindly gave us an in-depth talk about the gardens, showing his incredible passion for the collections and his strong desire to share them with members of the public, a feeling clearly shared by his dedicated staff. As we sat outside in the morning sunshine we were lucky enough to see a hummingbird visiting for a feed just a few feet away.

Coffee and buns demolished, the staff went back to work and Daniel took us to the Botanical Garden's nursery, just a short drive from the main site. The nursery is headed up by Kevin Kubeck who has been in charge since 2010, having been at the University, working both in the gardens and with the botany department, for twenty years. He is assisted on a part-time basis by Nadine Robinson¹ as well as by students of the University and volunteers. The nursery supports the UBC Botanical Gardens by propagation of the collections as well as growing on seed collected from all over the world, within a single glasshouse and a polycarbonate house. We were fortunate enough to see plants raised from seed collected in Vietnam in 2014 by Andrew Hill, Curator of the Asia Garden at UBC, and Andrew Luke, previously Supervisor of the Arboretum Nursery at RBG, Kew, and now Supervisor of the Woodland Garden, Grass Garden and Order Beds. Sister plants are being cared for both at RBG, Kew and RBG, Edinburgh highlighting the importance of collaboration across botanical institutions. Long-term plans are to bring the nursery closer to the grounds of the gardens as Kevin and his team are rather isolated, which can cause difficulties with communication. This is great news as the place is brimming with potential and it would be so beneficial for the garden staff to be able to visit regularly as is the case at RBG, Kew.



Figure 101: New glasshouse at the nursery



Figure 102: Kevin Kubeck showing propagation tent



Figure 103: Potting bench



Figure 104: Potting media

Once back on the main site we were left to explore alone. As we strolled peacefully along paths and through the display gardens we found ourselves feeling very much at home. The gardens have a similar atmosphere to RBG, Kew, albeit being on a much smaller scale, with beautifully presented collections and a clear message to visitors of the need to conserve the world's plant species and the importance of education of both young and old to achieve that end. There are a few differences however and none more obvious than the sight of a man on a segway with helmet and high vis. jacket rolling towards us. Strange, we thought, with an amused glance at each other, but it wasn't until he had passed us that we noticed his jacket had a message on the back of it inviting members of the public to join a tour of the

¹ Nadine Robinson has subsequently left UBC to take up the position of Chief Horticulturist at Sunshine Coast Botanical Gardens. Small world!

gardens by segway, him actually being a 'glide master'. Whilst this is a novel idea and an increasingly popular way to sightsee in various parts of the world it is perhaps not something that would catch on at Kew. Or would it? Standout species spotted during our stroll were the very rare *Rehderodendron macrocarpum* in the Styraceae family and from Yunnan, China, with its deep pink drooping, sausage-like fruits hanging frustratingly out of reach, and *Pterosyrax hispida* (Epaulette Tree), also from China, the seed-heads of which hung down like fairy curtains and had us transfixed as the sun caught the delicate furry casings.*

Our final port of call at UBCBG was the Greenheart TreeWalk, which we hoped to compare to the Treetop Walkway at RBG, Kew. Made up of suspended walkways and tree platforms, the 310 metre-long canopy walkway hangs from huge cedars and Douglas firs many of which are over 100 years old. At its highest point it reaches almost 20 metres from the forest floor (comparable with Kew's static walkway, which stands at 18 metres and extends for 200 metres), giving a bird's eye view of the fantastic coastal temperate rainforest below. Greenheart differs from many other treetop canopy walks having been specifically engineered to minimise impact on the trees or habitat using a specialised cable tension system enabling platforms to be hung from the trees without the need for bolts or nails. For those whose knees knock on the relatively stable, static walkway at Kew, this constantly moving, suspended walkway might prove too much (and it certainly makes taking photographs a challenge) but we were fortunate enough to have the whole walkway to ourselves and could marvel at the forest floor in relative comfort.



Figures 105 & 106 The Greenheart TreeWalk

Figure 107: Peering down to the forest floor

Leaving the main site at UBC, we were delivered to Nitobe Memorial Gardens before we bid Daniel a fond farewell. On entering though the gateway into the gardens we were struck by an almost overwhelming sense of calm as the noise from the surrounding busy roads was muffled and we drifted effortlessly through the lush green landscape. The garden was created in 1959 by Inazo Nitobe (1862 - 1933), a Japanese agricultural economist, author, educator, diplomat and politician, whose goal was to create a space: "to become a bridge across the Pacific". Considered to be one of the most authentic Japanese gardens in North America and among the top five outside of Japan, it includes a rare authentic Tea Garden with ceremonial Tea House. Every stone, tree and shrub has been placed deliberately and is carefully maintained to reflect "an idealised conception and symbolic representation of nature". Maples, cherries, azaleas and iris species were brought over from Japan but alongside these are native trees and shrubs, which have been trained and pruned in the typical Japanese fashion to incorporate them into the landscape. The website states: "A place of reflection, where each step reveals a new harmony, the garden is designed to suggest a span of time – a day, a week or a lifetime – with a beginning, choice of paths and ending" and after everything we had seen over the past three weeks this immensely different landscape came as a surprise and pleasure to our eyes. We gently walked through the garden along twisting paths, separating and then meeting again within the space with soft smiles and in a state of total serenity.



Figure 108: Nitobe Memorial Garden



Figure 109: *Polypodium* sp. with moss



Figure 110: Moss carpet at Nitobe

A perfect end to an amazing trip and we probably should have stopped there but instead were lured to Stanley Park to admire its “ever-blooming gardens” and famous seawall, which, at nearly 30km in length, is a mecca for walkers, runners and cyclists affording stunning views out over Vancouver Harbour and English Bay.

At over 1000 acres and with the heat of the day increasing we only saw a tiny proportion of what Stanley Park has to offer but were treated to the sight of one of its most famous residents, a cheeky raccoon making the most of someone’s leftover pizza and skipping among the buses departing for downtown.



Figure 111: Stanley Park's seawall



Figure 112: Raccoon, locally known as “Trash Pandas”

DAY TWENTY: Home time.

Our final morning in Vancouver and we were up just after dawn to catch a taxi to the airport. With heads full of new plant names and many happy memories we bid farewell to British Columbia and the wonderful sights it beheld for us. Whilst packing so much in to our three-week stay, we have come away with an awareness of just scratching the surface of what this incredible province has to offer in terms of plant life and biodiversity. We met so many wonderful, knowledgeable and, above all, truly passionate plants people who were only too happy to share their habitats and expertise with us; for that we shall both be eternally grateful.



CONCLUSION

PD: Apart from being the most unforgettable and rewarding experience, I have come away from this trip with a much greater knowledge of British Columbia's plant habitats, native species and cultural history, as well as having met some genuinely inspiring and remarkable people. Seeing plants in their native habitat, some of which are extremely rare or only exist in tiny populations within this region, was a truly humbling experience and, if I needed convincing about the importance of my career change both personally and professionally, this trip certainly did that for me. It has also underpinned the value of the conservation efforts taking place within botanical institutions such as RBG, Kew and Sunshine Coast, Tofino & UBC Botanical Gardens and how collaboration across such organisations is vital to the success of that work.

Having observed so much throughout the trip I now have much to reflect upon and research in order to build on the foundation of what I experienced in BC. I am keen to introduce natural source material from species we saw there into the Woodland Garden here at RBG, Kew and have already secured a possible donation of native seed from collections made by Paul Krystof after our time spent with him. There has also been a tentative invitation from Daniel Mosquin to take another trip with him, this time into the Siskiyou Mountains of southwest Oregon and northwest California, to see erythronium and cypripedium species, and a genuine encouragement from everyone we met to visit again and explore further.

It takes time, organisation and stamina to propose, fundraise for, plan, and execute a trip such as this but it has been worth every minute, leaving me with not only a huge sense of achievement and satisfaction but also the knowledge that I forged relationships with individuals and organisations that both RBG, Kew and I can nurture and draw from in the future.

FDA: The first thing to say is a massive thank you to everyone that helped us go on this fantastic trip. I have never felt so inspired and passionate about seeing plants and nature in their natural habitats.

My main focus was to observe the delicate ecosystems across coastal British Columbia by visiting many different habitats to get a real understanding of how different plants thrive and where they don't. Amazingly the chance to see so many habitats in such a small part of the state was incredible. We saw temperate rainforests all along the coast of mainland BC, throughout Vancouver Island and down to Washington State but what was fascinating was seeing different plants in every area and even the same plants were growing differently depending on the conditions. This gave me a huge understanding of environmental conditions and how plants will react to them, not to mention the plants living high up on a mountain rock. It really showed me how delicate these habitats actually are and how very small shifts in the environment can throw it off course in so many ways.

One such place was Cowichan Garry Oak Preserve where a small area of original Garry Oak (*Quercus garryana*) ecosystem stand surrounded by residential housing and roads. No public can walk through this very delicate ecosystem so we stood and watched the rain stop, the sun come out and the steam rise and felt enormously privileged to see such a beautiful area of woodland. Less than 10 percent of the original extent of this ecosystem remains worldwide, yet more than 100 species at risk depend on this disappearing habitat. I left the Garry Oaks feeling very sad but also incredibly privileged to see their wonderful black twisted branches covered in moss and lichen. The Cowichan Preserve has many volunteers working to save these small pockets involving burning the woodland floor and planting native species and will hopefully one day be able to extend the area further and further. One of my many dreams after returning from this trip was to come back to Cowichan in spring to work with the team to experience the conservation involved in preserving the ecosystem and also to see the incredible sights of a colourful display of spring bulbs and flowers covering the woodland floor.

I feel by observing plants in their natural habitats along with visiting some inspiring gardens and nurseries I have a better understanding of how to propagate and care for them. This has given me much greater confidence working in the Arboretum Nursery at RBG, Kew where we help to conserve the vast collections across the gardens. I feel we have made some very valuable connections across British Columbia where we can share plant expertise and help to conserve the value of Botanic Gardens open to the public.

EXPENSES

EXPENSE	COST	TOTAL
Air Fare London Heathrow to Vancouver International direct. Vancouver International to London Gatwick via Toronto	£866.95 each	£1733.90
Car Hire 4 x 4 vehicle for 4 days (Victoria to Tofino and back)	£350	£2083.90
Fuel Victoria to Tofino (rtn) + travel w/Alan Tracey (Mt. Thynne) & Daniel Mosquin (Vancouver Island, Olympic Mountains & Vancouver).	£155	£2238.90
Public Transport Bus/Train/Ferry within Vancouver, to Sunshine Coast (rtn), to Vancouver Island, to Olympic Mtns, to Vancouver. Plus UK travel.	£350	£2588.90
Accommodation (Hostels, Air B'n'B, Campground)	£1250	£3838.90
Food & Sundries	£1015	£4853.90
Botanic Garden/Parks/Garden Entry	£45	£4898.90
Water Taxi & Mountain Pass (Tofino to Meares Island [rtn], Lone Cone Mountain)	£70	£4968.90
Maps, Guidebooks, Publications on flora	£65	£5033.90
Gifts, Printing/Binding & Postage	£270	£5303.90
Miscellaneous	£35	£5338.90
TOTAL		£5338.90

NB There were no visa requirements and insurance costs were covered by RBG, Kew
Certain costs have been rounded up slightly to account for changes in the exchange rate and tipping.

FUNDING RECEIVED

AWARDING BODY	AMOUNT
Royal Horticultural Society	£2000 (£1000 each)
John Scott-Marshall Award	£1700 (£850 each)
The Merlin Trust (FDA)	£889.25
Alpine Garden Society (PD)	£889.25
TOTAL	£5478.50

SIGNED: PIN DIX.....

SIGNED: FLORENCE DUNCAN-ANTOINE.....

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