DAVIDSONIA

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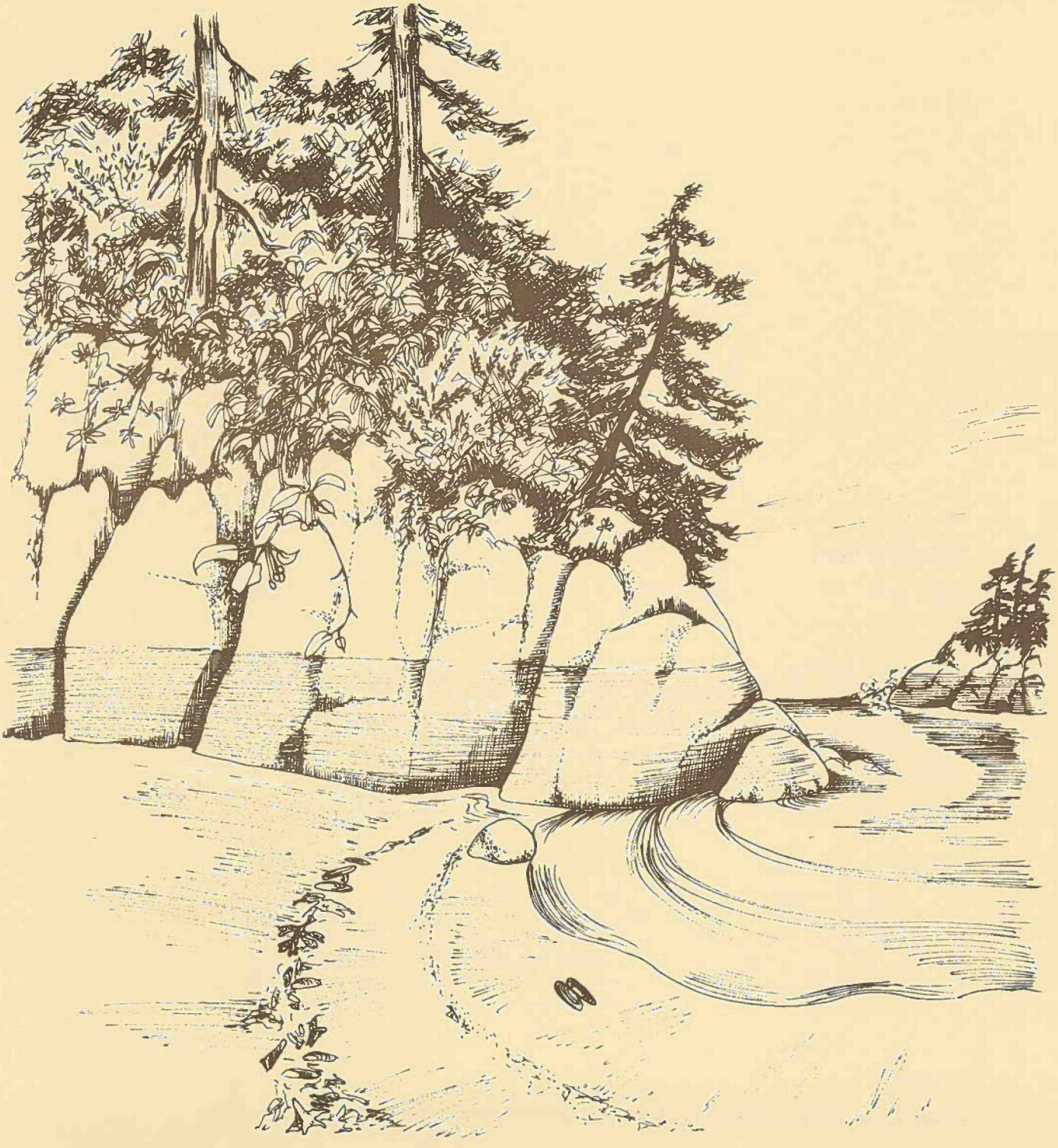
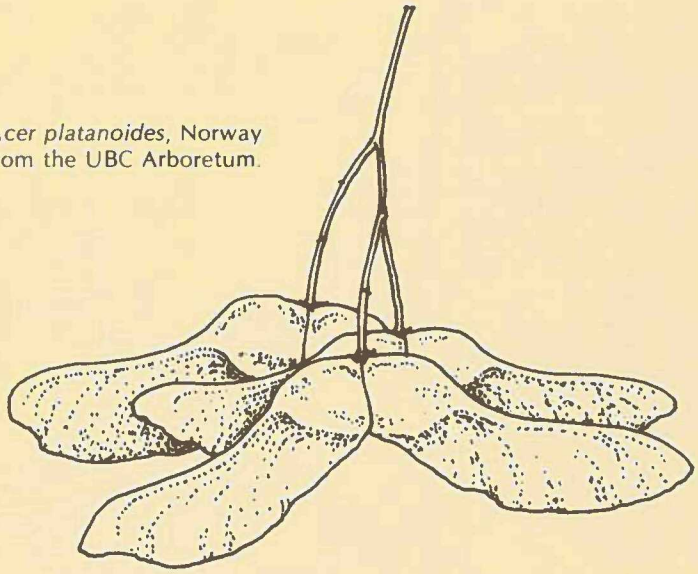


Cover:

A rocky headland close to the tide-line at McKenzie Beach on Vancouver Island. This is a common habitat for *Malus fusca*, Pacific Crab Apple.

Samaras of *Acer platanoides*, Norway Maple, from the UBC Arboretum.



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Acknowledgements

The pen and ink illustrations are by Mrs. Lesley Bohm. The photographs on page 46 were provided by Mr. and Mrs. L.G. Sayers of Ontario, and those for Figures 3, 4, and 8 on page 48 and facing page 64 were taken by Dr. R.L. Taylor. The photographs in Figures 5 and 7 on page 52 and facing page 64 are taken from a 1938 University of British Columbia publication titled "Botanical Gardens" by Professor John Davidson. Dr. George Eaton of the Department of Plant Science at UBC reviewed the article on the McIntosh Apple.

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The McIntosh Apple

SYLVIA TAYLOR and ROY L. TAYLOR

Apples have been cultivated in Canada for well over 300 years. The French settlers of the early seventeenth century are believed to have brought seeds, and possibly trees, with them to plant in their settlements along the banks of the St. Lawrence River and in the Acadian region of Nova Scotia. It seems that apples were grown almost exclusively for cider making until the 1830's, although many of them were probably also used locally in cooking and for eating fresh. In British Columbia, small plantings of apples for local use were made wherever a settlement developed, principally at the Hudson's Bay Company forts in the coastal regions. The earliest plantings in the province were made about 1843, reportedly from scions or seedlings grown from seed originally sent to Fort Vancouver in what is now Washington State. By 1855 there were a few orchards around Victoria on Vancouver Island.

The variety of apple brought to Canada by the French settlers is believed to have been the Fameuse strain (or Snow as it was more commonly known in the United States), although the French consider the Fameuse to be of Canadian origin, being taken back to France by the early seigneurs in the seventeenth century. This was a very small apple with red skin and white juicy flesh that was sparingly planted in home orchards. It is believed that an open-pollinated seed of either the Fameuse or, possibly, the Fall St. Lawrence (of Quebec origin) gave rise to one of the world's most famous apples, the McIntosh Red. As so often happens, the chance seedling was discovered by accident and saved on an impulse.

John McIntosh (1777–1846) was born at Vischer's Ferry in the Mohawk Valley, New York, the year after his parents had emigrated from Inverness in Scotland. He quarrelled with his family in 1796 and followed his sweetheart to Upper Canada (now Ontario), only to find that she had died. Nevertheless, he decided to stay, working at odd jobs and farming along the St. Lawrence River. He married Hannah Doran in either 1801 or 1808, and finally acquired some property in 1811 in the Township of Matilda, County of Dundas, an area now called Dundela.

About one-quarter of this land had been cleared previously but was now covered with second-growth brush, which John McIntosh had to clear. In the process he discovered about twenty apple seedlings that had grown from chance seeds. Apples were a luxury in early nineteenth century Canada, so the seedlings were saved, and soon transplanted to a clearing near the homestead. They were carefully nurtured by his wife Hannah, but only one was still alive by 1830. This tree, however, grew rapidly and the apples it began to bear were superior to any then known. At first they were known as "Granny McIntosh's Apple" to the neighbouring farmers, but John later changed the name to "McIntosh Red" and then to "McIntosh".

The McIntosh's tried to propagate the variety about 1820 by growing seedlings in an orchard, but none produced apples as good as the original. However, an unnamed migrant worker from America was hired in early 1835, and he knew the technique of grafting. John and his sons, Allan (1815–1899) and Sandy (1825–1906), quickly learned the technique, and soon had a large number of young trees growing in the orchard.

Allan established a nursery, first using McIntosh seedlings as the stock and later the hardier Transcendent Crab, and promoted the new strain vigorously during his travels as a circuit preacher. The younger son, Sandy, would set out each spring with a load of young trees and scions, selling his goods and services as a grafter for cash or barter. The McIntosh trees spread rapidly into the eastern United States and across Canada. The apples were large, red, and had

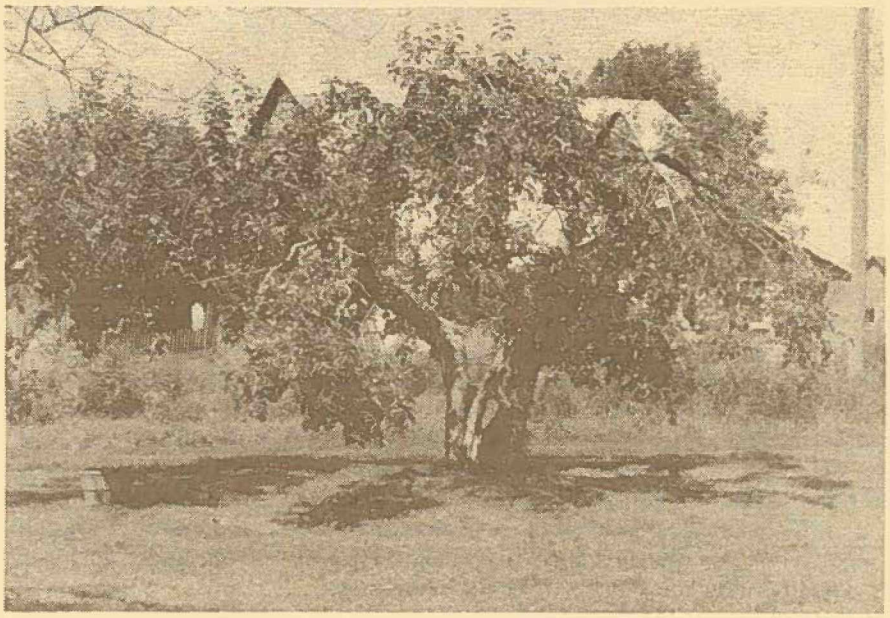


FIGURE 1. One of the three trees grown from cuttings of the original McIntosh Apple. This tree is about one hundred years old but is still producing fruit. The hollow trunk may be seen in this photograph.

FIGURE 2. The small stone marker indicating the site of the original tree.

tender white flesh that was much better tasting than any apples then known, although it tended to go to mush when cooked, but even the "mush" had an excellent taste. Eventually McIntosh trees were shipped to Scotland, England and Southern Rhodesia, as well as within North America. By 1965 there were well over three million McIntosh trees in orchards in North America.

The original tree was planted only 4.5m from the McIntosh homestead, which burned down in 1893. The heat from the fire seriously damaged one side of the tree, but the undamaged half continued to bear fruit until 1908, dying two years later when at least one hundred years old.

The McIntosh Farm is still in existence in Dundela, and is now in the process of renovation by a young couple who bought the property in 1977. They hope to restore the house to its original state, and to continue growing apples. There are still three trees on the site that were grown from cuttings of the original tree. These trees are about one hundred years old. One tree was in very poor condition in 1978, having been damaged in a wind storm, and was not expected to survive. A second tree is basically a hollow shell, but is still producing good fruit (Figure 1). The third tree is large and in apparently good condition. During some of the renovation work, brush growing near a barn was cleared, revealing a small stone marker that had been placed on the site of the original tree (Figure 2). The foundation of the original house is partially covered by the barn.

The University of British Columbia Botanical Garden received from Mr. and Mrs. L.G. Sayers of Iroquois, via Dr. Allan Chan of the Federal Department of Agriculture in Ottawa, in 1976 a number of scions of wood from the second tree described above. The material was grafted on to an East Malling No. 26 rootstock and planted in the courtyard of the Macmillan Building on campus. This building houses the Faculties of Agricultural Sciences and Forestry. The tree forms part of a commemorative program to honor our late University President, Walter H. Gage, who showed much interest in, and enthusiasm for, Agricultural Science students. The tree and apples are shown in Figures 3 and 4. We are pleased to be able to have on campus some of the genetic material from the original tree produced by John McIntosh since the apple industry in British Columbia is an important agricultural resource. We feel that this is an appropriate living commemorative to Dr. Gage and his interest in agriculture in this province.

The McIntosh apple is still a popular variety, although it is being replaced commercially in some areas by the Cortland variety (a cross between Ben Davis and McIntosh), which has much better shipping and keeping qualities. The McIntosh was planted in the pioneer days of apple growing in British Columbia, its hardiness and the popularity of the fruit enabling it to become the leading variety for many years. The leading variety is now Red Delicious, but McIntosh is a very close second — Red Delicious and McIntosh together account for approximately two-thirds of the annual apple crop (378 to 420 million pounds or approximately 169.5 to 170.25 million kilos) in the province (Swales, 1978). Commercially acceptable spur-type strains (where the growth is more compact, the buds spaced closer, and fruit buds commonly form on one-year old wood) were first discovered in British Columbia in 1967, and several of them appear to have great promise for the future. The McIntosh apple is also involved in the parentage of several more modern apples, for instance, the Spartan apple is the result of a cross between McIntosh and Yellow Newtown.

The McIntosh Apple is suitable for growing in Zones 5 to 9 (Canadian), and there are several forms available from nurseries. These include: Double Red McIntosh and Nured McIntosh, both with high color; Early McIntosh and Milton (or Milton McIntosh), which ripen earlier than the other forms and are both the result of crosses between Yellow Transparent and McIntosh; and Morspur McIntosh, a spur-type form. The one disadvantage for the home orchardist is that the McIntosh is very susceptible to Apple Scab, the most serious fungus disease of apple leaves and fruits, so that a spray program has to be maintained.

We would like to thank Mr. and Mrs. L.G. Sayers of Iroquois and Ottawa, Ontario, for providing information and photographs of the McIntosh homestead and trees. Mrs. Sayers is a descendant of another McIntosh family who emigrated to the Dundela area from the Mohawk Valley as United Empire Loyalists.

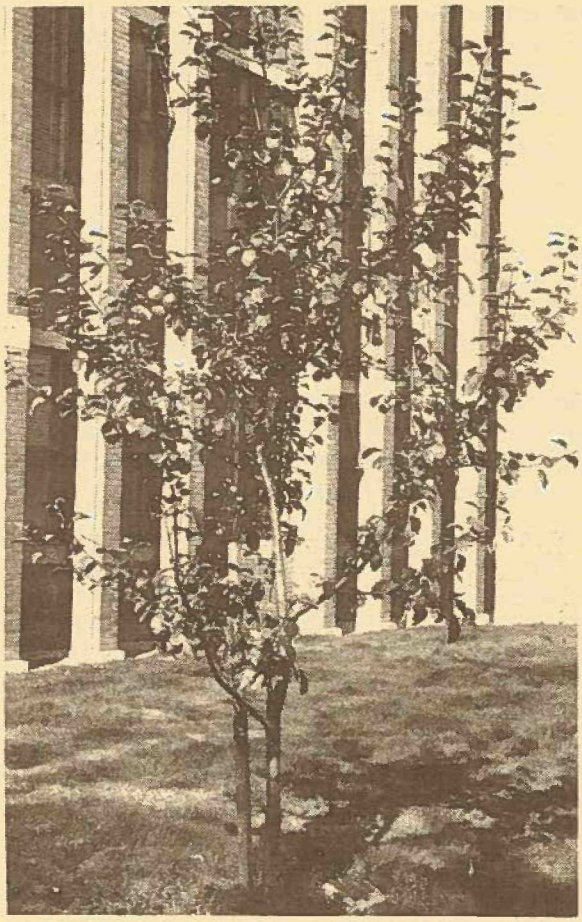


FIGURE 3 (left). The McIntosh Apple tree in the courtyard of the Macmillan Building at UBC.

FIGURE 4 (below). The fruit of the tree seen above.

REFERENCES

Bailey, L.H. 1963. Rev. ed. The Standard Cyclopedia of Horticulture. The Macmillan Co., New York.

Harkin, D. 1978. New Owners Plan to Restore Home of the McIntosh Apple. The Farmer, May 1978. pp. 8, 13.

Lape, F. 1973. The Decline of the Apple. Arnoldia 33:217-227.

Smith, J.A. 1976. British Columbia. *In* Fisher, D.V., General Coordinator, and W.H. Upshall, Editor. History of Fruit Growing and Handling in United States of America and Canada 1860-1972. American Pomological Society, University Park, Pennsylvania.

Swales, J.E. 1978. Commercial Apple Growing in British Columbia. Publication 78-3. British Columbia Department of Agriculture, Victoria, B.C.

Upshall, W.H. 1970. McIntosh. *In* Carlson, R.F. *et al.* North American Apples: Varieties, Rootstocks, Outlook. Michigan State University Press, East Lansing, Michigan.

Mr. and Mrs. L.G. Sayers of Ontario and the McIntosh Apple tree in the courtyard of the Macmillan Building at UBC in 1978.

The History and Development of the Arboretum at UBC*

SYLVIA TAYLOR

Introduction

One of the first significant achievements of the Botanical Garden at UBC was the planning and development of the Arboretum. The project was initiated and carried out by Professor John Davidson, first Director of the UBC Botanical Garden. It is the oldest, continuous garden component on the campus, and, although many modifications have taken place in the Arboretum since its inception, many of the original trees and the planting scheme are still evident.

The area referred to as the old Arboretum comprises approximately 2.7 hectares (6.7 acres) located on the west side of UBC campus. Several office buildings, collectively known as the Ponderosa Complex, are located in the area. The Arboretum plays an important part in the history of UBC since its beginnings go back to 1916, when the first botanical garden was established in the area. The native portion of the Arboretum has been in existence since that time; the exotic or systematic portion was added before and after the Second World War.

History of the Botanical Garden and Arboretum

Few people are aware that the UBC Botanical Garden was founded over 60 years ago, in 1916. Its history is, to a large extent, the history of its creator and director, Professor John Davidson, who was born in Aberdeen and became a first-class botanist, largely through self-education. He arrived in Vancouver in April 1911 and was appointed as the first Provincial Botanist on June 1 of that year. He was given two main tasks — to make a complete survey of the B.C. flora, and to establish a botanical garden and herbarium of native plants. Because of the difficulty in exploring the province's largely unsettled 146,502 hectares (366,255 acres), John Davidson appealed for help from the public, including ranchers, surveyors, prospectors and teachers. Within four years, he had received over 10,000 pressed specimens and hundreds of live plants, seeds and bulbs from volunteer collectors. He himself made many collecting trips — among the first, and perhaps most significant of these, were the 1912 and 1913 expeditions into the Garibaldi area north of Vancouver, the first white men to explore the area, parts of which were unknown even to the Indians. During the first expedition Davidson collected live specimens of about 80 species, which eventually made the long arduous trip back to Vancouver by packhorse.

Davidson soon acquired a stock of native plants, and in 1912 was given two acres on the Colony Farm at Essondale as a temporary botanical garden. By 1914 there were over 700 species of native plants, including 30 species of trees that were to form the nucleus of a permanent native Arboretum, in the garden.

The advent of World War I meant that the provincial government had to economize, and the Provincial Botanical Office was abolished in 1916. The herbarium and botanical garden were turned over to the University, even though that institution had no facilities for either. The University had been inaugurated in 1908 and Point Grey chosen as its location, but the site was still almost entirely covered in brush in 1916 and the University was housed in temporary buildings about 19 km (12 miles) away. Davidson was appointed by the Biology Department as Botany Demonstrator in charge of the herbarium and botanical garden. During 1916, 34 hectares (85 acres) of land on Point Grey were laboriously cleared and prepared, the thin topsoil being enriched by planting successive crops of oats, rye and barley and ploughing each one under. Most of the

*The information in this article is taken from: Curtis, Sarah F.J. 1979. History and Development of the Arboretum at the University of British Columbia. Miscellaneous Publication. The Botanical Garden, The University of British Columbia.

cleared land was designated as an experimental farm, but 2 hectares (5 acres) to the west of the site were set aside for the botanical garden. The move to Point Grey from Essondale began in the fall of 1916 and was completed by 1917. Over 25,000 plants (about 900 species) were transported by truck over the 40 km (25 miles).

Davidson drew up an ambitious plan for the new garden, which now had education as its main function. To provide a living museum of the B.C. flora, he designed a series of systematic beds, each 15 m × 1.8 m (50′ × 6′), into which all the herbaceous species of the province could be arranged, family by family, in accordance with the Engler and Prantl evolutionary scheme then generally accepted by botanists. Deciduous and evergreen native trees and shrubs were to be planted on each side of these beds, with space for about 60 species of trees and 100 species of shrubs. There was a pool for aquatic natives, and areas for display beds and a nursery.

The University finally moved out to buildings on Point Grey in 1925, and the garden began to fulfil its functions as a teaching and research resource. An alpine garden, or "rock-slide garden" as Davidson called it, was constructed using stone left over after the building of the Library. This rockery stretched for 120 m (400′) along what is now West Mall, and was about 1.8 m (6′) high. It contained an impressive collection of alpine and dryland natives planted in pockets between the boulders. For many years a section of the garden was devoted to medicinal plants because Davidson had a strong interest in them. There was also a small ethnobotanical garden containing plants used for food by the Indians. A small salicetum was established in 1920 in a boggy corner of the garden when a gift of 50 species of willow was received from France.

The rapid growth of the University during the 1920's was abruptly curtailed in 1929 when the Great Depression began. However, the garden survived, and by 1938 consisted of the systematic beds, native arboretum, nursery, medicinal beds, rock garden, salicetum, various display areas, and an aquatic garden (Figures 5 and 7).

In 1938 Davidson drew up plans for an exotic or systematic arboretum, but this plan eventually served only as a general guide when the actual planting was done. The trees were laid out in rows of ten, running from north to south, and grouped by family according to the Engler and Prantl system, beginning with the conifers in the northwest corner. Planting began in 1939, but further development was halted by the outbreak of World War II in that year. A survey done in 1944 shows that there were then 84 species of trees in the area. Further plantings were carried out after the war, with 138 species being planted by 1951 and approximately 170 species (representing 57 families) by 1964.

John Davidson retired in 1948, and the botanical garden then entered what eventually became a period of decline. In 1950, it was integrated with the rest of the campus plantings, and in 1951 the entire campus was designated as the Botanical Gardens, with the Chairman of the Botany Department, Dr. T.M.C. Taylor, receiving the title of director of the Botanical Gardens. In 1956 the Botanical Gardens Department came under the control of the Department of Buildings and Grounds (later Physical Plant), which then became responsible for the development and maintenance of the entire campus. From 1949 until 1963 Dr. John Neill of the Department of Plant Science was Associate Director of the Botanical Garden and Supervisor of Campus Development. During this period, Dr. Taylor and Dr. Neill were responsible for the maintenance and development that occurred in the Arboretum area. In 1963, the Botanical Gardens Department was merged with the Grounds Division of Buildings and Grounds. Finally the Botanical Garden was established as a separate non-academic service department under the jurisdiction of the President in 1966, and a new Director was appointed in 1968.

At the same time, the decade beginning in 1959 was a period of expansion that changed UBC almost beyond recognition and made it the second largest university in Canada. Building construction was almost continuous and on such a large scale that permanent landscaping was almost impossible. During this period of confusion and change, the botanical garden founded by John Davidson was almost worn away. In 1959 the systematic beds were removed and replaced with annual beds and lawn. The garden buildings and some plantings were removed when the Place Vanier student residences were constructed in 1960 below the garden area. The nursery and medicinal beds disappeared, and the pool was filled in to become a rhododendron bed. The

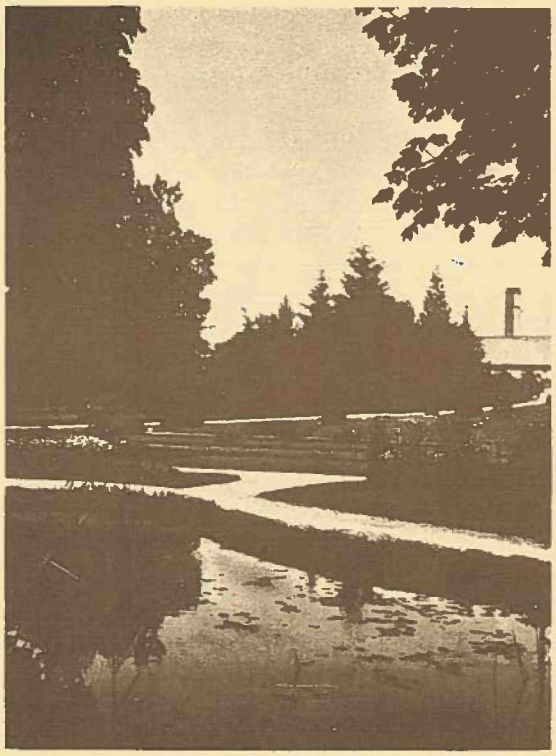


FIGURE 5. A view looking across the Aquatic Garden towards the Arboretum about 1938. Today you would be standing near the Place Vanier student residences looking towards the University's Power Plant (the chimney visible to the right on the photograph, but now obscured by Arboretum trees and other buildings).

Japanese Memorial Garden, constructed in 1935 adjacent to the garden but not part of it, was replaced in 1960 by the Nitobe Memorial Garden. By 1963, the arboretum, rock garden and the seed exchange (begun in 1928) were the only portions of the garden still extant.

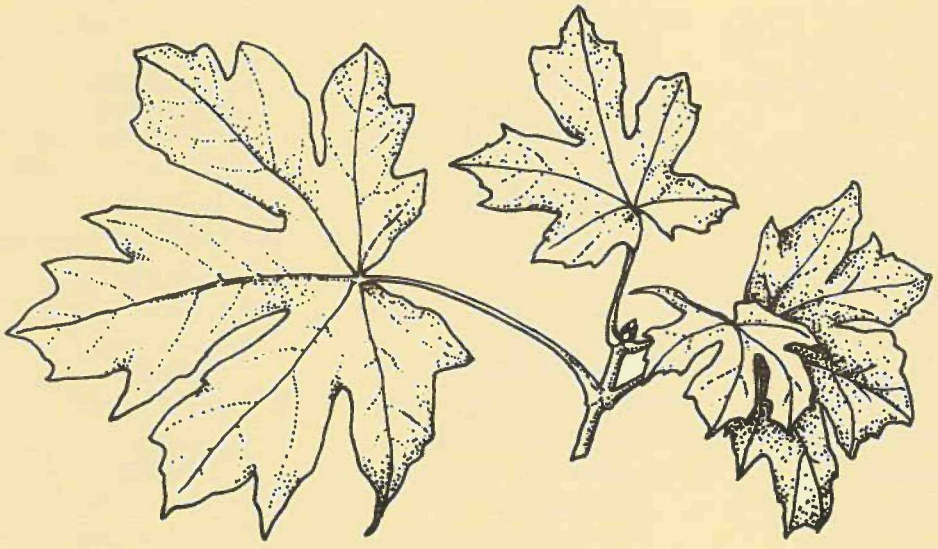
In 1969 a parking lot was constructed in the northwest corner of the arboretum, necessitating the removal of approximately 30 species of trees. As many species as possible were retained, with special island beds being created in the parking lot for *Picea pungens, P. orientalis, Abies sibirica, A. balsamea, Metasequoia glyptostroboides, Cryptomeria japonica, Pterocarya fraxinifolia* and *P. stenoptera*. In addition, a grill through which rain water could reach the underlying soil was placed next to the curb on the eastern side so the *Quercus* species immediately adjacent could obtain sufficient water. Twelve species, including *Chamaecyparis lawsoniana* 'Fletcheri', *C. lawsoniana* 'Wissellii', *C. thyoides, Juniperus virginiana* 'Burkii', *J. virginiana* 'Canaertii', *Carya alba* and *Corylus cornuta*, were taken to the Physical Plant Nursery where they are still alive. The other species were either destroyed or replanted in other parts of the campus. These included species such as *Pinus pinaster, Taxus* × *media* 'Hicksii', *Picea glauca* 'Conica', *Thujopsis dolabrata, Gingko biloba, Abies pinsapo, A. numidica, Cephalotaxus harringtonia* 'Fastigiata', *Cupressus sempervirens, C. lusitanica, Corylopsis spicata, Salix purpurea, Myrica cerifera, M. californica, Comptonia peregrina, Betula alleghaniensis, B. pendula* 'Dalecarlica', *Alnus cordata,* and *Carpinus betula*.

In 1970 and 1971 the construction of the buildings comprising the Ponderosa Complex on the grounds of the systematic arboretum necessitated the removal of the rockery along West Mall, the lawns and annual beds planted in 1959, and several more trees. Some of the trees were replanted in the area of the buildings, including *Rhus* sp., *Tilia americana, Fraxinus pennsylvanica* var. *lanceolata,* and *Diospyros virginiana*. Other specimens were relocated elsewhere in the Arboretum — *Acer ginnala, Cornus mas, C. florida, Fraxinus excelsior,* and *Rhododendron macrophyllum*. Twelve species were apparently destroyed or moved elsewhere, including *Rhus typhina, Koelreuteria paniculata, Aesculus* × *carnea* 'Briotii', *Cephalanthus occidentalis, Viburnum lantana, Styrax* sp., *Corylus cornuta* var. *californica, Amelanchier* sp., and *Alnus* sp. In addition, hedge plantings of *Taxus brevifolia, Tsuga heterophylla* and *Thuja plicata*, and six of the 16 *Cornus nuttallii* trees along the edge of the native section, were removed.

Over the years almost 60 other species of trees and shrubs have disappeared from the Arboretum, because of death, disease or some other reason. These include:- *Pinus echinata, Picea smithiana, Taxodium distichum,* several *Salix* species, *Corylopsis glabrescens, Alnus incana* 'Acutiloba', *Decaisnea fargesii, Paeonia delavayi, Quercus prinoides, Castanopsis chrysophylla, Berberis thunbergii, Hamamelis japonica, Maclura pomifera, Robinia hispida, Cercis canadensis, Sibiraea laevigata, Rhodotypos scandens, Genista hispanica, Aralia spinosa, Staphylea trifolia, S. pinnata, Daphne laureola, Clethra alnifolia, Syringa josikaea, Ligustrum delavayanum, Ceanothus × delilianus* 'Gloire de Versailles', *Kalopanax pictus, Catalpa speciosa, Franklinia alatamaha, Osmanthus illicifolius, Jasminum arborescens, Callicarpa bodinieri* var. *giraldii, Lavandula angustifolia, L. officinalis, Symplocos paniculata, Olearia × haastii, Phyllostachys aurea, Yucca filamentosa, Symphoricarpos albus, Rosa gymnocarpa, Philadelphus gordonianus, Holodiscus discolor, Mahonia aquifolium, Shepherdia canadensis, Clematis ligusticifolia, Ribes sanguineum, Ledum groenlandicum, Rosa nutkana, Viburnum pauciflorum, Pyracantha coccinea, Physocarpus malvaceus, Cytisus scoparius, C. scoparius* 'Andreanus', *Paxistima myrsinites, Spiraea douglasii, Prunus virginiana* var. *demissa, Abies amabilis, Juniperus scopulorum,* and *Larix occidentalis*. Fortunately, specimens of many of these trees and shrubs are now represented elsewhere in the Botanical Garden or on the campus.

Today the Arboretum contains approximately 115 species in 33 families (some specimens are still not identified to species) (see Appendix). Of these, 24 are B.C. natives (some now over 60 years old), 27 are native to other parts of Canada, 10 to other parts of North America, and approximately 53 are native to other regions of the world. Some of the B.C. native trees and shrubs, including *Acer circinatum, Alnus rubra* and *Crataegus douglasii*, have attained a size rarely seen in the wild.

The old Arboretum is a unique and valuable part of the UBC campus in that it is one of the few original landscape developments still basically intact. It is a valuable teaching aid for instructors in biology, botany, horticulture, forestry, and landscape architecture, giving students the opportunity to view and compare a large number of native and exotic species. In addition, it has an important aesthetic function, because of the beauty of the trees and because it provides a green area on campus. It is our hope that the Arboretum will continue to thrive and serve as an example to remind us of the history and development of plant collections on campus.



Acer macrophyllum leaves.

APPENDIX. Plants Currently in the Arboretum*

ARAUCARIACEAE - 1 species

Araucaria araucana

CUPRESSACEAE - 4 species

Chamaecyparis lawsoniana
Chamaecyparis nootkatensis
Thuja orientalis
Thuja plicata

PINACEAE - 21 species

Abies balsamea
Abies grandis
Abies sibirica
Cedrus brevifolia
Cedrus deodara
Larix laricina
Larix sibirica
Picea orientalis
Picea pungens
Picea sitchensis
Pinus banksiana
Pinus contorta var. *contorta*
Pinus jeffreyi
Pinus ponderosa
Pinus rigida
Pinus strobus
Pinus sylvestris
Pinus sylvestris cv. Pumila
Pseudotsuga menziesii
Tsuga heterophylla
Tsuga mertensiana

TAXACEAE - 1 species

Taxus brevifolia

TAXODIACEAE - 6 species

Cryptomeria japonica
Cunninghamia lanceolata
Metasequoia glyptostroboides
Sciadopitys verticillata
Sequoiadendron giganteum
Taxodium ascendens

ACERACEAE - 9 species

Acer circinatum
Acer ginnala
Acer glabrum
Acer glabrum subsp. *douglasii*
Acer negundo
Acer platanoides
Acer rubrum
Acer saccharinum
Acer saccharum

AQUIFOLIACEAE - 1 species

Ilex aquifolium

BERBERIDACEAE - 1 species

Berberis julianae

BETULACEAE - 4 species

Alnus rubra
Alnus sinuata
Betula papyrifera
Betula papyrifera var. *commutata*

CALYCANTHACEAE - 1 species

Calycanthus fertilis var. *laevigatus*

CELASTRACEAE - 2 species

Euonymus alata
Euonymus europaeus

CERCIDIPHYLLACEAE - 1 species

Cercidiphyllum japonicum

CORNACEAE - 4 species

Cornus florida
Cornus nuttallii
Cornus nuttallii cv. Eddiei
Cornus sanguinea

EBENACEAE - 1 species

Diospyros virginiana

ERICACEAE - 2 species

Arbutus menziesii
Rhododendron macrophyllum

FABACEAE - 7 species

Caragana arborescens
Cercis occidentalis
Colutea melanocalyx
Gleditsia triacanthos
Gymnocladus dioica
Lespedeza thunbergii
Robinia pseudoacacia

FAGACEAE - 10 species

Castanea dentata
Fagus sylvatica
Nothofagus sylvatica
Quercus borealis var. *maxima*
Quercus coccinea
Quercus garryana
Quercus macrocarpa
Quercus prinus
Quercus stellata
Quercus velutina

HAMAMELIDACEAE - 2 species

Hamamelis virginiana
Liquidamber styraciflua

HIPPOCASTANACEAE - 1 species

Aesculus hippocastanum

JUGLANDACEAE - 4 species

Juglans nigra
Pterocarya fraxinifolia
Pterocarya sp.
Pterocarya stenoptera

MAGNOLIACEAE - 2 species

Liriodendron tulipifera
Magnolia kobus var. *borealis*

MORACEAE - 1 species

Ficus carica

OLEACEAE - 5 species

Fraxinus americana
Fraxinus excelsior
Fraxinus nigra
Fraxinus ornus
Fraxinus pennsylvanica var. *lanceolata*

PLATANACEAE - 1 species

Platanus orientalis

RHAMNACEAE - 3 species

Paliurus spina-christi
Rhamnus catharticus
Rhamnus purshianus

ROSACEAE - 11 species

Amelanchier laevis
Chaenomeles japonica
Crataegus douglasii
Mespilus germanica
Oemleria cerasiformis
Prunus laurocerasus
Prunus serotina
Prunus yedoensis
Rubus spectabilis
Sorbus aucuparia cv. Edulis
Spiraea prunifolia cv. Plena

RUTACEAE - 1 species

Poncirus trifoliata

SALICACEAE - 4 species

Populus grandidentata
Populus tremuloides
Populus trichocarpa
Salix matsudana cv. Tortuosa

SAXIFRAGACEAE - 1 species

Ribes alpinum

SIMAROUBACEAE - 1 species

Ailanthus altissima

STYRACACEAE - 2 species

Halesia carolina
Styrax obassia

TILIACEAE - 2 species

Tilia americana
Tilia petiolaris

ULMACEAE - 2 species

Celtis occidentalis
Eucommia ulmoides

* The first five families belong to the Cone-bearing plants and are listed alphabetically, followed by an alphabetical listing of the families of flowering plants.

Malus fusca in British Columbia*

Pacific Crab Apple

Member of the Family Rosaceae

Distribution and Natural Habitat

Malus fusca (Rafinesque) C.K. Schneider occurs along the Pacific coast from southern Alaska (Kenai Peninsula and Prince William Sound) through western British Columbia, western Washington and western Oregon to northern coastal California (Sonoma and Napa counties). The species usually grows in moist to rather wet, deep, rich or sandy soil in moist woods, and along streambanks, swamps and bogs, although it may also be found in open canyons and the foothills of the western slopes of the Coast and Cascade Mountains. It often forms dense thickets that are almost impenetrable because of the interlacing branches when growing along streambanks and swamp edges. It rarely grows above 800 m in the northern part of the range, or 300 m in the southern part. The climate in its area of distribution is generally mild and uniform, with heavy precipitation, high humidity, and gradual changes of temperature. The summers are generally mild and the winters are not severe. *Malus fusca* may grow in large, dense, pure thickets, or as scattered specimens among Red Alder, willows, Cascara, Broadleaf Maple, Western Dogwood, and lowland shrubs.

In British Columbia the species is present along the entire coastal strip, including the adjacent islands, and extends inland through the Fraser Valley to the lower slopes of the Cascade Mountains at Hope and Manning Park (about 160 km inland). *Malus fusca* grows in low damp places such as stream and swamp edges, on low ocean frontage, and in open woods in low river bottoms and along lake margins, as well as along roadsides and fences. In the Queen Charlotte Islands it is particularly common along the upper limits of sea beaches, open headlands, and in open wooded areas in the lowlands of eastern Graham and Moresby Islands.

Description

Malus fusca is a deciduous, small, often scraggly, tree 6–10(–12) m tall, (12.5–)20–35(–40) cm in diameter, or often shrub-like, when 2–5 m tall with numerous stems 2.5–5 cm thick. The tree has an irregular, spreading crown, and tends to be very bushy when growing in the open. The branches are alternate, slender, upright or spreading, or horizontal to drooping. There are no true thorns, but numerous stout, sharp, spine-like hardened spur-shoots, 2.5–5 cm long, form realistic imitations. There is a tendency for the shrub to form dense impenetrable thickets caused by interlacing of the branches.

The roots are fibrous.

The bark is smooth on young shrubs, becoming 0.6 cm thick, grayish- to reddish-brown, scaly and often fissured with age.

The twigs are slender to stout, round, more or less pubescent when young becoming red and shiny by the end of the first year and eventually dark brown. They bear thorn-like spurs (reduced fruit-bearing branches) that are roughened by leaf scars. The twigs are faintly lined below the leaf scars, and are marked by small, pale, flat lenticels. The pith is white, continuous, and somewhat

* By Roy L. Taylor and Sylvia Taylor.

angular. The twig has a bitter taste. The leaf scars are alternate, raised, and half-elliptical to narrowly shield-shaped. There are 3 large bundle traces. There are no stipule scars.

The wood is heavy, hard, and close-grained. The heartwood is light brown tinged with red, and the thick sapwood is lighter colored. The wood has no commercial value.

The winter buds are 1.5–3 mm long, ovoid with a bluntly acute apex, chestnut brown, pubescent to glabrous, and covered by many imbricated scales. The outer scales often have red margins, and the inner scales are accrescent and leave conspicuous ring-like scars at the base of the branchlet. The leaf rudiments are imbricated in bud.

The leaves are alternate, simple, deciduous, and somewhat similar to orchard apple leaves when mature. They are rather variable in shape but are usually narrowly ovate to ovate or elliptic, often with a prominent lobe along one or both margins toward the apex. The base is cuneate or rounded, and the apex is gradually acute or acuminate. The leaf blade is thick, firm, (2.5–)4–9(–10) cm long, 1.2–5(–6) cm broad, with a serrated margin and prominent veins. They are deep green and glabrous or sparsely pubescent above, paler and pubescent or tomentose and often eventually rusty beneath. The petiole is 2.5–4 cm long, slender to rather stout, rigid, and pubescent. The stipules are free from the petiole, 1.25–1.9 cm long, narrowly lanceolate with an acute apex, and are soon deciduous. The leaves often turn brilliant yellow or orange and red in the fall.

The flowers are perfect, regular, fragrant, showy, 2–2.5 cm in diameter, and occur in terminal flattened cymose or corymbose clusters of 6–12 on short spur-like branches, which grow from two-year or older wood. The flowering time is April to June or early July throughout the range, although the period of bloom may not exceed three days in hot weather. The calyx tube or hypanthium is urceolate, glabrous to usually tomentose outside, short, lined with a glandular disc, and adnate to the ovary. There are 5 free calyx lobes, which are narrowly triangular to lanceolate, acuminate at the apex, more or less reflexed in anthesis, 3–5 mm long, and glabrous or tomentose. The 5 petals are free, white or pinkish, 8–15 mm long, suborbicular with a short claw at the apex, and usually contracted below into a stalk-like base. The margins of the petals are often erose or undulate. There are usually 20 stamens arranged in 3 rows with the outer row opposite the petals. The stamens are somewhat shorter than the petals, and bear yellow anthers. There are usually 3(4) styles, which are glabrous, connate at the base, and about the same length as the stamens. The stigmas are capitate. The ovary is inferior and usually 2- to 4-celled with 2 ovules in each cell. The hypanthium finally closes over the ovary, becoming fleshy in fruit. The pedicel is 1.25–1.9 cm long, slender, and pubescent or glabrous.

The fruit is a simple fleshy pome with homogenous flesh in which 3(4) papery carpels are embedded. The fruit is greenish at first becoming yellowish more or less splashed with red to red-purple at maturity, non-waxy, oblong with a distinct depression at each end, and is 1–2 cm long. The calyx is deciduous in fruit. The flesh is thin and dry, and is edible with an agreeable slightly acid to very tart flavor. The fruits become brown and soft and much sweeter after the first frost. The seeds are ovoid, acute, about 4.5 mm long, chestnut-brown, and lustrous. There are usually 2 seeds in each carpel, although one may be lost by abortion. The pedicel is slender, and enlarges to 2–3 cm long in fruit. The species appears to produce fairly large crops in the central and southern parts of its range and in less exposed situations, being less prolific in the northern part of the range. There is some evidence that large crops may be borne about every 2–4 years, beginning at about 5 years of age, or 3–5 years after moving to a permanent position. The fruit drops to the ground soon after ripening.

It should be noted that *Malus fusca* tends to be less pubescent when growing inland than when growing on the coast.

The leaves and seeds, and possibly also the bark, contain a cyanogenic glycoside that has an almond-like flavor, but releases poisonous hydrocyanic acid on hydrolysis in the stomach.

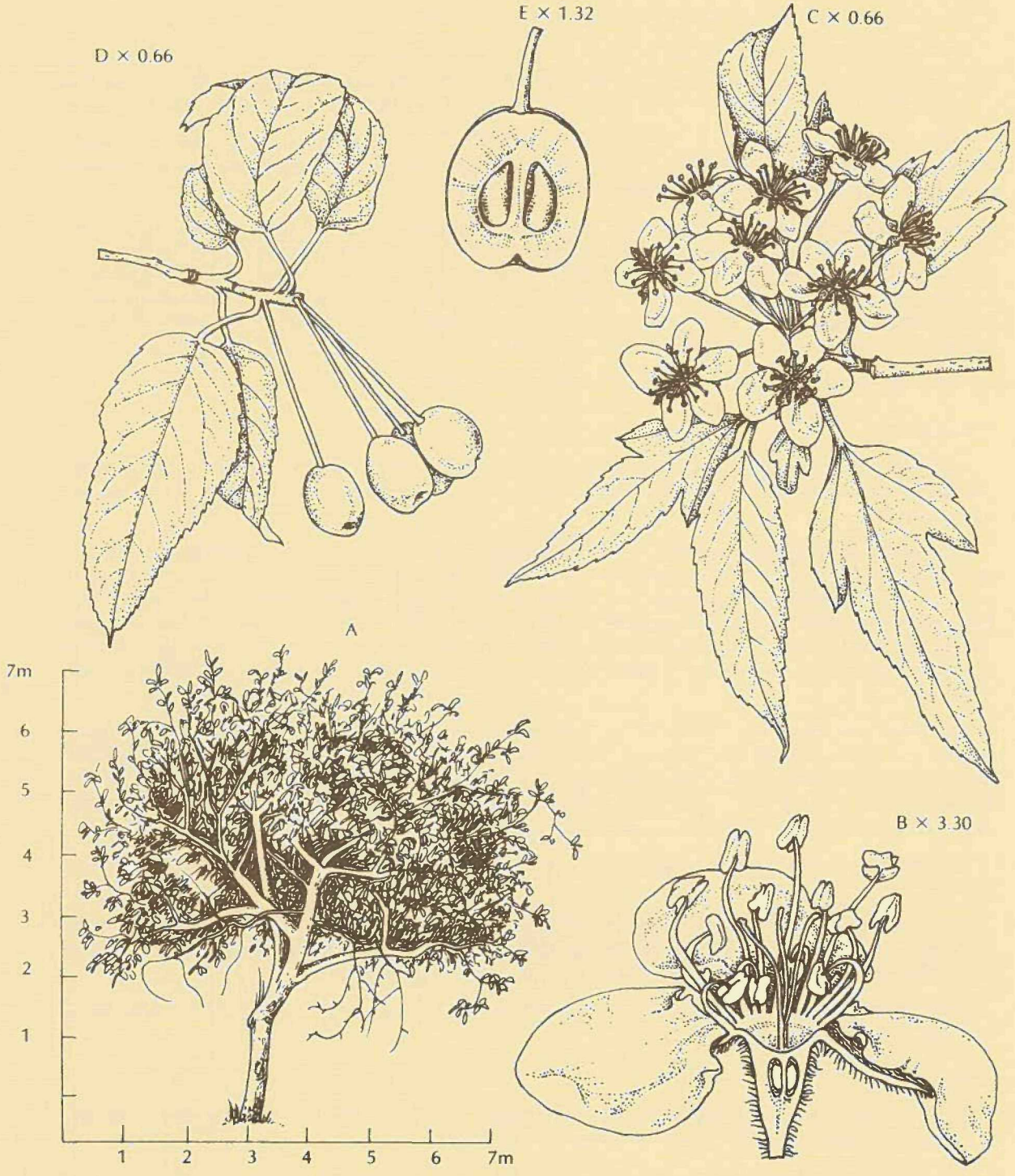


FIGURE 6. *Malus fusca*. A. Habit, B. section through a flower, C. flowering branch, D. fruiting branch, E. longitudinal section of fruit showing seeds.

Varieties and Ornamental Cultivars

There are no varieties of *Malus fusca* in British Columbia.

One variety has been described in the past but seems to be no longer accepted. *Malus fusca* var. *levipes* (Nuttall) Schneider was the name given to the more glabrous form of the species that is the more common form in the Willamette Valley and along the western slopes of the Cascades.

Malus fusca will hybridize with the cultivated apple (*M. domestica*) in areas where the apple has escaped from cultivation and become naturalized. The overlapping areas are in southern British Columbia, and from Washington south to California.

Malus × *dawsoniana*, Dawson Crab Apple, is a supposed hybrid between *M. fusca* and *M. pumila* that was raised at the Arnold Arboretum in 1881 from open-pollinated seed collected in Oregon. It is very similar to *M. fusca*, except that the leaves are broader, more elliptic and sharper serrate, and the flowers are pale pink at first later turning white. The fruit is very long, up to 3.8 cm long, yellow with a pink or reddish blush, and is completely unlike that of any other Crab Apple. It is apparently not known in the wild state, and may no longer be available.

There are no ornamental cultivars of *Malus fusca* listed.

Propagation

Malus species may be grown directly from seed, but they do hybridize readily with each other so that the seeds from a Crab Apple growing in proximity to another of a different species may not come true.

The seeds show delayed germination due to dormancy and require cold stratification before they will germinate. Other treatments have been tried, including excising the embryo, which have resulted in somewhat faster germination. One treatment, which requires further investigation as it was apparently tried on only one sample, involved soaking the seeds for 24 hours in a 0.02% solution of gibberellin, resulting in germination 7 days later. Removal of the seed coat should result in fast germination, but these seeds should be sown in sterile cultures to prevent pathogenic infections.

The seeds may be sown in late fall as soon as they are ripe, sowing 1.25–2.5 cm deep in loose friable soil. The winter provides the necessary cold stratification period, and germination should occur in the following spring. The seeds may be cold stratified in a moist medium at 2.8–5°C for 90 days before sowing. They may be stored dry in an airtight container at 2–10°C for one or two years before sowing without loss of germinative ability.

The seedlings of all *Malus* species may be sprayed weekly with a fungicide to control Powdery Mildew.

Leafy softwood cuttings taken in May and early June, given a hormone rooting treatment and planted in sandy soil will give good rooting. Cuttings taken from leafless shoots in early winter and planted in a cold frame may be used, but are rarely successful.

Ornamental varieties of *Malus* species are commonly propagated by grafting or budding on to closely related stock.

Transplanting

Bare-root specimens of *Malus* should be planted in eary winter or early spring, although container-grown specimens may be planted at any time.

Conditions for Cultivation

Crab apples in general are of very easy culture, and are adaptable to varying soil conditions, including heavy wet soils. They do best in well-drained, moist, heavy loam, with a pH of 5.0–6.5, and need full sun for best development of flowers and fruit. Most crab apples are hardy to Zone 6a (U.S.D.A.), although some are hardy to Zone 2b (U.S.D.A.).

Malus fusca is a hardy slow-growing tree, the longevity of which has not been fully determined. One tree was found to have a diameter of 28 cm at 102 years, while another tree was 15 cm diameter at 57 years. The species will endure moderate shade throughout life and rather dense shade in youth. It grows naturally in moist, deep, rich soil, so should do well in any good garden soil.

Crab apples in general require little pruning, except to remove sucker growth, to build a good shape, or to remove superfluous twigs, although a straggly or untidy specimen may be hard pruned to shape. Annual pruning is not necessary. Pruning should be done immediately after flowering, and completed by early June as most crab apples form next year's flower buds in mid-June to early July.

Landscape Value

Crab apples are useful for planting in heavy soils or where there are drainage problems. They are among the most useful and least troublesome of flowering trees. Crab apples can be grown as specimen trees on the lawn, in rows along driveways, walls or fences, or in a shrub border. Some forms make good espaliered plants.

Malus fusca is hardy and useful as an ornamental, but is rarely grown in gardens even in western Europe. While it is not as good an ornamental as some of the other species of *Malus*, it is attractive in flower and fruit, and would be useful in a wild garden or shrub border. Birds are attracted to the fruit. The leaves often provide good color in the fall.

Availability

Malus fusca is not generally available in western nurseries.

Other Uses

The wood is tough but of no commercial importance, although it is suitable for carving or for the turning of small articles by a hobbyist. The wood has been used in the past for mallets, mauls, tool handles, and bearings for machinery.

The fruit is eaten by birds and animals, and the trees have been planted in forests in the western United States both to provide food for wildlife and for aesthetic purposes.

The fruits ("crab apples") are small and edible, but can seldom be eaten fresh in large numbers because of their tartness. They do, however, make a good thirst-quencher in an emergency on a hike. The cooked fruit is excellent, and is used to make jellies, preserves, and in bread, cakes and cookies. The pulp left after making jelly can be rubbed through a sieve to remove the seeds and stems, mixed with sugar, and allowed to ferment into a tangy cider (Turner and Szczawinski, 1979). Crab apples can be stored by freezing or canning.

Ethnobotany

The fruit of *Malus fusca* was an important food for all the coastal Indian groups in British Columbia. The crab apples were generally collected in the late summer when they were fully grown but still green, and allowed to ripen in storage. Some groups, such as the Sechelt, collected them after the first frost when they were soft and brown. They were usually picked and stored in bunches with the stems still attached. Crab apples were most plentiful and of the greatest importance in the Nootka territory at the head of the Alberni Canal on Vancouver Island. The Nootka Indians took great care of their trees, and were so upset when white settlers began to encroach on their territory that they destroyed the trees so that the settlers would not be able to gather the crab apples in future.

Some groups, including the Kwakiutl, Bella Coola and Haida, stored raw or boiled crab apples covered with water in tall cedar boxes, allowing them to stand until the winter ceremonials when they were eaten at large feasts. For a feast, the crab apples were drained, mixed with eulachon grease, and eaten with spoons. The juice was saved for other uses.

The Pacific Crab Apple was a common item of trade and commerce, especially among the northern Indians. A single box of the fruit in water was valued at 10 pairs of Hudson's Bay blankets at the turn of the century (Turner, 1975). High-class families exchanging wedding gifts might include 10 boxes of crab apples, together with 5 boxes of eulachon grease to put on them, in the gift.

Crab apples are still eaten today in many areas, either in the traditional way or as jelly, but they are now usually freezer stored.

The Bella Coola Indians sometimes mixed the bark or roots of *M. fusca* with those of the Coastal Black Gooseberry (*Ribes divaricatum*), boiled the mixture, and used the decoction as an eyewash three times a day for soreness and approaching blindness.

The Gitksan Indians scraped the juice from the peeled trunk and used it as an eye medicine. They also took pieces of the trunk and branches, or scrapings from the inside of the bark, boiled them until thick, and drank the decoction for 4-6 months for "consumption" and rheumatism. They considered it to be a fattening medicine that was both laxative and diuretic.

Crab apples are the most frequently mentioned fruit in Coast Tsimshian mythology.

During the past several years one of the authors (RLT) has had an opportunity to visit several of the ancient villages on the Queen Charlotte Islands during UBC Centre for Continuing Education field study programs. These trips have followed the exploration program and subsequent 1968 publication of *The Flora of the Queen Charlotte Islands* from the Canada Department of Agriculture. During the later visits to the ancient Indian villages of Ninstints, Tanoo and Skedans, the structure of the forest surrounding each village has been carefully evaluated. In each instance, an area which I like to refer to as "the orchard" has been found and plants of *Malus* have occurred in each "orchard". These *Malus* trees are not the Pacific Crab Apple, although the Pacific Crab Apple is usually a common plant in the vicinity of the coastal area of the village. Scions have been taken from these apple trees, which are more than one hundred years old, and we are now attempting to provide identification. It seems apparent that the Haidas used and introduced a commercial apple into their villages, presumably after post-European contact. In addition to apples, one usually finds very old plants of *Ribes lacustre* and *Sambucus racemosa*, both native plants of the area, but these plants appear to be planted rather than of natural origin in the "orchard site" near each of the villages. "The orchard" is usually located near a water source and behind the initial row of housing structures that form the front of the village. In the course of studying the vascular flora of the islands, Calder and Taylor (1968) have indicated that some plants found in west coast Indian villages were clearly the result of introduction by Indians. There is good evidence that stinging-nettles were used and grown by the native Indian groups, and such things as *Plectritis congesta* and *Collinsia grandiflora* were both found in village sites on the west coast, an area in which you would not expect to find dryland east coast plants. There is much to be learned about the domestic cultivation of plants by the Haida Indians and it is hoped that, as more visits are carried out to the various village sites, a more detailed analysis can be made of the ethnobotanical plantings made by the Haidas in and around their village sites.

Diseases and Problems of Cultivation

The bark, leaves and especially the seeds are poisonous to humans and to livestock because of the presence of a cyanogenic glycoside.

Diseases and pests of *Malus fusca* are few and rarely cause problems. Fireblight, *Erwinia amylovora* (Burr.) Winsl. *et al*, is endemic on Rosaceae in North America, although it is usually not a major problem in British Columbia because of rigid inspection practices. It is a bacterial disease that is spread to the blossoms by insects, and then progresses down the twigs into the bark of the larger limbs. The flowering shoot suddenly wilts and has the appearance of being scorched by fire.

Apple Scab, *Ventura inaequalis*, is a fungus disease of the leaves, blossoms and fruits that occurs naturally in British Columbia. Toms (1964) reports that *Gymnosporangium cornutum* Arth. ex Kern and *G. nootkatense* Arth. cause Rust on *Malus fusca* in the wild in British Columbia, but the

disease does not impede the growth and development of the trees.

Origin of the Name

The generic name *Malus* is the classical Latin name of the Apple, possibly derived from the Greek *melon*, 'apple' or 'fruit', although Stearn (1973) states that *malus* means 'bad'. The specific epithet *fusca* means 'brown', 'dusky', or 'a sombre brown', and is believed to refer to the color of either the bark or the fruit.

Malus fusca has been known variously as *Pyrus fusca* Rafinesque, *P. diversifolia* Bongard, *Malus diversifolia* (Bongard) M.J. Roemer, *Pyrus rivularis* Douglas ex Hooker, and *Malus rivularis* (Douglas ex Hooker) M.J. Roemer since its discovery, and may be found listed under any of these names in various books and catalogues.

It has been difficult to determine the type locality as Rafinesque does not appear to have given it in his description. *Pyrus diversifolia* was described by August Heinrich Gustav Bongard (1786–1839) from a specimen collected at "Sitka" by Karl Heinrich Mertens. *Pyrus rivularis* was described from a specimen collected at "Nootka Sound" by Archibald Menzies.

Camillo Karl Schneider (1876–1951) was a German botanist and dendrologist who studied coniferous and deciduous trees in Europe and North America. He separated *Malus* from *Pyrus* mainly on the basis of the flesh of the fruit — that of *Pyrus* contains stone cells, that of *Malus* does not.

Malus fusca was apparently introduced into cultivation in Great Britain in 1836, although it has been little known in cultivation for many years.

REFERENCES

Boer, A.F. den. 1959. Ornamental Crab Apples. The American Association of Nurserymen.

Calder, J.A. and R.L. Taylor. 1968. Flora of the Queen Charlotte Islands. Part 1. Systematics of the Vascular Plants. Monograph No. 4. Research Branch, Canada Department of Agriculture, Ottawa. Queen's Printer, Ottawa.

Garman, E.H. 1973. 5th ed. rev. Guide to the Trees and Shrubs of British Columbia. Handbook #31. B.C. Provincial Museum, Victoria, B.C.

Hitchcock, C.L., *et al.* 1961. Vascular Plants of the Pacific Northwest. Part 3. Saxifragaceae to Ericaceae. University of Washington Press, Seattle, Washington.

Hosie, R.C. 1969. 7th ed. rev. Native Trees of Canada. Canadian Forestry Service, Department of Fisheries and Forestry. Queen's Printer, Ottawa.

Jefferson, R.M. 1970. History, Progeny, and Locations of Crab-apples of Documented Authentic Origin. National Arboretum Contribution No. 2. U.S.D.A., Agricultural Research Service, Washington, D.C.

Lyons, C.P. 1965. Rev. ed. Trees, Shrubs, and Flowers to Know in British Columbia. J.M. Dent & Sons (Canada) Ltd., Vancouver, B.C.

Munz, P.A. and D.D. Keck. 1973. A California Flora and Supplement. Combined edition. University of California Press, Berkeley.

Stearn, W.T. 1973. 2nd ed. Botanical Latin. David & Charles (Holdings) Ltd., Newton Abbot, Devon.

Taylor, R.L. and B. MacBryde. 1977. Vascular Plants of British Columbia: A descriptive resource inventory. Technical Bulletin No. 4. The Botanical Garden of the University of British Columbia. University of British Columbia Press, Vancouver, B.C.

Toms, H.N.W. 1964. Plant Diseases of Southern British Columbia. A Host Index. Reprinted from: Canadian Plant Diseases Survey 44: 143-225. Canada Department of Agriculture, Ottawa.

Turner, N.J. 1975. Food Plants of British Columbia Indians. Part 1. Coastal Peoples. Handbook #34. B.C. Provincial Museum, Victoria, B.C.

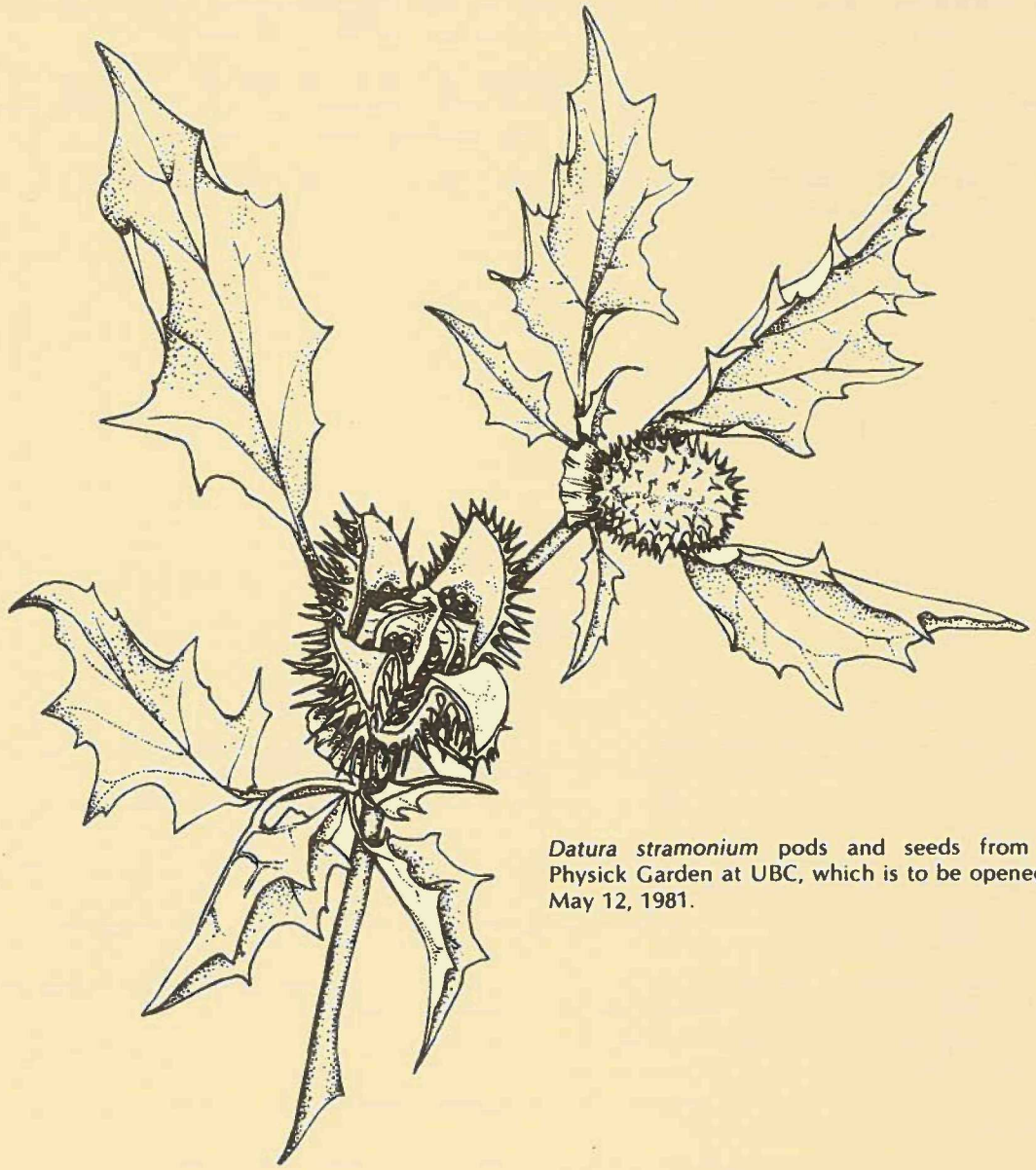
Turner, N.J. and A.F. Szczawinski. 1979. Edible Wild Fruits and Nuts of Canada. Edible Wild Plants of Canada, No. 3. National Museum of Natural Sciences, National Museums of Canada, Ottawa.

U.S.D.A., Forest Service. 1974. Seeds of Woody Plants of the United States. U.S.D.A., Forest Service, Agriculture Handbook No. 450.

Viereck, L.A. and E.S. Little, Jr. 1972. Alaska Trees and Shrubs. U.S.D.A., Forest Service, Agriculture Handbook No. 410.

Welsh, S.L. 1974. Anderson's Flora of Alaska and adjacent parts of Canada. Brigham Young University Press, Provo, Utah.

Wyman, D. 1955. Crab Apples for America. The American Association of Botanical Gardens and Arboretums.



Datura stramonium pods and seeds from the Physick Garden at UBC, which is to be opened on May 12, 1981.

Botanical Garden News and Notes

Student Plant Sale Organized by the Friends of the Garden — The sale was held on Wednesday, Thursday and Friday, September 10, 11 and 12, 1980 and once again was a great success. The tennis court at The Botanical Garden Office and Educational Centre was converted into a sales area. Approximately 7500 plants were sold during the three-day sale and more than 3600 students participated in the program. A number of the new Friends of the Garden were involved in the program. The Sale continues to provide an excellent service to students living in residences, and also enables many people on the campus to acquaint themselves with the activities of The Botanical Garden at the University. In addition, a number of departments take advantage of the sale to upgrade the green plantings in their own office areas and to obtain expert advice from members of The Botanical Garden staff during the sale period. We believe that the program represents an important public relations program for the Garden within the University community, and, in addition, serves as a major means of informing students about the programs offered by The Botanical Garden. The Plant Sale is followed by in-residence care clinics on plants to enable those students who purchased plants to learn something about the continuing care of their purchases.

New Developments in The Garden — Work is continuing on the completion of the landscaped elements of the Main Garden area. The new Public Interpretation Centre is scheduled for completion by the end of November. This building will provide facilities for visitors to the Garden, and is the first stage of the major building program to be completed. The underpass between the Main Garden and the Asian Garden should be completed shortly, concurrent with the completion of the major highway development by the provincial Ministry of Transportation and Highways. The construction landscaping of the entrances to the underpass will enhance the visitors' overall experience of the Garden and enable a safe and aesthetically-pleasing passage between the two garden elements. We are looking forward to the formal opening of the Asian Garden and the medicinal and pharmaceutical Physick Garden on May 12, 1981. Mr. Allen Paterson, Director of the Chelsea Physic Garden in London, will officiate at the opening of the garden elements.

New In-house Staff Training Program — This new program has been initiated by the Assistant Director, Bruce Macdonald. The objectives of the program are to increase both the theoretical knowledge and the practical skill of employees at the Garden, the emphasis being placed on practical skills. The program will place particular emphasis on: (1) improvement of the standard and output of work; (2) development of a greater interest in one's own work and the work carried out by colleagues; (3) bringing personnel working within the Garden together so that knowledge can be shared and built upon; (4) improvement upon one's level of work and knowledge to enable employees to develop their careers both within the Garden and for subsequent positions with other organizations; and, (5) assistance to those employees taking recognized certificates and diplomas so that they can improve their level of qualification. A number of subjects are being covered, including pruning, soils (particularly those problems related to plant culture), vegetative propagation of shrubs and conifers, bedding plant production, safety at work, plant identification, and the operation and maintenance of machinery. The program operates on Thursday afternoons and is voluntary.

New Art Show — An art show is to be launched in May 1981 to coincide with the opening of the new garden components. The show is entitled "Cloud Flowers: Rhododendrons East and West" and features approximately 45 original water colors of rhododendron species that have been commissioned by The Botanical Garden for this event. Artists represented in the show live across Canada from Halifax to Victoria. The show will be in Vancouver during the summer of 1981 and will then be shown across Canada and at the Hunt Institute for Botanical Documentation in Pittsburgh during the next two years. This program is an out-growth of the successful "Plantae Occidentalis: 200 Years of Botanical Art in British Columbia" program and many of the same members of the Friends of the Garden Art Committee [illegible] again worked on the project.

Ecological Reserve Cancelled — Information has been received by The Botanical Garden that arrangements for the establishment of an Ecological Reserve at Sky Meadows in the Chilliwack area have fallen through. The property is one of the few locations in British Columbia where *Eburophyton austiniae*, Phantom Orchid, occurs (see Davidsonia 10:30–33, 1979). The Provincial Government apparently refused to give assurances to the owner that the property would not be divided or sold in the future, and Mrs. Tye therefore withdrew her offer to transfer the land to the province. At the time the previous article went to press we were convinced that the 50-acre property, which contains the greatest concentration of Phantom Orchids known in the province, had been established as an Ecological Reserve within the Ecological Reserves Act of British Columbia. The news of the failure at the last step has been a blow to many naturalists.

"B.C. Gardens" Television Program — The show, produced by CBC Vancouver with Bob Switzer and David Tarrant and using many of the facilities of the UBC Botanical Garden, will be shown on CBC TV stations as indicated below. All times are Pacific Standard Time, but may be changed due to special programming events.

January 18, 1981	Bloedel Conservatory	11:30 a.m.
January 25, 1981	Tofino Rhododendrons	11:30 a.m.
February 1, 1981	UBC Botanical Gardens	11:30 a.m.
February 8, 1981	Butchart Gardens	11:30 a.m.
February 15, 1981	Queen Elizabeth Park/VanDusen Botanical Garden	1:00 p.m.
February 22, 1981	Bradner Daffodils	1:00 p.m.
March 1, 1981	Kelowna	11:30 a.m.
March 8, 1981	Nitobe Gardens	3:00 p.m.
March 15, 1981	Oliver Orchardists	3:00 p.m.
March 22, 1981	Cominco Gardens, Kimberley	11:30 p.m.
March 29, 1981	Victoria Allotment Gardens	3:00 p.m.
April 5, 1981	Summerland Research Station	11:30 a.m.

Climatological Summary*

Data 1980	JULY	AUGUST	SEPTEMBER
Average maximum temperature	19.6°C	20.3°C	16.9°C
Average minimum temperature	12.7°C	12.4°C	11.4°C
Highest maximum temperature	25.8°C	27.5°C	22.5°C
Lowest minimum temperature	9.4°C	9.2°C	8.8°C
Lowest grass minimum temperature	4.5°C	0.4°C	2.4°C
Rainfall/no. days with rain	70.2 mm/13	43.7 mm/12	84.4 mm/15
Total rainfall since January 1, 1980	661.0 mm	704.7 mm	789.1 mm
Snowfall/no. days with snowfall	0	0	0
Total snowfall since October 1, 1979	10.6 cm	10.6 cm	10.6 cm
Hours bright sunshine/possible	293.2/482.5	235.5/439.0	151.5/372.2
Ave. daily sunshine/no. days total overcast	9.5 hr/3	7.6 hr/2	5.0 hr/7

**Site: The University of British Columbia, Vancouver, B.C., Canada V6T 1W5*
Position: lat. 49° 15' 29" N; long. 123° 14' 58" W. Elevation: 104.4 m

FIGURE 7. A view of the upper part of the Arboretum about 1938, with the rock garden visible at the right and the maples in the left background. The rock garden was constructed parallel to the western edge of West Mall. The sundial in the centre of the photograph has been moved to the new Physick Garden component in the Main Garden area of the present Botanical Garden.

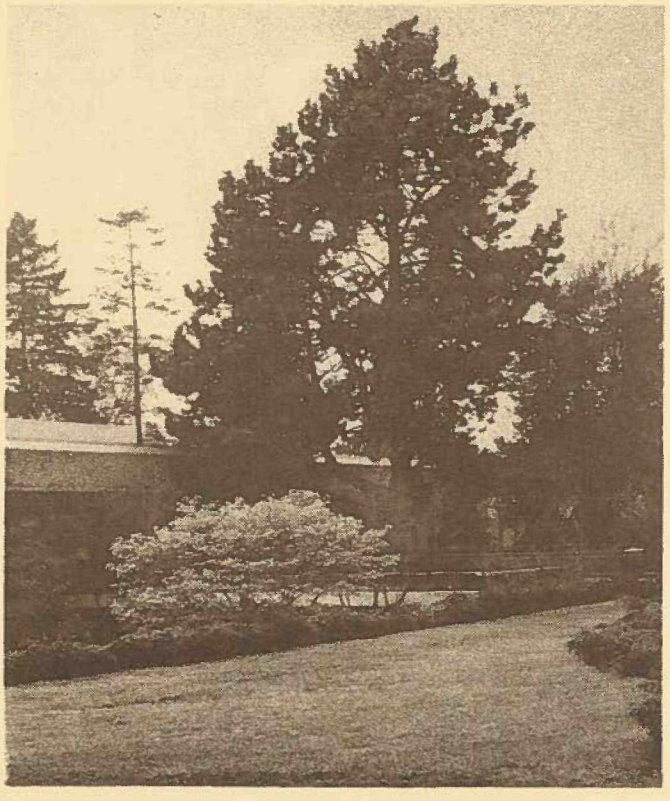


FIGURE 8. A view of approximately the same scene as above taken in 1972. The maples at the right are those in the left centre background of the earlier photograph. The prominent tree is the largest specimen of *Pinus ponderosa* on campus.

Malus fusca flowering branch showing leaves with sparse lobing, a common variation in the species, × 0.60

DAVIDSONIA

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