DAVIDSONIA

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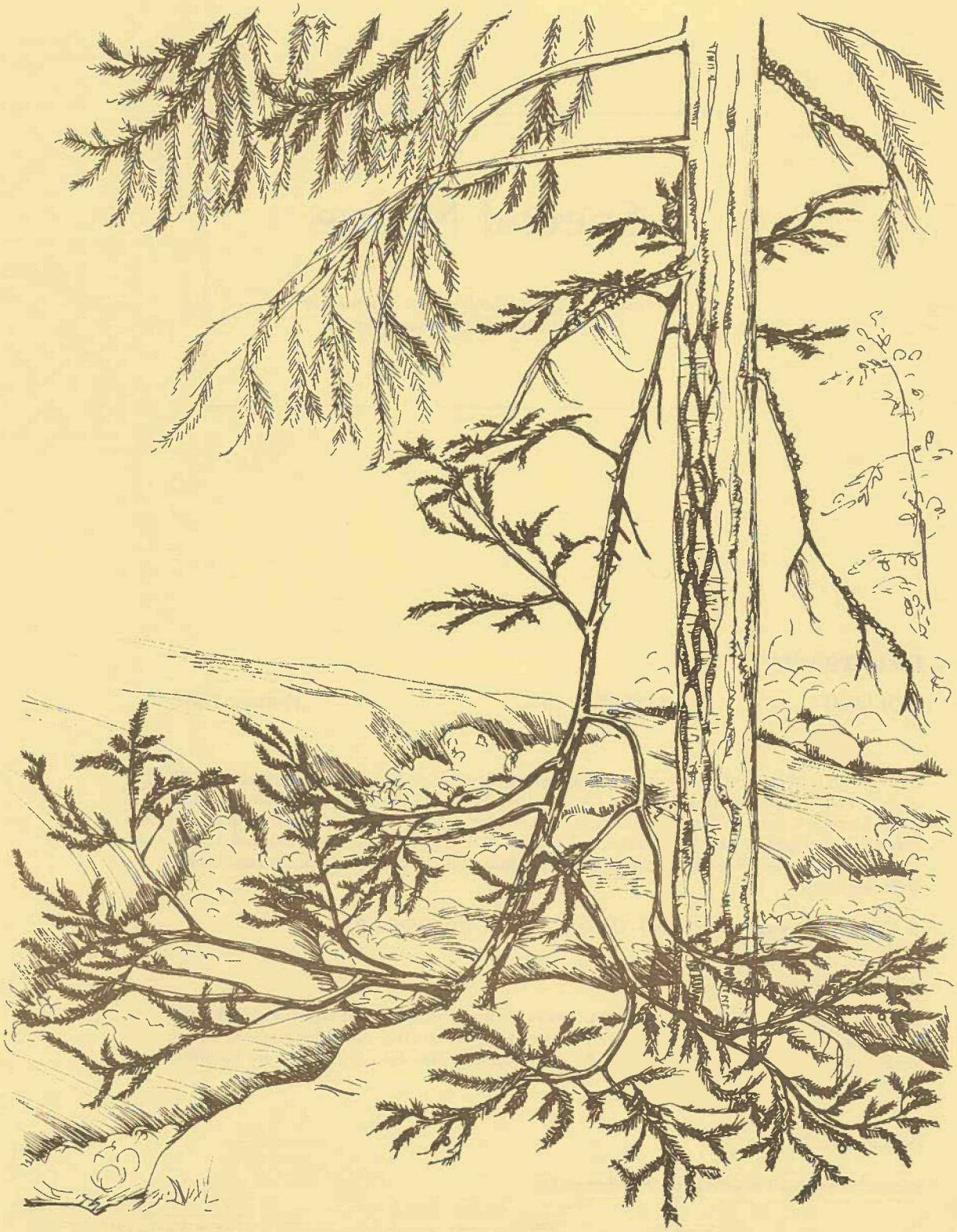

Cover:

Taxus brevifolia on the Shuswap River near Mabel Lake in British Columbia.

Special Notice

Please see inside back cover for notice re discontinuance of Davidsonia.

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Some Liliaceae of British Columbia

RON LONG*

Veratrum viride W. Aiton, Green False Hellebore

The large plaited leaves and drooping tassels of green flowers make Green False Hellebore one of the most distinctive components of the British Columbia flora. This is fortunate since it is also one of the more poisonous of our wild plants.

The true Hellebores belong to a European genus (*Helleborus*) of the Buttercup Family (Ranunculaceae). *Veratrum* in Latin means 'The Hellebore', so that a rather confusing situation was caused by Linnaeus in 1753 when he so named a genus of the Lily Family (Liliaceae). Since *Helleborus* species are the true Hellebores, *Veratrum* has become known as False Hellebore.

Some authors have interpreted Veratrum as being derived from the Latin roots *vera* or *vere*, 'truth', and *ater*, 'black'. However, the name is so ancient that the meaning is obscure. What 'true black' refers to is anybody's guess, although it may refer to the black roots.

The specific name *viride*, meaning 'green', is descriptive — the entire plant is green. Green False Hellebore is one of the few green-flowered plants in British Columbia, and is certainly the largest of them. Its leaves are exceeded in size only by those of the Skunk-cabbage, for which it is sometimes mistaken.

About 12 species of *Veratrum* occur in the Northern Hemisphere, but only one of these species is found in British Columbia. Our western plant is often treated as a subspecies, *V. viride* subsp. *eschscholtzii* (A. Gray) Love & Love, as it supposedly has longer, more drooping panicle branches and is more pubescent on the leaves than the eastern form. The subspecific name commemorates Johann Friedrich Gustav von Eschscholtz (1793-1831) who accompanied Otto von Kotzebue in his first expedition around the world in 1815-1818.

The ancient Greek herbalist Dioscorides advised that the roots of Hellebore (*Helleborus*), dried, ground and mixed with honey, were useful for killing mice. Today, a garden insecticide made from False Hellebore and marketed under the name 'Hellebore' is prepared in much the same way, but without the honey. Farmers, to their sorrow, have discovered that the leaves of Green False Hellebore are poisonous to chickens.

The poisonous principles present in *Veratrum viride* are a group of alkaloids, including pseudojervine, rubijervine, jervine, cevadine, and veratroidine. These alkaloids are not only dangerous to insects, mice and birds, but to larger animals as well — including man. Livestock, deer and elk are sometimes killed by eating quantities of roots and new shoots, but such losses are not great. The danger of poisoning from *V. viride* is at its peak in the spring because of the young succulent growth at a time when other fodder may be in short supply. As the plant matures, the poisonous factors decrease, and frosted and dried foliage is apparently harmless to livestock. Recently it has been discovered that *V. californicum*, which occurs further south, is responsible for the congenital defect in sheep known as "monkey-face". Pregnant ewes that eat moderate amounts of this False Hellebore during the second and third weeks after conception produce lambs with badly malformed heads, shortened faces and poorly developed noses. Monkey-face lambs are unable to nurse successfully and usually die shortly after birth. The compound causing the abnormal development is unknown, but sheep appear to be unaffected at other times of year than late summer.

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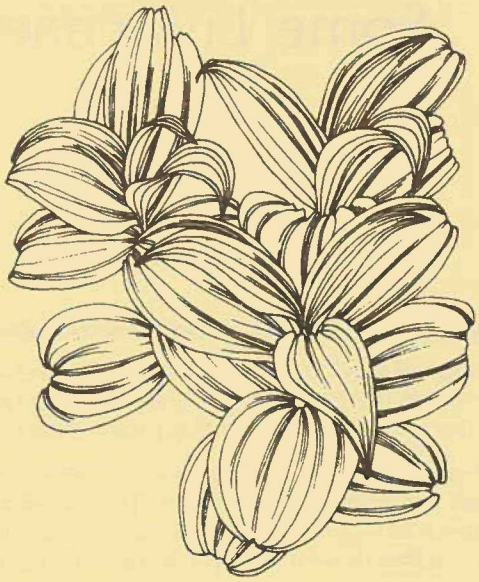

FIGURE 1. *Veratrum viride*, one week after snow melt, growing in an avalanche gully in Cypress Bowl, West Vancouver, × 0.5.

Human poisoning by False Hellebore is rare. Relatively large amounts of the plant must be eaten to cause death, and the bitter taste precludes this happening by accident. Nevertheless, the root was one of several used by Indians to commit suicide. The alkaloids act on the nervous system, causing the small arteries of the body to expand while the small veins contract. The rate of heartbeat is slowed. The overall effect is a lowering of the blood pressure. Severe poisoning results in shallow breathing, lowered body temperature, convulsions, and death.

On the other hand, the purified alkaloids have been used medicinally to reduce blood pressure. It is reported that the Indians used an infusion of Green False Hellebore in this way. The Blackfeet Indians took powdered root as snuff to treat headaches, and a preparation of powder was used in an ointment for itching.

Green False Hellebore occurs in moist habitats from sea level to subalpine elevations throughout British Columbia and across Canada. Plants growing below the subalpine level often fail to produce flowers, and, in unfavorable years, no flowers are produced at any elevation. Even without flowers, the leaves are easily recognizable, and under no circumstances should any part of this plant be eaten.

Xerophyllum tenax (Pursh) Nuttall, Bear-grass

Bear-grass is an unlikely lily. A large torch-like flower cluster held aloft on a stem that may be over 1.75 m tall, growing from the centre of a thick, tropical-looking hummock of basal leaves, make it by far the largest lily species in British Columbia. The leaves of developing plants remain green all winter, making Bear-grass also the only evergreen species in the family.

Bear-grass, Squaw-grass, and Soap-grass are all names that reflect the close resemblance of the leaves to the true grasses. The very paucity of names incorporating 'lily' indicates that the plant was rarely recognized as such in the early days. It is only when the small individual flowers are closely examined that the family resemblance becomes apparent.

Xerophyllum is a strictly North American genus, consisting of two species that evolved on opposite sides of the continent. The type species, *X. asphodeloides*, occurs only on the Atlantic coast, while *X. tenax* is found in the extreme west. A third species, *X. douglasii*, was once distinguished on the basis of flower size but it has since been merged with *X. tenax*.

André Michaux (1746–1802) was a French botanist who carried out extensive botanical explorations of the eastern United States and Canada between 1785 and 1792. His monumental *Flora*

Boreali-Americana was published posthumously in 1803. The original description of *Xerophyllum asphodeloides* was published in this flora. He named the genus for its coarse dry leaves — *xeros* is Greek for 'dry' and *phullon* or *phyllon* means 'leaf'.

Meriwether Lewis was the first white man to see and write about the western Bear-grass. In 1805 he found that the plant was an important trade item among Indians, who called it *Quip-Quip*. Mountain tribes traded the plant both east to the prairie and west to the coast tribes. Prairie Indians used the boiled roots as a hair tonic and as a treatment for sprains. The coastal Indians prized the tough pliant leaves, which they bleached and dyed for use in decorative designs woven into cedar bark or spruce root baskets. Although many authors report its use as food among Indians, it has also been listed as poisonous to humans.

The specimens of Bear-grass collected in the Bitterroot Mountains of Montana by Lewis in 1806 were described by Fredrick Pursh (1774–1820) in 1814 as *Helionas tenax*. The species name *tenax*, Latin for 'tough' or 'tenacious', refers to the wiry leaves. Thomas Nuttall (1786–1859) realised the relationship of this plant to *Xerophyllum asphodeloides*, and published the new name of *X. tenax* in 1818 in his book *Genera of North American Plants*. The name is most appropriate for the plant, meaning 'dry leaved and tough'.

Bear-grass has been described as one of our most magnificent natural lilies. This is particularly so on high mountain slopes where concentrations of the plant occur. Crossing such a slope can be treacherous, however, as the leaves tend to pull out of their sheaths when stepped on — a very "upsetting" habit.

Every five to seven years the colony will suddenly produce dozens or even hundreds of brilliant white flower heads in a truly spectacular floral display. Why such spectacles occur so infrequently is poorly understood. The plants grow from a creeping rhizome, take several years to develop, flower once, and then die back. It seems reasonable to assume that such a growth habit would produce some flowering plants each year, but such is not the case. Many years may pass with virtually no flowers produced — then the entire colony will burst into bloom at once.

Bear-grass growing in forest conditions rarely blooms, but it is known that the increased light level after logging or a fire causes a burst of luxuriant growth. This may explain why plants of some colonies get their start all at once and follow the same cycle in subsequent years. But other colonies, unaffected by fire or logging, also synchronize their bloom. It is possible that the controlling factor is climatic — plants may mature but not bloom until the right conditions prevail. Whatever the cause, the erratic bloom certainly adds to the charisma of Bear-grass, and provides a never-to-be-forgotten experience for those lucky enough to be in the mountains in a "good" year.

Opinion on the origin of the name Bear-grass varies. Some authors state that bears pull out the leaves to feed on the succulent white leaf bases. Others flatly deny this. A third group, with whom I must concur, expresses puzzlement over the name. Common names can become firmly established without any factual basis, and this is possibly the case here.

Bear-grass is listed as a rare plant in British Columbia, reflecting its limited distribution in the province. However, the 'rare' designation does not imply that the species is endangered — ample populations are protected in Waterton Lakes, Glacier and Yellowstone National Parks, and there are ample colonies thriving in inaccessible places in the mountains.

Zigadenus, Death-camas

About 15 species of *Zigadenus* occur in North America, eight of them in the Rocky Mountains. Two of the species are found in British Columbia. A further species occurs in Asia.

The genus name is taken from the Greek *zygos* or *zugon*, meaning 'yoke', or *xugeo*, 'to be joined', and *adēn*, 'a gland'. The reference is to the prominent two-lobed or paired nectar-producing gland at the base of the perianth.

Plants of this genus are perennial herbs growing from tunicated (layered) bulbs. The stems are simple and the leaves are mostly basal, long, narrow, and usually smooth.

Zigadenus venenosus S. Watson — Death-camas

This species is separated into two varieties based on the presence or absence of a white membraneous sheath base on the upper one or two leaves. The sheath base is present in *Z. venenosus* var. *gramineus* (Rydberg) Walsh ex M.E. Peck, Grass-leaved Death-camas, and absent in the variety *venenosus*. The ranges of the varieties are also well separated in British Columbia. *Zigadenus venenosus* var. *venenosus* occurs on southeastern Vancouver Island, the lower Fraser Valley and occasionally in the Okanagan Valley, while the variety *gramineus* is restricted to the southern Interior, east of the Coast Mountains.

The two varieties have been treated as separate species by some authors, and the easy distinction that can be made between them in British Columbia would tend to support this treatment. However, the varieties merge completely in eastern Washington, where the ranges overlap. The best authorities now agree that a varietal designation best describes the relationship.

This species is the most dangerous member of the genus well known for its poisonous properties. The poisonous principles that make it one of the most poisonous plants in the west are alkaloids, which are possibly twice as potent as strychnine. The bulb is virtually indistinguishable from that of the edible Camas species, *Camassia quamash* and *C. leichtlinii*, and similar to the edible bulbs of Wild Onion (*Allium* sp.), Mariposa Lily (*Calochortus* sp.), Chocolate Lily (*Fritillaria* sp.) and Wild Hyacinth (*Brodiaea* sp.). These plants grow freely in the same habitat, making the gathering of bulbs for food a dangerous practice except at flowering time. The Indian peoples, aware of the danger, made determined efforts to identify Death-camas plants while in flower and to eradicate them from the Camas beds. If the *Zigadenus* plants were too numerous to remove, strips of bark were tied to the stalks of the desirable plants so that they could be recognized easily after flowering.

The leaves are also poisonous, and appear in early spring when little other forage is available. Thus, Death-camas is also a threat to livestock, and may be responsible for greater loss of life in sheep on spring range than any other plant. The threat of Zygadenine poisoning has long been recognized, and various treatments, including bleeding stricken animals, were used. The problem is largely avoided today by keeping livestock off infested range land until the plants have withered and other forage is available. There are commercially available "death-camas tablets" that are effectively used to treat the occasional case of poisoning that occurs. However, a doctor should be consulted immediately if human poisoning is suspected.

The plant was not without its uses — the resourceful Blackfoot Indians found that crushed bulbs applied externally relieved the pain of bruises and sprains.

Zigadenus elegans Pursh subsp. *elegans* — Elegant Death-camas

The specific name refers to the larger, more impressive flowers borne in open, rather than crowded, racemes, and accented by large V-shaped glands, both making it 'more elegant' than other species.

The species was first collected by Meriwether Lewis in 1806 in Washington, and was subsequently described and named by Fredrick Pursh in 1814. The plant is widespread in North America, being reported from New England to California and from Alaska to Mexico. In British Columbia, it is found east of the Cascades only, and is most abundant in the south-eastern Interior.

Although less toxic than the more common *Z. venenosus*, this species does contain suffficient concentrations of alkaloids to be dangerous.

Taxus brevifolia in British Columbia*

Western Yew

Member of the Family Taxaceae

Natural Distribution and Habitat

Taxus brevifolia Nuttall occurs from the extreme southeastern tip of Alaska south through the coastal ranges of British Columbia, western Washington, and western Oregon to northern California, and then along the western slopes of the Sierra Nevada to Tulare County in central California. It also occurs further inland, from the Selkirk Mountains in southeastern British Columbia south to the western slopes of the Rocky Mountains and Continental Divide in northern Montana and Idaho, and to eastern Washington and eastern Oregon. The species is found near sealevel in Alaska, reaching a maximum elevation of 2150 m in the mountains of California. It is widely but not abundantly distributed in rich, rocky or gravelly soils near low mountain streams, on moist flats and benches, and in deep ravines. The species reaches its largest size in the Pacific Coast region of British Columbia, Washington and Oregon, and is often reduced to a low sprawling shrub in Alaska and at higher elevations near timberline. The climate throughout the range may be characterized as having long growing seasons, and high precipitation and relative humidity, with most of the precipitation falling as winter rain. *Taxus brevifolia* occurs in small groves or as scattered individuals in the medium to deep shade of the understory layer in mixed coniferous forests.

In British Columbia, *Taxus brevifolia* is locally common from 0–300 m on Vancouver Island and in the mainland Coastal Region, and at 1000–1500 m in the Interior. It is confined to the borders of inlets on the Queen Charlotte Islands. The species extends eastward through the Fraser Valley to Chapmans Bar (49°43′N 121°25′W) and the Coquihalla River about 32 km north of Hope. The tree is usually found along river banks and damp canyons, under the shade of other trees. It is commonly associated in the Province with *Tsuga, Thuja plicata* and *Oplopanax horridus*.

Description

Taxus brevifolia is an evergreen, dioecious (sexes on separate plants) species varying from a small tree to a low spreading shrub at higher elevations or in deep shade. It is usually (4–)12–20 (–25) m tall, with a diameter of (10–)15–45(–120) cm. The trunk is erect, rarely cylindrical but tapered, and often conspicuously unsymmetrical and fluted due to spiral grain growth. The crown is broad, conical, open, and often extends almost to the ground except in larger older trees when it may become rounded and unsymmetrical. Young trees frequently have a somewhat square outline, becoming more conical with age. The branches are long but often of unequal length, slender, spreading, and usually horizontal to slightly pendulous. They appear flattened because of the two-ranked leaves. Trees growing partly or wholly in the open often have a weeping appearance, with a much more dense crown and foliage than trees grown in deep shade.

There is a deep, widespreading root system.

The bark on mature trees is 4–6 mm thick, dark reddish- or purplish-brown, scaly, and often ridged and fluted. The scales are small, papery, and easily detached, exposing the reddish or reddish-purple inner bark. The color of the bark usually attracts attention to the tree.

* By Roy L. Taylor and Sylvia Taylor

The twigs are slender, drooping, glabrous, terete, and yellowish-green becoming dark reddish- or purplish-brown in the second season.

The wood is non-resinous, fine-grained, dense, heavy, hard, strong, and elastic. The heartwood is bright orange to rose-red, becoming gradually duller when exposed to light, and the sapwood is thin and light yellow. The wood has no characteristic odor or taste.

The winter buds are small, ovoid, and have numerous, overlapping, loose, thin-pointed, yellowish, persistent scales.

The needles are alternate, flat, slightly curved, (6-) 12-25 mm long, 1-2 mm wide, dark yellowish-green above and paler with 2 broad yellowish or grayish-green stomatal bands below. The apex is abruptly and sharply acuminate, and the base is gradually narrowed into the petiole. The margin of the needle is somewhat revolute. The petiole is 1.5-2 mm long, slender, and yellowish. The base of the petiole is prolonged down the twig, and the petiole is twisted so that the spirally arranged needles lie in 2 spreading rows forming a flat spray. The needles are persistent for 5-12 years.

The strobili ("flowers") appear during the early spring throughout the range. The male and female strobili both form in the axils of leaves on the undersides of branches of the previous year's growth. The male or staminate strobili are solitary, numerous, globose, 3-5 mm broad, about 3 mm long, and yellowish. They consist of a stalked globose head of 6-14 stamens, each with 5-9 microsporangia (pollen sacs), and there are several sterile scales at the base. The female or ovulate strobili are solitary, sessile, small, greenish, and usually pendent. Each strobilus consists of a single, erect ovule on a fleshy ring-like disc, with several imbricate scales below. The basal scales of both staminate and ovulate strobili are persistent and decussate. In exceptional cases, strobili of the opposite sex may occur on a single branch or twig of a tree.

Taxus species do not form cones, but have an arillate naked seed. The fleshy disc at the base of the ovule enlarges to form a fleshy, mucilaginous, sweet, scarlet, cup-shaped structure, the aril, that almost surrounds, but is free from, the seed. The aril structure in *Taxus brevifolia* is ovoid, 6-12 mm in diameter, and is open at the apex to expose the seed. The shape of the aril may be affected by growing conditions and maturity of the tree.

The seed is solitary and erect within the aril. It is hard, bony, brown or dark bluish, 5-6 (-8) mm long, ovoid with a slightly 2-4-angled apex, and marked at the base by the much depressed hilum. The seed is ripe in the early fall of the first year, and is frequently dispersed by birds, which eat the aril.

Taxus brevifolia is a fairly prolific seeder, with some seed produced every year and large crops at irregular intervals.

Taxus brevifolia has a reputation of toxicity to humans and livestock, especially the needles and seeds, but several analyses have failed to reveal the presence of alkaloids, and conclusive cases of poisoning do not appear to have been recorded. *Taxus baccata*, English Yew, and *T. cuspidata*, Japanese Yew, do contain the alkaloid taxine, a heart depressant, in the wood, bark, needles and seeds.

Varieties and Ornamental Cultivars

There are no taxonomic varieties of *Taxus brevifolia*, although it is considered not unlikely that geographical races may have developed, in view of the extensive range occupied by the species.

Three cultivars are listed:- cv. Erecta, a columnar form; cv. Nana, a dwarf form; and, cv. Nuttallii, a drooping form.

Taxus × *brevicata* has been listed in at least one publication, but has no botanical standing. It was reported to be a garden hybrid between *T. brevifolia* and *T. cuspidata*.

Propagation

Interspecific hybrids occur frequently in *Taxus*, therefore seeds collected from a tree growing

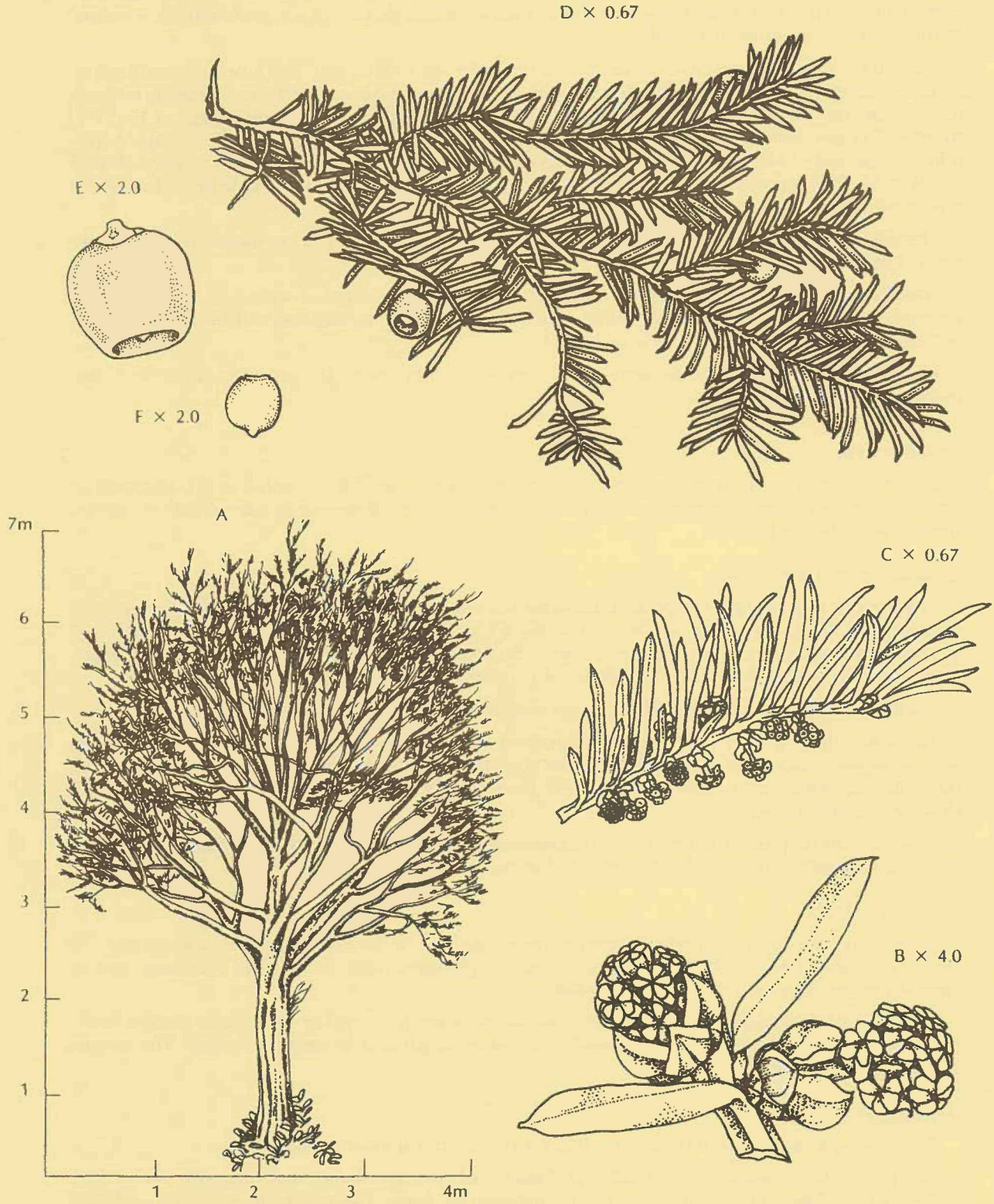

FIGURE 2. *Taxus brevifolia*. A. Habit of an old tree growing in the open in Stanley Park, Vancouver, B. male strobili, C. branch with male strobili, D. branch with arillate naked seed, E. aril, F. seed.

in the presence of other species, such as in an arboretum or collection, cannot be relied upon to come true to type. The seeds show a strong but variable double dormancy, germinating in nature in the second year after dispersal.

The fruit should be picked as soon as it is ripe, the seed extracted, and sown or stratified as soon as possible. The seed may be stored dry in a sealed container at 1-2°C for 5-6 years without losing viability. *Taxus brevifolia* seed should be given a period of warm stratification at 15-21°C for 90-150 days, followed by cold stratification at 2-3°C for 60-120 days, before sowing. A germination period of 60 days with day temperatures of 30°C and night temperatures of 20°C should result in 50-99% germination. If no germination has occurred after several months, a further 90 day period of cold stratification may be tried.

The young seedlings require protection from the sun. In nature they occur mostly in deep shade on wet moss and decaying wood.

Hardwood cuttings may be taken from October to January, treated with a hormone rooting powder, and stuck in well-drained, moist sand or a sand-peat mix. Rooting will take 2-3 months. Softwood cuttings have also been successful.

In nature, the lower branches sometimes root when they touch the ground, and sprouts frequently develop from cut stumps.

Transplanting

Taxus species can be transplanted easily in either spring or fall as balled and burlapped or container-grown plants. Large plants may be successfully moved providing a large ball of earth is moved with the roots.

Conditions for Cultivation

The growth rate in both height and diameter is slow, especially when the trees are growing in deep shade. *Taxus brevifolia* is believed to be a long-lived tree, reaching maturity at 250-350 years. In nature, trees 15 cm in diameter are 75-90 years old, reaching 30-50 cm at 140-245 years, with the largest trees being 350-375 years old. *Texus* is a shade tolerant species.

Taxus brevifolia is hardy, and the recommended hardiness zone is Zone 6b (U.S.D.A.).

Taxus brevifolia thrives in a moist, well-drained, rich clay soil, in either sun or shade, but will also grow well in a variety of slightly acid to slightly alkaline well-drained soils. The tree should be sheltered from winds and winter sun. All *Taxus* species benefit during hot weather if hosed down every two weeks.

Yews should be pruned during the early growing season if necessary, although they all may be severely pruned or sheared if required for shaping.

Landscape Value

Yews in general are excellent ornamental trees, because of the dense dark foliage and the red fruits on female trees in the fall. They are used as specimen trees, foundation plantings, and as formal hedges, screens, and in topiary work.

Taxus brevifolia is rare in cultivation, but would be worth growing for its irregular and picturesque habit and its foliage. It is occasionally cultivated in gardens in western Europe. The berries are attractive to birds.

Availability

Taxus brevifolia may be difficult to obtain, except from specialist nurseries.

Most material offered commercially as *Taxus brevifolia* has been, and may still be, in fact *T. baccata* cv. Adpressa (or Adpressens) or *T. cuspidata* cv. Nana. The species must not be confused with *T. baccata* cv. Brevifolia.

Other Uses

The wood of *Taxus brevifolia* has no commercial value because of the sporadic occurrence and variable size of the trees. However, the wood is an attractive color, durable, and takes a good polish. It is used mainly for articles such as canoe paddles, archery bows, small turned articles, carvings, poles, fence posts, and stairways.

Ethnobotany

Taxus brevifolia was used by most of the Indian tribes in the Pacific Northwest. The wood was well-known for its strength and durability, being prized by all the Native peoples within its range. It was also often traded to groups in other areas. The wood was used to make weapons and implements requiring strength and toughness, such as bows, arrows, clubs, harpoon shafts, canoe paddles, adze handles, dip net frames, digging sticks, fish hooks, bark scrapers and beaters, wedges for splitting logs, spoons, knives, dishes, mat-sewing needles, awls, trinket boxes, combs, fire tongs, gambling sticks, and snowshoe frames. The Okanagan-Colville Indians of Washington and British Columbia ground the dry wood and mixed it with fish oil to make a red paint.

A bundle of yew branches was tied to a hemlock pole and used to gather sea urchins by the Kwakiutl. Women of the Saanich tribe on Vancouver Island used yew twigs to remove underarm hair, and the Lillooet used larger branches to support their deerhide hammocks. Youths of the Swinomish people in western Washington rubbed themselves with smooth yew sticks to gain strength.

The needles were used medicinally in several ways. They were crushed, soaked in water, and the liquid used to bathe a baby or old person to improve their condition. The needles were crushed, boiled, and the infusion drunk for any internal injury or pain. Several groups moistened the needles and ground them up, or chewed them, and then applied the pulp to wounds. The Saanich tribe on Vancouver Island and several Salish groups in western Washington dried the needles and then smoked them, using a tube made of an elderberry stem. This was said to make a person dizzy.

The Quinault of western Washington were the only tribe to make medicinal use of the bark. It was peeled, dried, boiled, and the liquid was drunk as "lung medicine".

The berries were ignored by most groups, although the Haida at Masset and the Lillooet of the Fraser River area would eat them in small quantities. However, the Haida believed that a woman would become sterile if she ate too many berries.

Young men of the Kwakiutl tribe tested their strength by trying to twist a yew tree from crown to butt. The Saanich used a yew sapling as an effective catapult during wars — they would fix a spear to the sapling, pull it back and then release it.

Diseases and Problems of Cultivation

Taxus brevifolia is one of the most resistant of western conifers to damage from sulfur dioxide. It is sensitive to damage from fire because of the thin bark. The needles may turn brown or yellow in winter because of desiccation caused by exposure to winter sun, dry winds, and very low temperatures. The foliage may also be damaged in the summer when light and heat is reflected from a south or west facing wall. Deer have been known to browse the foliage of nursery plants.

Yews in general are considered disease-free, the few pests include vine weevils, scale, and spider mites.

Sphaerulina taxicola (Peck) Berl. and *Macrophoma taxi* Berl. & Vogl. have been reported to cause needle blights on *Taxus brevifolia* in British Columbia.

Origin of the Name

The generic name *Taxus* is the classical Latin name for the English Yew, *Taxus baccata* L., and is believed to be derived from *taxos*, the Greek name for the tree. There is some debate as to whether the Greek *toxon*, a bow, was derived from *taxos* or the reverse, as bows have been made

from yew-wood since antiquity. The specific epithet *brevifolia*, short-leaved, is derived from two Latin words, *brevi* meaning 'short' and *folia*, 'leaved'. This is in comparison to *T. baccata*, which has longer leaves. The common name Yew is derived from the Old English *īw* or *ēow*, which is believed to signify verdure, alluding to the fact that the tree is evergreen.

The type locality for *Taxus brevifolia* is "In the dense maritime forests of the Oregon", where it was collected by Thomas Nuttall (1786–1859), an English botanist and ornithologist who travelled extensively in America from 1811 to 1834. He also named the species.

The species was introduced to cultivation in Great Britain in 1854, being sent to the Veitch Nurseries in London by William Lobb (1809–1863).

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Book Reviews

Stace-Smith, R., L. Johns and P. Joslin, Editors. 1980. Threatened and Endangered Species and Habitats in British Columbia and the Yukon. British Columbia Ministry of Environment, Fish and Wildlife Branch, Victoria, B.C. vi + 302 pp.

This volume is the proceedings of a symposium co-sponsored by the Federation of British Columbia Naturalists, The Institute of Environmental Studies at Douglas College, and the Fish and Wildlife Branch of the B.C. Ministry of Environment and held in Richmond, B.C., on March 8 and 9, 1980. In the words of the Chairman, R. Stace-Smith, the purpose was to "take stock of the situation" and "create an awareness of the issues" (p. iii). Within that framework, two classes of presentations can be identified, general statements and specific papers. The former were designed, I suppose, to "create an awareness of the issues" and the latter to "take stock of the situation". I should like to make a few comments about the papers in these two categories.

The general statements seemed to be overly long reiterations of the obvious. The excess verbiage in these contributions did little to accurately and concisely "create an awareness". In fact, I found it difficult to extract anything but the most general of concepts. The issues would have been clearer had there been journalistic restraint.

The specific papers were of two types: those devoted to habitats and those to rare and endangered species. The former were, far and away, the best of the volume. These few papers stressed the critical issue in the question of rare and endangered species, the habitat. As well, they discussed the cause of habitat degeneration in B.C. (economic, both industrial and residential, exploitation), and the impact of different types of exploitation. The presentations on rare and endangered species consisted of articles of varying length about individual species or groups of species, their status, and the approaches that were being taken in an attempt to identify endangered species or to conserve them. The information included ranged from brief reports to detailed studies that included such topics as feeding ecology and population dynamics. As well, some reports included histories of groups that were concerned with the preservation of rare and endangered species. As would be expected, the standard of writing varied considerably. My interest in the various articles was determined, to a large extent, by professional interests (Botany). I suspect that other readers would likewise find their interests determined by favored groups, although there would not be a great deal (only Scudder's article) that would attract an entomologist.

The above represents a very brief review of what is contained in the volume. I have more to say. The book is a collection of independent papers with, at best, a vague theme, and suffers therefrom. A few comments added at the beginning did not give the work any semblance of cohesiveness. Perhaps the topic is too broad to be cohesive.

The reports were strongly biased. Based on the number of pages in the report, about 75% of the species in B.C. and the Yukon are birds and mammals, about 15% are plants, and there are about 2% each of fish, amphibia, reptiles and insects. This uneven representation, no doubt, reflects the interests of the majority of the participants in the symposium, and perhaps of the majority of people in B.C. But, paying so little attention to those groups that include the majority of species in B.C. and the Yukon (plants, about 19,000 species; insects, about 35,000 species) makes comments about preserving genetic variation (p. 16, and implied on p. 271) seem incongruous.

In the last section of the book, there are a series of recommendations entitled "Where to next". The recommendations were not overly impressive in the imagination shown. Most, if not all, could have been made by any competent biologist who had the facts and some time to think. Also, some of the recommendations are strange. It seems odd to recommend that the Fish and Wildlife Branch establish an advisory committee to determine which species (I assume vertebrates) should be considered endangered when the Wildlife Act is not concerned with either amphibia and reptiles (p. 66) or peripheral species (p. 67). Peripheral species may be common elsewhere but, as Pojar and Scudder, amongst others, so accurately point out, the habitats are not. It seems strange also to designate the Ministry of Forests to assume responsibility for plant and

insect species. The only representative from that Ministry at the symposium has a background in plant ecology and Ecological Reserves, not forestry. The recommendation (V, 2) "to recognize and establish the right of all species to exist for their own sake" has a pleasant ring, but is overly simplistic. It ignores the fact that many species are serious pathogens of humans or economic crops. I was also a little dismayed to see that practically all the recommendations were directed at the government or academic level. Apart from Brink's presentation (pp. 282–284), there seemed to be little concern with enlisting the aid and support of citizens whose affiliations are not strictly with governments or universities. I find it difficult to believe that the large pool of concerned, intelligent, interested and highly competent non-professional biologists has been completely utilized in attempts to preserve our natural heritage.

As a final comment, I cannot help but still be amazed by the apparent concern with species when, in most cases, the unit in greatest danger is the habitat. One wonders if the emphasis on species is a means of showing concern about preservation but, at the same time, avoiding economically unpopular decisions. The designation of a species as rare and endangered may offer some protection to the members of that species, but may not necessarily exclude its habitat from economic exploitation. Also, I should like to point out that it is easier to identify endangered habitats, and much easier to describe them, for legislative protection, as they may be defined geographically. In this context, it would seem logical that even more emphasis should be placed on, and support given to, the Provincial Ecological Reserves Programme (recommendation I, 5).

Jack Maze

Department of Botany

University of British Columbia

Bechtel, Helmut, Phillip Cribb and Edmund Launert. 1981. The Manual of Cultivated Orchid Species. M.I.T. Press, Cambridge, Mass. 444 pp., including 720 color photographs and 149 b/w illustrations. (First published in German in 1980).

The orchid enthusiast who picks up *The Manual of Cultivated Orchid Species*, opens the cover, surveys the table of contents, then briefly thumbs through the pages of text and illustrations, will feel a great surge of excitement. He will realise that here is the orchid book that will give him all that for which he has been looking. Not since the publication in 1901 of Sander's definitive work on species, *Orchid Guide*, has so much information on this subject been brought together in one book. Also, although Sander's work dealt with more species, it lacked the stimulation and clarification, derived from the excellent color pictures, available in this new volume.

The text is written by Phillip Cribb and Edmund Launert, resident botanists at the Royal Botanical Gardens, Kew in England, who write in the introduction that they "hope this work will make it easier for the orchid grower to identify his plants and will also enable him to develop his interest in any particular genus by suggesting further reading on the subject." Helmut Bechtel is a renowned German natural history photographer, and travelled around the world to capture the species on film.

The book is divided into two parts. Part I contains the morphology, life history, and aspects of the ecology of orchids, this last so important to those growers wishing to acclimatize plants to their own growing situation. There is a brief but fascinating history of the orchid in cultivation. I personally would have liked to see included some history of that incredible breed of men, the hunters, an intriguing addition to the orchid story. A more expert student of orchids than this reviewer noted that the section on taxonomy is completely up-to-date, as shown by the inclusion of the genus *Miltoniopsis*, but at the same time questioned the spelling of the species name *schlecterianum* rather than *schlecteranum*.

Part II is the meat of the book, comprising a detailed analysis of 217 genera found in cultivation. Many of the lesser known genera are included, such as *Nageliella*. Needless to say, the larger and more popular genera occupy considerably more space as many more of the species are included (for example, *Paphiopedilum* has forty species listed). Over 1200 species are described in detail, including diagnostic features, distribution in the wild, closely related species, any synonym by which it may be known, and derivation of the name, plus excellent notes on general cultural requirements. All this information is easily found as the listings are alphabetical by genus. One bit of information that is not provided is the blooming time of each species. Every grower, whether tyro or pro, anxiously awaits the bloom, which is, after all, the yardstick of success in orchid growing.

The color photographs are the crowning glory of the book. Good illustrations are so much more meaningful to most readers than even the most expert botanical description. The lack of scale is more than compensated for in the clarity of detail, and the true-to-life color makes identification a near certainty.

As a keen amateur grower of orchids, I recommend this book. There are many less expensive how-to and picture books available, but nowhere will one find the wealth of information and the superb photographs to equal the quality and scope of this one volume.

Anne E. Aikins
Friend of the Garden
UBC Botanical Garden

Donations to The Botanical Garden

The following people or organizations have donated money or gifts in kind to The Botanical Garden during 1981. We are very grateful to them, and take pleasure in listing their names here.

Alpine Garden Club of B.C., Vancouver, B.C.
Cascades and Koi Landscaping, Ocean Park, B.C.
L.K. Evans, Vancouver, B.C.
Ms. S.M. Farrington, Vancouver, B.C.
Ms. D. Fermaniuk, Vancouver, B.C.
Friends of the Garden, UBC, Vancouver, B.C.
Gray Elementary School, Delta, B.C.
Mrs. M. Greig, Royston, B.C.
R.L. Higinbotham, Vancouver, B.C.
Dr. Basil Ho Yuen, Vancouver, B.C.
Ms. H. Hunt, Vancouver, B.C.
Mr. & Mrs. E.H. Lohbrunner, Victoria, B.C.
Nippon Express U.S.A., Inc., Vancouver, B.C.
Mrs. K. Pattison, Vancouver, B.C.
The Stanley Smith Horticultural Trust
Ms. M.L. Walker, Hazelton, B.C.

Botanical Garden News and Notes

Joint Program for Acquisition of Plants — The Alpine Garden Club of B.C. and The UBC Botanical Garden have initiated a joint program for the acquisition of plants from the Alpine Garden Society of Japan. The Botanical Garden will propagate plant material received as cuttings, seeds and live plants. Excess material propagated will be distributed to the Alpine Garden Club of B.C. and, in addition, The UBC Botanical Garden has undertaken to distribute any remaining material to other sister institutions involved in the maintenance and development of alpine garden collections. Seed received will normally be split 50-50 between the Alpine Garden Club of British Columbia and The Botanical Garden, and The Botanical Garden will return any excess seed not used for propagation to the Alpine Garden Club of British Columbia. The costs for this plant exchange program will be shared by the Alpine Club of British Columbia and The UBC Botanical Garden. A substantial number of alpine plants have been received from the Alpine Garden Society of Japan and, in return, a number of specialized plants from Northwest America have been sent to Japan.

Hortline Service — On October 1st, 1981, a new joint information service for the public was initiated by the Department of Plant Science of the Faculty of Agricultural Sciences and The UBC Botanical Garden. Telephones (228-5858) are manned four days a week, Monday through Thursday from 1:00 p.m. to 4:00 p.m. At all other times the telephone contains a recorded topical tip, which is changed once a week. The service has provided a much better program for people interested in questions of a horticultural nature and has at the same time regularized the contribution by the two departments toward the program. It is anticipated that the Hortline mobile trailer will again operate during the summer months providing that sufficient funds are obtained from government and industrial sources.

Retirement — Dr. John W. Neill, Landscape Architect and Research Scientist with The Botanical Garden, retired on June 30th, 1981. A gala picnic was held in his honor and he received an honorary Life Membership in The Botanical Garden, joining Mr. Ken Wilson who was given a similar award at the opening of the Asian Garden on May 12th. Dr. Neill will continue to work on a consultant basis to the Garden to complete a number of specialized projects related to the renovation and establishment of specialized collections within the Garden program. In November, Dr. Neill received the first Pacific Coast Nurseryman's Outstanding Service Award for the B.C. Nursery Trades Association at the B.C.N.T.A.'s Annual Meeting held at Harrison Hot Springs. This award was made for the outstanding contributions that John has made for more than 30 years to the nursery trades industry. We in the Garden wish John and his wife, Helen, every success in his retirement.

More Awards — During the Fall of 1981, Mr. K. Nicholas Weesjes and Miss Evelyn Jack, now Mrs. K.N. Weesjes, retired from the University of British Columbia. Nick and Evelyn were long time supporters and friends of The Botanical Garden and it was a pleasure to award them lifetime passes to the Garden as part of their going away celebrations at the University. They have moved to Vancouver Island and we wish them well in the development of their new home on the Island.

Mr. & Mrs. E.H. Lohbrunner Work Exchange Program — Mr. and Mrs. E.H. Lohbrunner have recently given a significant donation to The Botanical Garden for the establishment of the Mr. & Mrs. E.H. Lohbrunner Work Exchange Program. This program is designed to provide a 3-4 month work experience for a person interested in alpine garden culture to work with members of The Botanical Garden staff in the E.H. Lohbrunner Alpine Garden. In addition, Mr. and Mrs. Lohbrunner provided an endowment fund for the continuing acquisition of new plant materials for the Alpine Garden at the University of British Columbia. It was a fine Christmas present for The Botanical Garden, and we hope that other supporters of the Garden will be encouraged to provide special funding for the operation, maintenance and development of the Garden at the University. Such donations are tax deductible.

Information Signs — New Information signs were erected during the Fall at the major Garden components to provide ready information for visitors to the Garden. These signs, developed by

Dharma Presentations Ltd. of Vancouver, will enable visitors to more easily find their way around the various components of The Botanical Garden.

Chinese Pagoda Gate — The Chinese Pagoda Gate has now been completed at the west end of the pedestrian underpass between the Main Garden and the Asian Garden. This handsome structure leads into the 30-acre Asian Garden where the major collection of Rhododendrons, Azaleas, and trees and shrubs of Asiatic origin are planted. This past summer saw excellent flowering of many species of *Meconopsis* and the first major flowering of *Cardiocrinum cathayanum*.

Staff Activities — The Garden staff continue to be active in major botanical garden associations. Mr. A. Bruce Macdonald, Assistant Director, serves on the North American Diploma in Horticulture Committee, and Mr. David A. Tarrant is Chairman of the Education Committee of AABGA. The AABGA's 1982 Western Regional Meeting will be held in Vancouver from April 27th to 29th, sponsored jointly by the VanDusen Botanical Display Garden and The UBC Botanical Garden. Information for this meeting may be obtained by writing to Dr. Gerald A. Straley, Educational Co-ordinator, VanDusen Botanical Display Garden, 5251 Oak Street, Vancouver, B.C., V6M 4H1.

The Director, Dr. Roy L. Taylor, attended the IX General Meeting and Conference of the International Association of Botanical Gardens held at the National Botanic Gardens, Canberra, Australia, from 17th - 20th August, 1981. Dr. Taylor presented one of the five papers given at this meeting. Dr. Taylor was elected Secretary of the IABG, succeeding Mr. Douglas Henderson, Regius Keeper, Royal Botanical Gardens, Edinburgh. The IABG will hold its next meeting in Hamburg, Germany, in August 1982.

Index Seminum

The Index Seminum, or Seed List, is published annually in mid-winter, and is the means by which The Botanical Garden offers seed for exchange with other botanical gardens and research institutions. Many botanical gardens, including ourselves, confine their Index Semina mainly to the seeds of native plants, most of which are collected in the wild during the previous summer and fall.

The Index Seminum for the 1980 collection year was distributed to a total of 550 institutions or individuals engaged in research projects in 49 different countries. The list contained 300 taxa in 64 families. We received requests for 7671 seed packets from 328 institutions or individuals, of which we were able to supply 6863 packets (89.5%). The ten most frequently requested taxa were: *Cornus nuttallii* (108 requests), *Abies amabilis* (101), *Fritillaria camschatcensis* (87), *Primula mistissinica* (84), *P. incana* (83), *Lewisia rediviva* (82), *Fritillaria pudica* (82), *Pinus contorta* (79), *P. ponderosa* (79), and *Erythronium oregonum* (78). The following are the ten countries in which our seed was in most demand:- United Kingdom (41 requests), West Germany (32), Czechoslovakia (27), East Germany (20), U.S.A. (19), Poland (17), France (16), U.S.S.R. (16), Belgium (12), and Switzerland (12).

We acknowledge with gratitude the assistance received from members of the 'Friends of the Garden' who spent many long hours cleaning seed and dispatching orders.

During 1981 we received 329 Index Semina from 46 countries. We requested 588 packets from 57 of these lists, and have received 370 packets (62.9%).

The 1981 Index Seminum will be the last one published in the current format. The program will be greatly reduced and offered on a biennial basis, the first Index Seminum under the new system being scheduled for distribution in the late fall of 1983.

Climatological Summary*

The year 1981 was wet, cloudy and mild. The total precipitation at UBC (rain plus snow) was a record 1533.6 mm on 211 days, surpassing the previous record set in 1980. April and June, with 151.8 mm and 126.4 mm respectively, were the wettest since 1961, the earliest year for which The Botanical Garden has records. The precipitation in April included 10.0 cm snow — the first recorded in that month since at least 1961. Only January, August and December received below average precipitation. The total sunshine for the year was 1789.5 hrs, down slightly from the UBC average of 1854.8 hours. May had the lowest sunshine in 21 years with 174.7 hrs, and April, June, July and October received less sunshine than average. On the other hand, ten of the months in 1981 had mean temperatures that were higher than the 20-year average — only June and October were below average. January, March and November all had record high mean temperatures of 6.1°C, 8.1°C and 7.8°C respectively. January had a record maximum temperature of 16.4°C and August a record high of 29.8°C.

From the horticultural point-of-view, 1981 was an excellent year for transplanting tree and shrub specimens, but the development of new lawns was particularly slow due to poor sunshine and more than abundant moisture. Vegetative growth was excellent, but flowering was noticeably decreased. The good fall weather provided us with greater and more intense fall coloration than usual, but we had an earlier than normal leaf drop. This was probably related to the cooler than normal October temperatures. The excellent vegetative growth has provided the promise of excellent flowering on ornamental shrubs and trees in 1982.

Data 1981	OCTOBER	NOVEMBER	DECEMBER
Average maximum temperature	12.0°C	10.4°C	6.5°C
Average minimum temperature	6.7°C	5.3°C	1.8°C
Highest maximum temperature	15.1°C	15.7°C	10.9°C
Lowest minimum temperature	2.8°C	−0.3°C	−2.8°C
Lowest grass minimum temperature	−1.5°C	−4.0°C	−6.7°C
Rainfall/no. days with rain	188.5 mm/17	230.4 mm/21	199.3 mm/24
Total rainfall since January 1, 1981	1080.4 mm	1310.8 mm	1510.1 mm
Snowfall/no. days with snowfall	0	0	10.5 cm/4
Total snowfall since October 1, 1981	0	0	10.5 cm
Hours bright sunshine/possible	118.7/318.4	75.9/268.2	58.3/253.1
Ave. daily sunshine/no. days total overcast	3.8 hr/10	2.5 hr/10	1.9 hr/10

**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

Colophon Notes for Volume 12

This volume has been printed in Oracle type on Donegal Linen Text (No. 1) and Beckett Cambric India (Nos. 2 - 4) by the Copy and Duplicating Centre, University of British Columbia, Vancouver. The ink used was deep brown.

February 1982

Au Revoir . . . . .

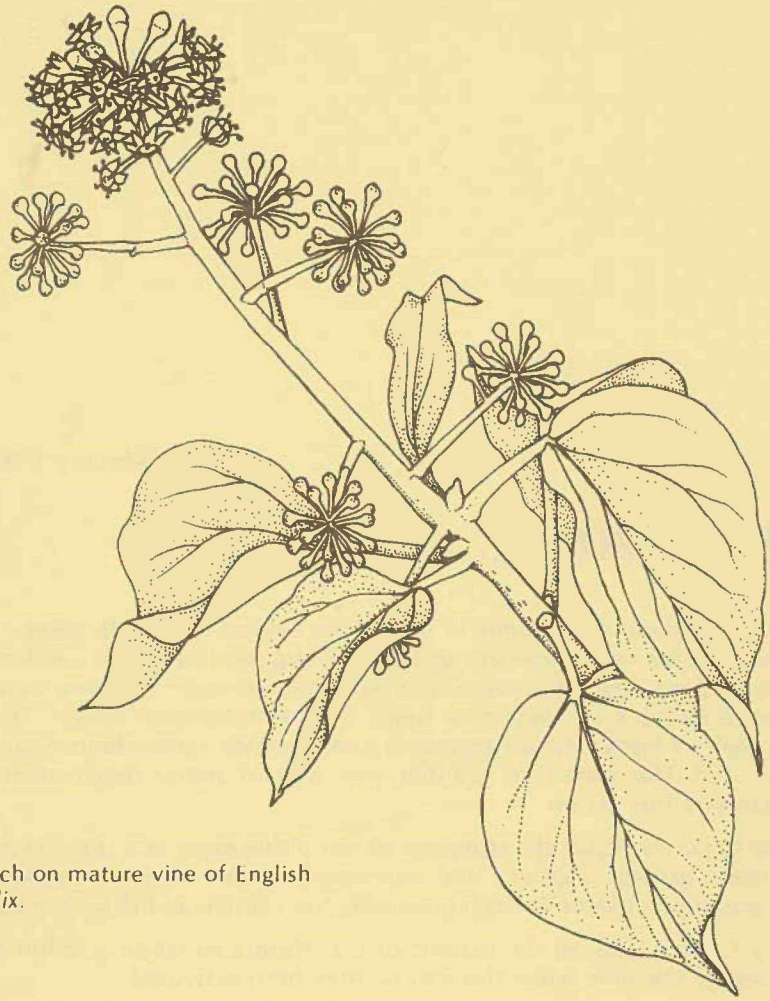
This last issue of Volume 12 marks the end of the publication of Davidsonia by The University of British Columbia Botanical Garden. The action was made necessary as a budgetary measure resulting from a severe cutback of University funds to The Botanical Garden. The University is currently undergoing a campus-wide retrenchment program, and The Botanical Garden was one of many departments affected by this action.

We sincerely regret the stoppage of our publication at a time when we need greater support and increased, rather than decreased, dissemination of information concerning the Garden and its activities.

The Garden bids all the readers of Davidsonia *au revoir* and looks forward to the time when the journal may be reactivated.

Roy L. Taylor

Director



Flowering branch on mature vine of English Ivy, *Hedera helix*.

DAVIDSONIA

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