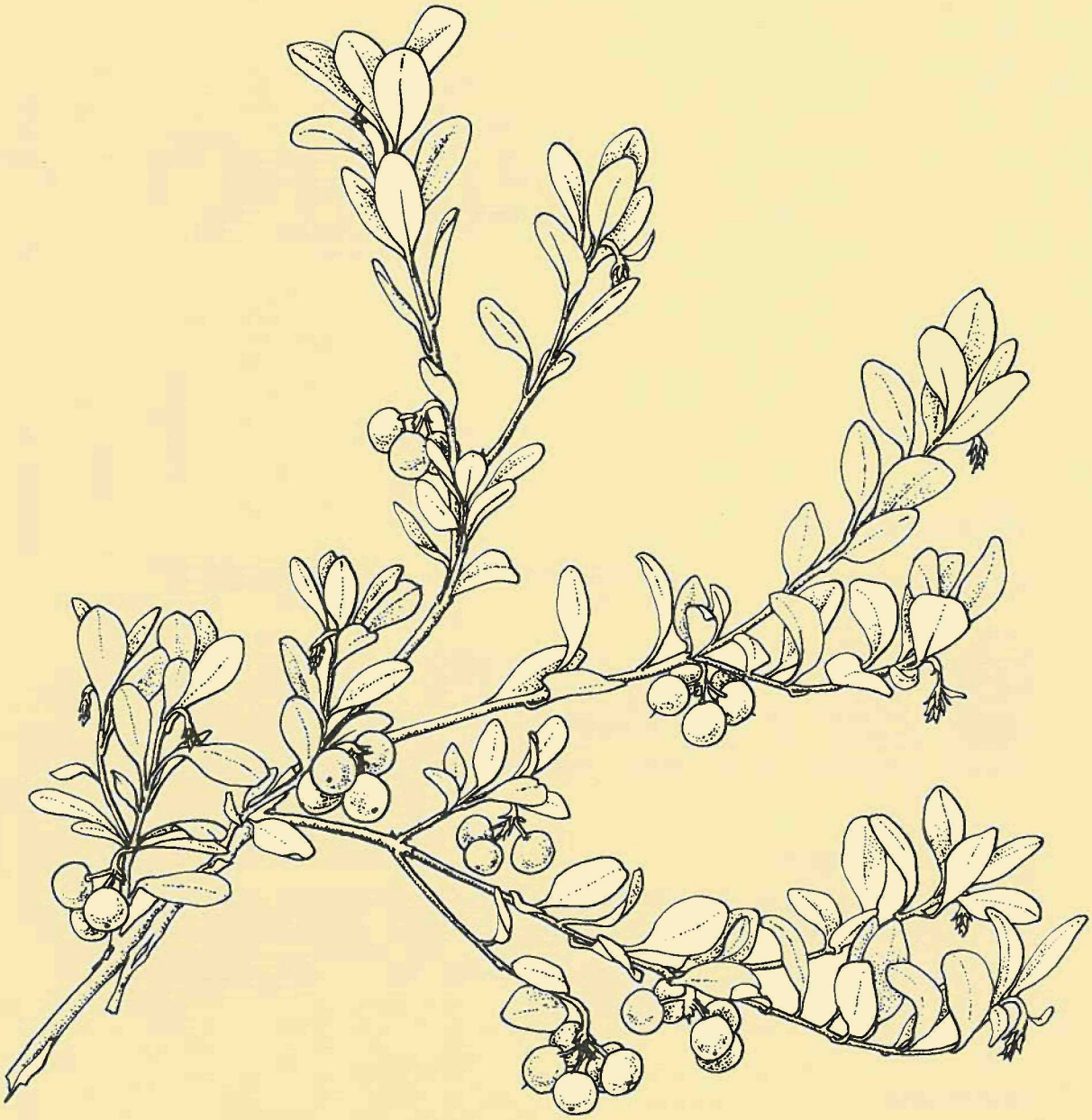
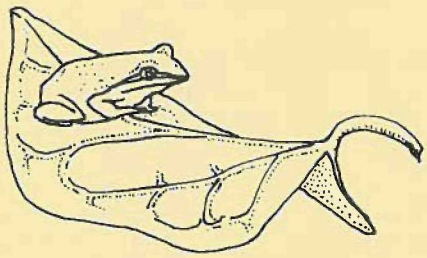
DAVIDSONIA

VOLUME 8 *NUMBER 1* *Spring 1977*



Cover:

Arctostaphylos uva-ursi or Kinnickinnick, a hardy and attractive ground cover for sunny locations.



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Ground Covers on the U.B.C. Campus

JOHN W. NEILL

Ground covers are plants which mass well, covering the surface of the ground completely, competing favorably with weeds, and presenting an attractive, trouble-free floor to any outdoor area. What could be more ideal for today's "easy-care" garden? Many good landscape plants fit this description quite nicely and it is understandable that interest in them should be increasing, for the landscape architect must be aware of subsequent maintenance costs when he specifies his plants, and the home garden enthusiast, at the other end of the scale, would rather spend time with special-interest plants than with weeds.

There are many shrubs which mass well and which become self-maintaining when allowed to grow together, the form of the individual being lost to the effect of the mass. For this purpose shrubs which lack specific form, often presenting a straggly habit of growth, are the best massers. Examples are most cotoneasters, spreading forms of junipers and yews, Zabel's Laurel, most of the brooms, *Escallonia* and *Abelia*. Rhododendrons, azaleas, camellias, hydrangeas, conifers, lilacs and many of our other flowering deciduous shrubs are mostly too important as individuals to be thought of as ideal massing plants. When subjected to mass arrangement, too much of their character is lost. Such individuals are better used sparingly in the landscape, in contrast to those which mass well.

Massed shrubs may fit the definition of ground cover, but low, spreading and prostrate plants are better suited to this purpose. They provide a floor to the garden, without the necessity for frequent clipping, as with grass, yet are living and organic, in contrast to the inflexibility of asphalt, concrete or stone. Few ground-cover plants will stand up to the wear and tear of foot traffic. Their use is therefore best confined to passive areas of the garden.

Ground covers were first introduced to the University campus for two purposes. First, they reduce the cost of maintenance, and secondly, they provide examples of plants for various purposes as demonstration for students. The campus has always been considered a vast outdoor laboratory for courses in Horticulture, Landscape Architecture, Botany and Forestry, and has a good range of landscape plant materials.

Some ground covers are best adapted to use in association with other plants; others prefer isolation. Few types can be mixed, for they do not thrive on competition. If two different ground covers are planted together, either both of them will do poorly, or one will surely dominate, over-running the other in due course. Combinations of contrasting form, however, have a much better chance of success. The key is the degree of shade tolerance of the lower-growing plant, for it should be able to maintain a permanent cover underneath taller material at all times of the year.

A good combination is the use of an evergreen floor mat under widely spaced deciduous shrubs. Here on the West Coast where we have so many broad-leaved evergreens we tend to overlook many of our old favorite deciduous flowering shrubs. By spacing them six feet or more apart, nothing is lost of their structure and maximum return from flowering in season is assured. The evergreen floor gives permanence, especially in winter, and often enhances the flowering effect. Many of our broad-leaved evergreens (for example, rhododendrons) are best used as individuals rather than massed. The same idea of wide spacing to retain the full form of the individual, yet tying the planting together with a ground cover, may be most interesting.

Many ground covers are good as bank plants. Once established they control erosion and provide a permanent substitute for grass, especially on the steeper slopes where mowing may be a problem.

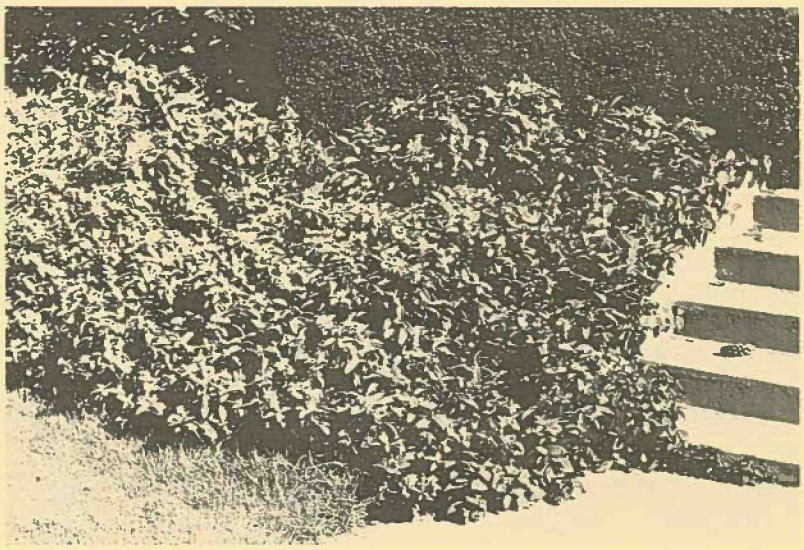
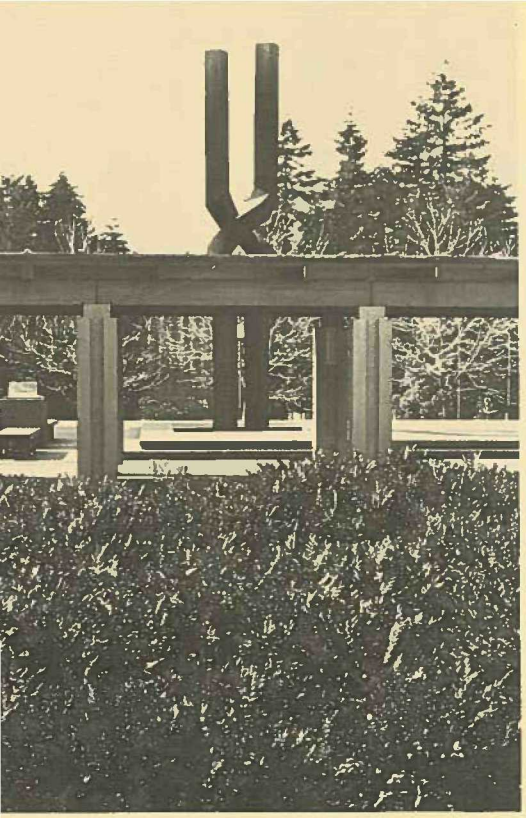


FIGURE 1. *Hypericum calycinum*, a shrub that is widely planted on campus, has showy yellow flowers in the early summer.

Over a five year period, 1965-1970, trial plots were established on highway slopes at a freeway interchange near Vancouver in cooperation with the B.C. Department of Highways. Following are a few general observations from this study: (1) Fill slopes usually provide a better soil medium than cut slopes and therefore the plants were able to get off to a better start, but there was much more competition from weeds in the better soil. Plants which were able to get established on the poorer slopes were able to fend for themselves (without the necessity of hand weeding) much sooner. Chemical controls were a help at the initial stage, but subsequent competition from weeds in the better soils proved to be a greater problem in later years. (2) Ground cover plants which were rhizomatous were superior to those which spread only above ground. Underground runners helped to bind the soil and were effective in competing with weeds. Grasses were a particular problem with the overland spreaders. Growth of rhizomes was slow on poorer soil sites, and on these a quicker cover was obtained from those plants which spread out above the surface. (3) Low shrubs, massed, were just as effective as prostrate material in providing cover. They were superior in competition with weeds and in erosion control and now, some years after the project was abandoned, they appear as solid blocks, while much of the lower material has been lost. (4) Satisfactory shrubby material included *Cotoneaster* 'Lofast', evergreen *Berberis, Salix purpurea* and *Mahonia aquifolium.* Satisfactory low material included *Cotoneaster dammeri, Arctostaphylos uva-ursi, Hedera helix* (vigorous forms) and *Vinca minor* (if not too exposed), all of which form a cover by spreading above the ground, and *Hypericum calycinum, Sasa pygmea* and *Pachysandra terminalis* (if not too exposed), which fill in by underground spread.

On the University campus, as in the home garden, many more plants have proven to be successful ground covers, especially where they are not expected to "fend for themselves", as is necessary for the highway situation.

Hypericum calycinum and the hybrid *H.* X *moserianum* have long been West Coast favorites, with a full flush of bright yellow flowers in early July, followed by intermittent bloom through October. *Hypericum* is invasive and needs containment, but is not likely to invade lawns. It is good in sun or shade, responding to a bit of nitrogen fertilizer if its foliage colour is not holding up well in full sun. This cover is most often used on banks or large open areas, but we have used it successfully as a base planting for *Spiraea arguta* and *S. prunifolia. Hypericum* should be sheared back once in a while almost to ground level, especially after foliage damage in a severe winter. Since it blooms on the end of the current season's growth, no flowering is sacrificed and the carpet will be neater.



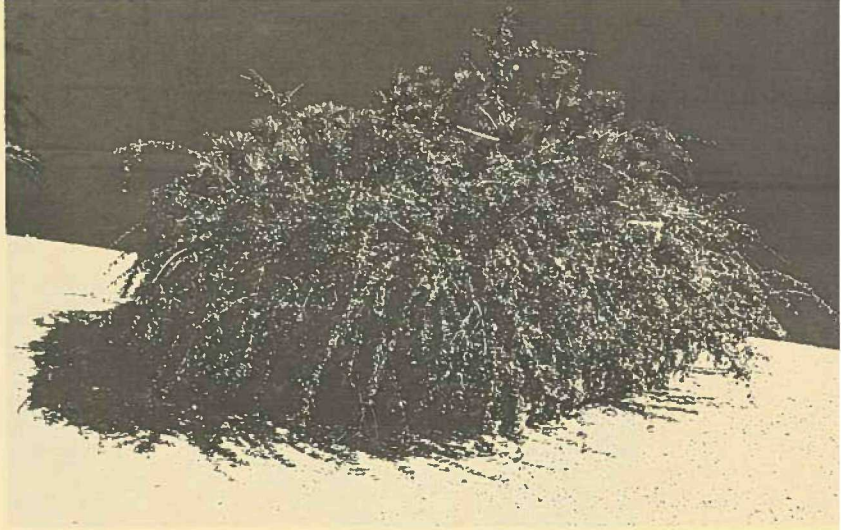


FIGURE 3. This planter, one of several near the Buchanan Tower, contains the medium-sized *Cotoneaster* 'Lofast'.

FIGURE 2. *Mahonia nervosa*, a native species of Oregon-grape, makes an attractive tall ground cover on the plaza south of the Music Building.

Cotoneasters are equally popular and equally adaptable to a wide range of situations. While they fruit better in full sun, they make a good cover in shade, even providing a complete cover under *Weigela,* as for example along the north wall of the University library. *Cotoneaster dammeri* is most useful as a prostrate form. A local selection, *C. dammeri* 'Mantenensis', smaller-leaved and forming a much tighter mass, has been featured on this campus.

Next in popularity and too often misused is *Hedera helix.* This plant is happiest when given a climbing task, for which the natural juvenile form is well suited. In ground cover situations it is fine for banks and open areas, but in time will tend to grow up trees and smother shrubs, if planted underneath. When confined, with no further room to spread or climb, it changes to the mature arborescent form. This is often undesirable and may create a maintenance problem in subsequent years, since the adult portion will need to be pruned out. Some of the cultivars, smaller-leaved and more compact, make excellent ground covers, particularly for smaller areas. Being less vigorous than the type, they require more care to eliminate competition from weeds. *Hedera colchica* 'Variegata', though marginally hardy, has been established on the U.B.C. campus. With its large, colorful leaves and vigorous habit of growth, it quickly makes an attractive cover for extensive, partially protected areas.

Two plants which require shade and offer contrasts in texture and growth habit are *Vinca minor* and *Pachysandra terminalis.* In the open, both of these will turn yellow and look sickly. In partial to deep shade they do well, often as a floor planting under trees, or with shrubs. Newer *Vinca* cultivars offer a change from the common blue periwinkle, with flowers from white to purple, but are not really more attractive. *Pachysandra* blooms in late winter here, with insignificant white flowers. It may be slow to establish, but once it fills in it forms a solid mass, seemingly indifferent to problems of drainage or soil type. Both of these ground covers respond to a dusting of high nitrogen fertilizer in the spring, following the leaching rains of the West Coast winter.

Kinnickinnick, *Arctostaphylos uva-ursi,* perhaps the hardiest of all ericaceous plants, is seldom 'happy' in shade. It needs full exposure and it is a mistake to expect it to do well as underplanting. Its

FIGURE 4. *Hedera helix*, the English Ivy, forms a dense and durable ground cover over large areas.

best use is on a sunny bank or trailing over a wall, where its growth will be dense and where it will display the large, red "bear-berries" which follow the pink bell flowers of spring. On campus it is outstanding, trailing down from the high planters at the Faculty Club.

In keeping with the increased interest in native plants, Salal (*Gaultheria shallon*) is proving to be a useful ground cover. Since its natural habitat is forest floor, it does well in shade and might be used more than it has been in combination with taller shrubs. It does not establish quickly, but container grown plants, grown from cuttings, are best for stooling out and filling in quickly. This is a satisfactory bank plant and, if grown on a sunny slope that has adequate moisture, it stays low. It can be most attractive in the spring with its typical ericaceous pink bells, followed by edible, blue-black fruits.

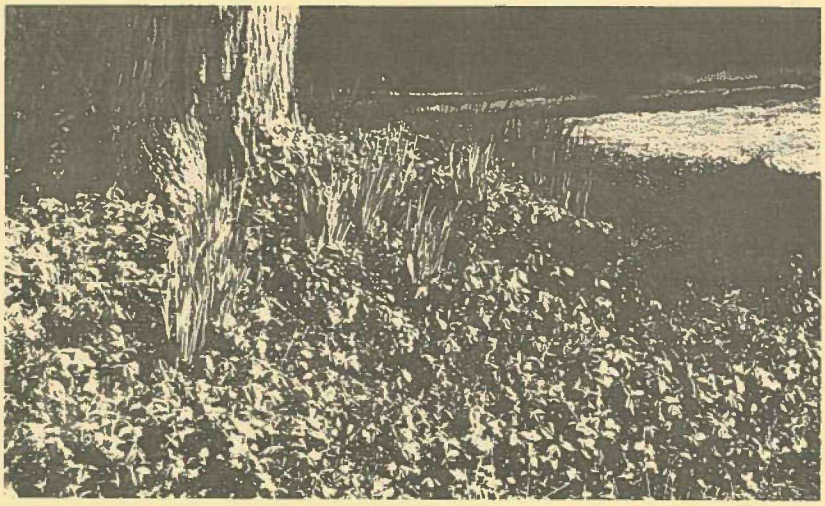
Mountain Cranberry (*Vaccinium vitis-idaea*), another ericaceous ground cover, is extremely hardy but may not be so generally useful. It has a shallow rooting habit and, while it will form a tight mat, it tends to dry out during periods of inadequate rainfall or to suffer from exposed roots following periods of excessive rainfall. It has not proven to be a good bank plant for these reasons, but it has provided a fine floor carpet effect under the pines and firs in the Nitobe Memorial Garden.

Heathers and heaths are not all equally suited to mass planting situations. Some form such neat mounds as individual plants that they are best used singly, or in small, widely spaced groups. Those which have a more straggly habit look attractive when massed for complete ground cover effect in many fully exposed situations. They have not proven to be good combination plants but are best on their own, many providing an extremely long season of bloom. All vigorous cultivars of *Calluna* and any of the Ericas which are taller than six inches respond to periodic shearing, or at least some pruning. This is necessary to assure long usefulness as a ground cover. An interesting example of "survival of the fittest" on campus has been the combination of Mollis Azaleas, underplanted some years ago with *Erica carnea*. The azaleas have steadily declined and are now almost completely overgrown with *Erica*.

West-Coast acid soils do not provide the best environment for *Daphne cneorum* and *Helianthemum nummularium,* although both are good covers for a sunny, well-drained location. Alternating annual treatments of lime and non-acid complete fertilizers will help. These plants are particularly attactive in bloom and are best when used in clumps or drifts on their own.

FIGURES 5 & 6 (above). Close-up views of *Hedera helix*, English Ivy (left), and *Vinca minor*, Blue Periwinkle (right).

FIGURE 7 (right). *Vinca minor* surrounds the base of this large maple at Cecil Green Park, and serves as an attractive background for spring daffodils.



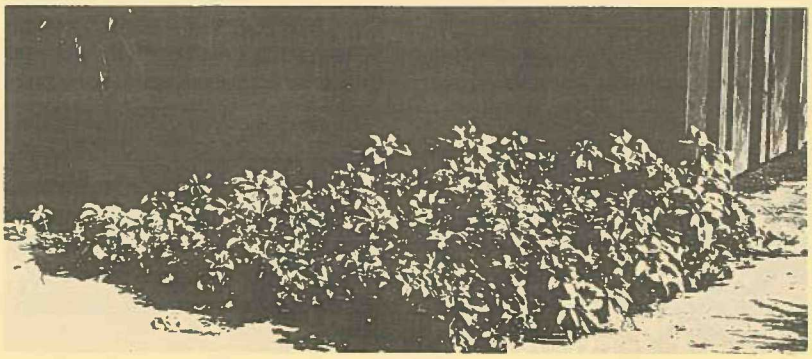
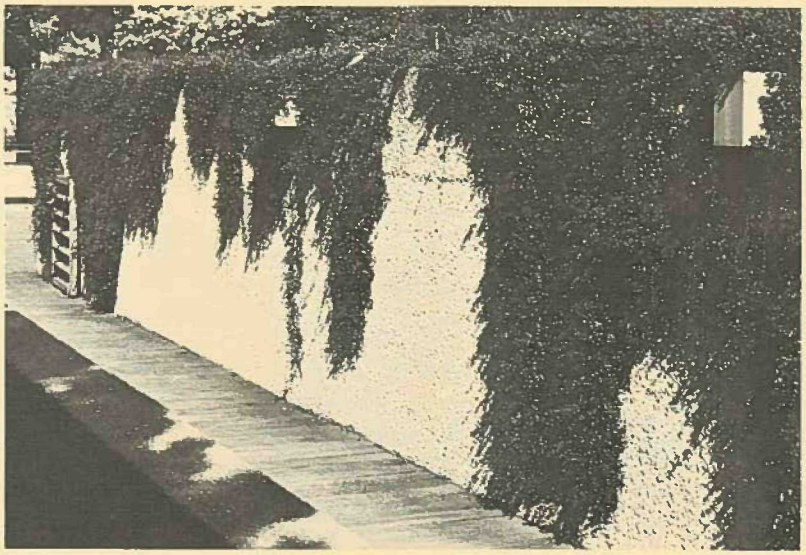


FIGURE 8 (left). *Pachysandra terminalis* is an excellent ground cover for shady situations. This photograph was taken at the west corner of International House.

FIGURE 9. An outstanding display of Kinnickinnick, *Arctostaphylos uva-ursi*, may be seen in the planters near the Faculty Club.



Several low forms of *Cistus* have been used on sunny banks, providing continuous colour through the summer months. Winters, however, have taken their toll and none remain on campus now.

Paxistima canbyi, from eastern North America, spreads into a tight mat, but is not attractive enough to be very popular on the West Coast. Our native *Paxistima myrsinites* is becoming more generally known. It has larger, box-like leaves and suckers out to form a solid mass up to 18 inches high.

Many herbaceous plants are most useful for permanent ground cover situations. *Ajuga reptans* has provided a carpet for many rhododendron beds. Its blue spikes in spring and copper foliage in winter add colour interest. This plant will stand full exposure if there is plenty of moisture. The roots are very shallow from strawberry-like runners. *Ajuga* tolerates partial shade, but flowers best when fully exposed. Some of the cultivars offer variety in foliage colour.

Waldsteinia fragarioides is another perennial which not only spreads like *Fragaria,* but resembles it. It is increasing in popularity and is locally available. *Fragaria vesca* and other species of the wild strawberry have made good semipermanent bank covers, especially suited to the scale of the home garden.

Too often relegated to isolated clumps in the garden, *Epimedium* species should receive more attention as ground covers. Their neat, pale green foliage which turns bronze in the autumn, their attractive yellow or red flowers and their rhizomatous habit could scarcely be improved upon. Selected varieties of *E. grandiflorum* provide a good colour range. Other species and hybrids add to the variety. The West Coast native *Vancouveria hexandra* is quite similar but has a more distinctive leaf, and should be used for carpet effect, especially in partial shade.

No list of low native plants would be complete without *Cornus canadensis* and *Cornus unalaschkensis.* These plants like to fend for themselves, so are best used in out-of-the-way places, where they spread into a solid mass. Their bright white bracts are followed by red fruit in the autumn. They have shallow spreading root systems and might be considered for any situation suggested for *Vaccinium vitis-idaea.* Our native wild ginger, *Asarum caudatum,* might also receive more consideration for similar situations. Many other native plants are presently under observation for potential ground cover use.

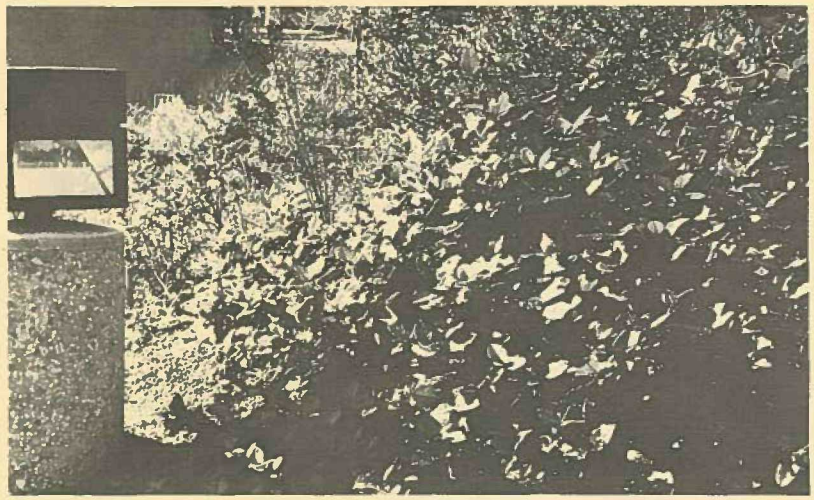


FIGURE 10. *Gaultheria shallon* or Salal, one of our native evergreen shrubs, makes an excellent (though tall) ground cover, and produces edible fruits in late summer.

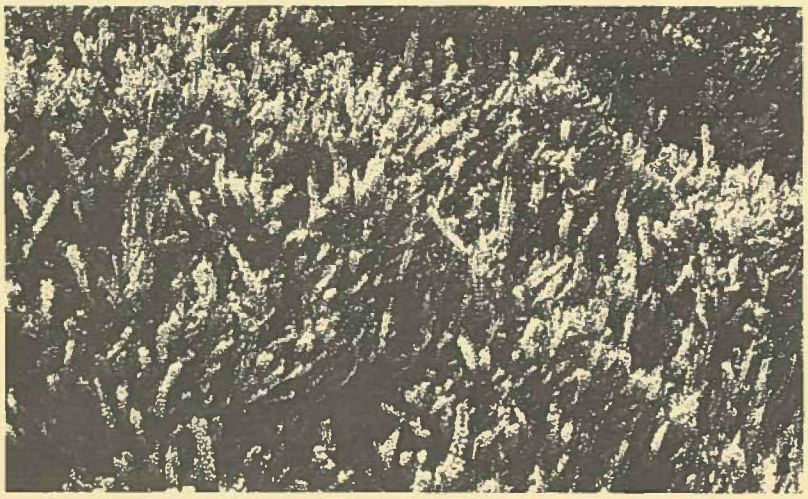


FIGURE 11. The pink-flowered *Erica* X *darleyensis* 'George Rendall' has been widely planted on the U.B.C. campus. The heathers are hardy and attractive plants with long-lasting flowers.

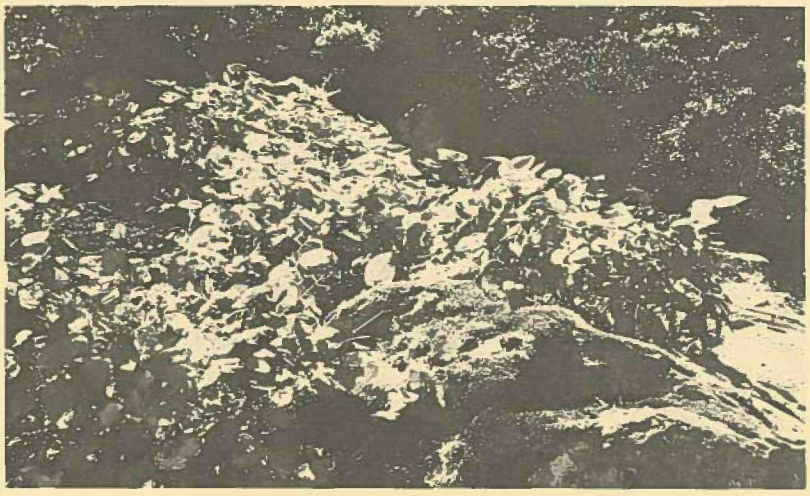


FIGURE 12. *Epimedium grandiflorum*, the Bishop's Hat, has large graceful heart-shaped leaves which turn a bronze color in the fall.

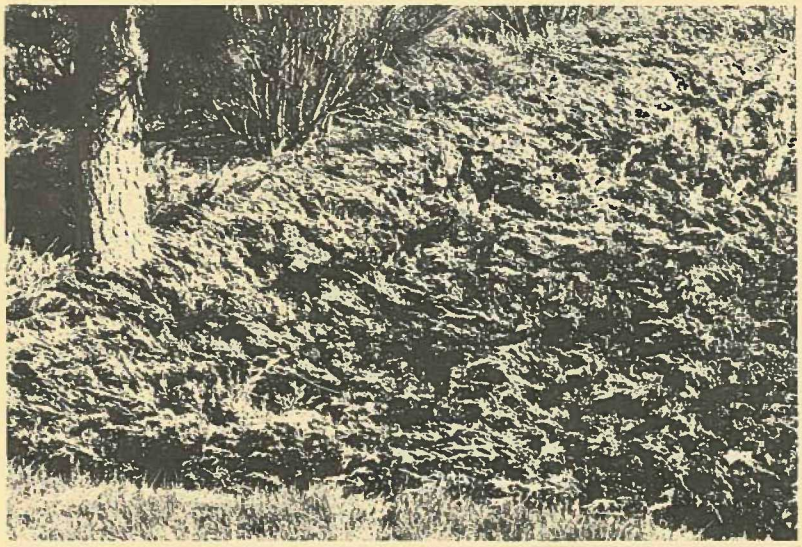


FIGURE 13. Junipers are adaptable to a wide range of ground cover requirements, and many different cultivars are available. *Juniperus horizontalis* 'Glauca' is a low-growing plant with compact blue-green foliage.

Cytisus kewensis is the best of the prostrate brooms for a dry, sunny bank. All brooms do well in this area, and ground cover lists should include *C. procumbens* and *Genista lydia* as well as some of the taller good massing forms.

All needle-leaved evergreens are at home in southwestern British Columbia. This is coastal rainforest country, where exotics vie with native conifers in our landscape. Junipers provide the best examples of ground covers and low massing plants. There are many from which to choose, but two which might be more frequently used are represented on campus and in the Botanical Garden. These are *Juniperus horizontalis* 'Procumbens' and *Juniperus communis* 'Honibrookii'. The former is prostrate, with soft, juvenile, blue-green foliage. It is perhaps too slow-growing for widespread use, but its colour and texture are attractions and it makes a solid mat. The latter is somewhat taller and looser, also with juvenile foliage, though much darker grey-green in colour than 'Procumbens'. Its use would provide some relief from the all-too-popular *J. chinensis* 'Pfitzeriana Aurea' and *J. sabina* 'Tamaricifolia'.

Juniperus conferta, a long-needled, beautiful ground cover, used to be represented on campus as a bank plant. It has not been replanted since being killed out in the severe winters of the fifties.

Taxus baccata 'Repandens', a needle-leaved evergreen with good spreading form, masses well and has the distinct advantage of shade tolerance. It is useful under trees and large shrubs. It has been put to good use on campus as a floor mass in raised planters.

Many other plants make suitable ground covers. Whether one chooses the familiar types or those lesser known, selection should be based on the following criteria: (1) Growth characteristics of the plants — are they good massers? (2) Possible associations — will they combine well with other forms, or will they be able to hold their own over the years in competition with others? (3) Horticultural adaptations — will they suit the environmental restraints of a given situation? (4) Economics — will they save time and money in the long run?

The list of ground covers in the Botanical Garden and on the University campus will be ever expanding in the search for answers to these questions.

Trillium ovatum Pursh

Western White Trillium

Member of the Family Liliaceae

Natural Distribution

Trillium ovatum occurs from southern British Columbia and southwestern Alberta southwards through Washington, Montana and Oregon to central California, Utah and Colorado. In British Columbia it is present south of latitude 50°N in suitable habitats on Vancouver Island, on the Gulf Islands and in the coastal forest zone on the adjacent mainland. It is also found in the wetter parts of the Interior, from McCulloch (east of Kelowna) and the southern Monashee Mountains eastward to the Alberta border.

Habitat

Trillium ovatum is found from sea level to elevations of several hundred metres, in moist acid soil along streambanks or in open or dense woods. It often grows where the ground is boggy in the spring. The plants prefer shade, but have been found growing in open meadows at 1067 m in the upper valley of the Hood River, Oregon, an area with mild daytime temperatures and cold nights (Wiley, 1968). In British Columbia the plant is found in the Douglas Fir and Western Hemlock Zones of both the Coast and the Interior. In the coastal zones the average annual precipitation is 66 to 665 cm, with absolute minimum temperatures of -30 to -7°C and absolute maximum temperatures of 26 to 41°C. In the interior zones, the precipitation is 36 to 170 cm annually, with absolute minimum temperatures of -47 to -14°C and absolute maximum temperatures of 35 to 43°C (Krajina, 1969).

Description

Trillium ovatum is a herbaceous perennial with glabrous aerial parts. The stem is simple, erect, unbranched, fleshy, stout and 20-46(-51) cm tall (1-10 cm in *T. ovatum* forma *hibbersonii*). It is bare apart from a few short scale-like leaves sheathing the base and a whorl of 3 leaves just below the terminal flower. The stems are usually solitary, although sometimes more than one may be produced.

The root system is a deep-seated, horizontal to somewhat erect rhizome from which fleshy white roots develop in spring. The rhizome is short, thick and fleshy, and bears obvious scars left by the fracture of stem sheaths from previous years.

The leaves are in a horizontal whorl of 3 (occasionally 4 or even 5) on the stem below the flower. They are clear green, entire, 5-15(-20) cm long and 5-15(-20) cm broad (about 2.5 cm long and 1-3 cm wide in forma *hibbersonii*), and sessile or nearly so. They are ovate to broadly-obovate or nearly circular, with an acute to rather abruptly acuminate apex and an abruptly narrowed to somewhat rounded base. There are 3-5 main parallel veins connected by rather conspicuous net-veins.

Flowers are produced from April to May in British Columbia, and as early as (February) March or as late as July in other parts of the range (depending on latitude, climate and elevation). The flowers are perfect, regular, erect to slightly nodding, bractless, solitary and terminal on pedicels arising from the centre of the leaves. They develop from buds formed during the previous growing season. The perianth segments are distinct and spreading from the base, and are in alternate sets of 3 (sometimes 4). There is considerable variability in the length and breadth of the segments in nature, particularly in the petals. The sepals are 3(4), green, lanceolate to oblong-elliptic, (1.5-)2.5-6 cm long and 0.2-1.5 cm broad, and are persistent. The petals are 3 (rarely 4, 5 or even 6), lanceolate, ascending, (1.9-)2.5-5.5 cm long and (0.9-)2-3(-5) cm broad, and deciduous. They are white or sometimes pinkish, becoming deep rose to purple with age. (*Trillium ovatum* f. *hibbersonii* is pale pink when it first opens, and does not usually become darker with age.) There are 6 stamens; the filaments are 0.3-0.6 cm long, and the anthers are cream to yellow, linear, erect, 2-celled and 0.6-1.5

cm long. The style is single but is deeply trifid to three-parted from the base and has 3 spreading, elongate stigmas. The ovary is superior, sessile, ovoid to subglobose, 3- to 6-angled or -lobed, and 3-celled with several to many ovules in each cell. The pedicel is erect and (1-)2-7(-8) cm long.

The fruit is a fleshy, globose to ovoid, 3-celled berry-like capsule. It is slightly winged or 3-ribbed and is greenish-brown and 1.2-2.5 cm in diameter at maturity. The seeds are many, ovoid, and 0.3-0.4 cm long, and are in a glutinous mass when the capsule first opens.

Propagation

Trilliums are considered difficult plants to propagate, and great care is needed throughout the germination period. Seed should be planted as soon as ripe (preferably straight from the capsule) without drying out, about 0.5 cm deep in a rich, well-drained, moisture-retaining soil or sandy leaf mold. The seeds must be kept moist during the whole of the germination period. Therefore the seed flats should be covered and kept damp as well as shaded from direct light and heat. Germination is not entirely reliable and older seed may not germinate for 2-3 years. It is known that the genus shows double dormancy in nature (two periods of cold separated by one warm period being required for germination), but planting the seeds immediately seems to remove the need for one of the cold periods. If necessary, seed may be stored for up to one year in cool storage, with a relatively moist atmosphere to prevent drying out. When first released, the seeds are in a glutinous mucilaginous mass; for easy sowing the opened capsules should be spread on papers in a warm dry room until the mucilage has dried but the seeds are still moist. At this point the seeds can be crumbled apart very easily and sown.

The seedlings undergo at least 3 to 5 years of vegetative growth before the first flowers are produced.

The forma *hibbersonii* seems to be more difficult to propagate than the species. The seeds of the form should be handled in the same manner as the species.

The rhizome produces offshoots, which may be divided from the parent in August at about 3 or 4 year intervals. It is important to ensure that the rhizome and the offshoots do not dry out during division. Reproduction in this manner is rather slow, and it is probable that no flowers will be produced by the offshoots for at least a couple of years.

In some species of *Trillium* it has been possible to increase the development of new rhizomes and buds by notching or nicking the parent rhizome. The soil is carefully removed from around the top of the rhizome and it is notched two-thirds of the way round just below the growing point. The soil is then replaced and the plant left undisturbed until at least the following year. The advantage of this method is that the rhizome is not disturbed and therefore flowering is not interrupted. However, there are conflicting reports as to its success in *Trillium ovatum.*

Transplantation

Trilliums do not like to be disturbed once they have become established and will take several years to recover and flower again. If a plant must be transplanted it should be moved in the late summer or fall when it is dormant. The roots should be disturbed as little as possible. When a plant is to be transplanted, it is a good idea to mark its position before all the aerial parts die down, otherwise it may be difficult to find the rhizome.

Conditions for Cultivation

Trillium ovatum is a slow-growing plant, but it is hardy and long-lived, and is considered to be one of the easiest members of the genus to grow. All trilliums (except *T. undulatum*) grow well in any deep moist well-drained rich acid soil, especially where there is a high content of organic matter in the form of leaf mold. A mulch of peat or leaves is desirable since this helps to increase the humus content. Trilliums require at least partial shade to provide protection from the afternoon sun, and prefer areas which are moist in summer. The rhizome should be planted in a horizontal position with the roots spread out, and covered with 10 to 15 cm of soil.

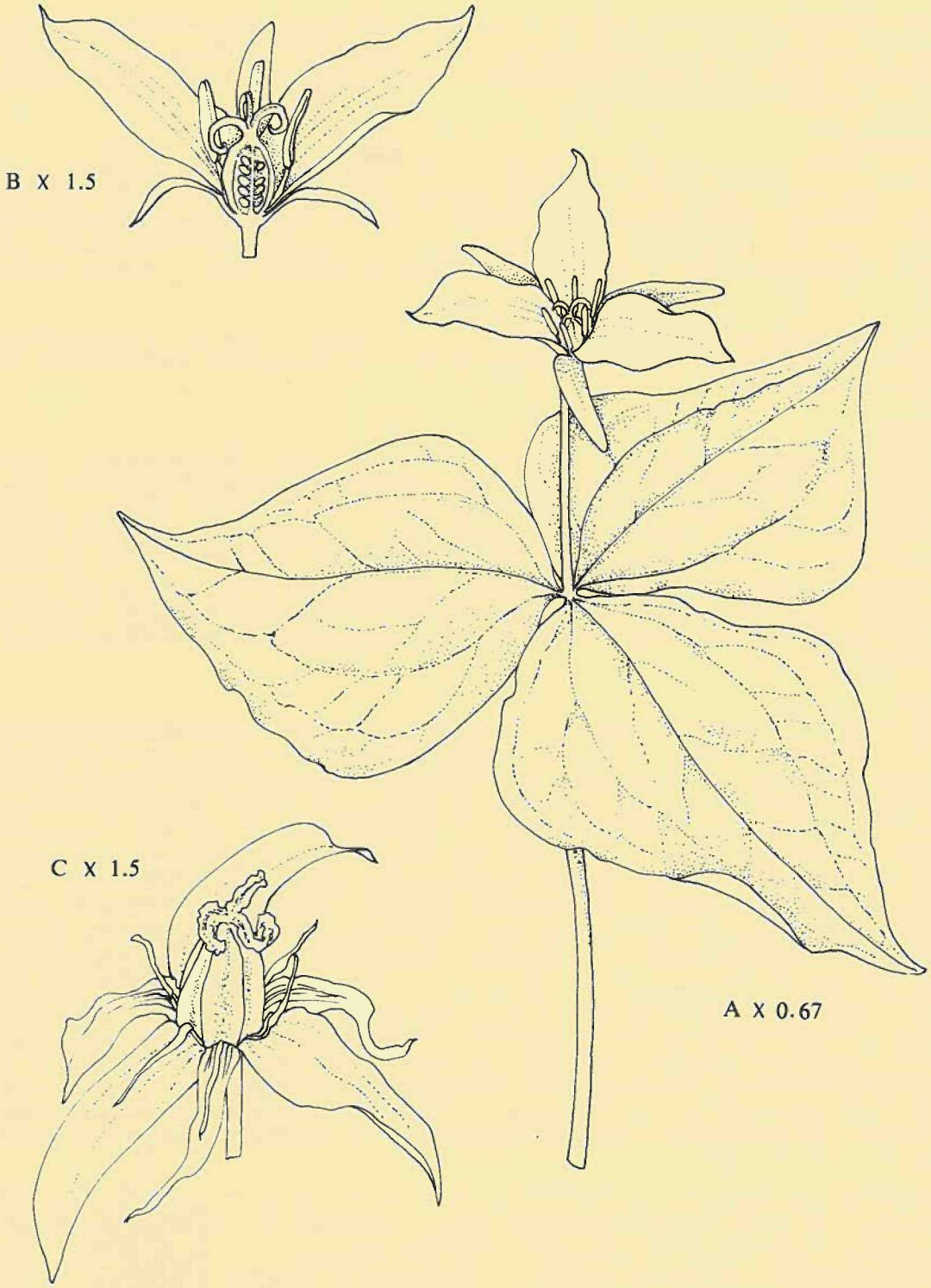


FIGURE 14. *Trillium ovatum*. A. habit, B. cross-section through the flower at anthesis, C. the maturing capsule.

The forma *hibbersonii* prefers well-drained conditions and success has been achieved by using a mixture of one-quarter tufa rock to three-quarters leaf mold. At UBC we use a mixture consisting of one-third soil, one-third very coarse sand and one-third coarse peat. The rhizome should be planted about 2.5 cm below the surface of the soil.

Landscape Value

Because *Trillium ovatum* will flower in deep shade, it is an excellent plant for shady wooded locations in a native garden. It is particularly attractive when planted in masses among ground-covering plants, native ferns, polyantha primroses or azaleas and rhododendrons. The species is also suited for growing in pockets in a rock or peat garden. Once planted the specimens should be left alone to grow naturally. Trilliums will also grow in full sun provided the days are cool and the nights cold.

The forma *hibbersonii* is a delightful small plant for tiny nooks and crannies in a rock garden or peat bed, with a background of some of the dwarf ferns. It will also grow in full sun under the same conditions as the species.

Availability

Plants and seeds of *Trillium ovatum* are available from specialist nurseries, both in British Columbia and in the United States. The forma *hibbersonii* is difficult to obtain because it is still rare in cultivation and large stocks of it have not yet been built up. Both this and the typical form are often obtainable from alpine garden clubs in various areas, but only members are eligible for their seed and plant exchanges. *Trillium ovatum* in British Columbia is protected by the Dogwood, Rhododendron and Trillium Protection Act (1960), and no wild plants or parts thereof may be collected. However, the law does not prevent disturbances of the natural habitats for construction and development. The typical form of the species is not endangered, but the forma *hibbersonii* is considered a rare plant.

Varieties

Like many other members of the genus, *Trillium ovatum* is a variable species and shows a number of unusual forms, with variation in the size and number of the petals. However, these variations are not usually of sufficient significance to warrant varietal status, and sometimes they will revert to type in subsequent seasons. Only one of the variants has been named: *Trillium ovatum* f. *hibbersonii* Taylor & Szczawinski (*T. 'hibbersonii'* Wiley; *T.* x *hibbersonii*), Hibberson's Western White Trillium. A dwarf form, 1-10 cm tall with rhizomes about 0.9 cm long. The leaves are 2.5-6.3 cm long, 1.2-3.2 cm wide and occasionally short-petioled, though usually sessile. The pedicels are short, stout and abruptly turned just below the flower. The petals are 1.9 cm long and 0.9 cm wide, and are clear pink slowly fading with age to almost white (Wiley, 1968). The capsules are almost perfectly spherical. Flowering occurs about two weeks before the typical form. It is best known from three sites on the west coast of Vancouver Island, from Kyuquot Sound to Hesquiat Harbour (49°55′N 127°25′W to 49°28′N 126°25′W) at about 122-610 m. According to Taylor and Szczawinski (1974), however, it is also found throughout the range of the species and intergrades with it. Mitchell (1969) speculated that this form may be a natural hybrid between *T. ovatum* and *T. rivale*; however, the northern limit of the range of the latter species is in Oregon. Though *Trillium ovatum* f. *hibbersonii* is becoming increasingly popular as a rock garden plant, and has now been given formal botanical status, there is still much to be discovered about this little trillium and about its relationships to other species.

The number of petals in *T. ovatum* is not always 3. The Botanical Garden at UBC has a tetramerous form of forma *hibbersonii* which reverted to normal in 1976. One or two double forms of the typical *T. ovatum* have been collected, in which the stamens have become petaloid. These can be propagated vegetatively, but may revert to type as do many of the other variants. Some cultivars from these double forms have been named. The Botanical Garden presently has a double flowered form, *T. ovatum* 'Kenmore', from the Royal Botanical Garden at Edinburgh. Our specimen has not yet bloomed, but this cultivar has flowered successfully in Scotland.

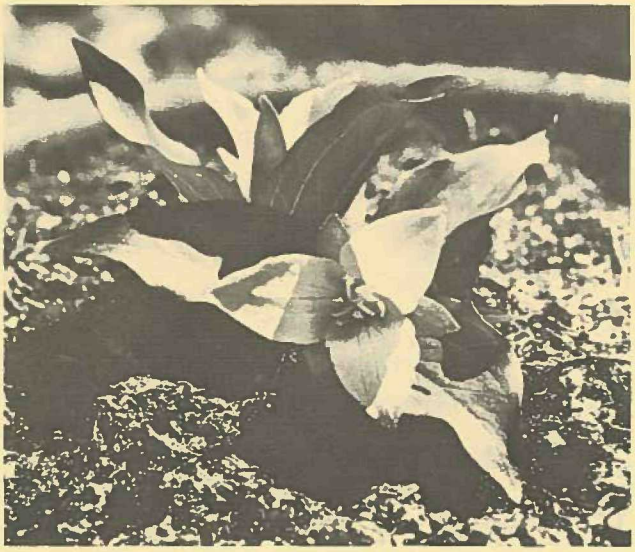


FIGURE 15. The tiny Hibberson's Trillium, *Trillium ovatum* f. *hibbersonii*. The plants shown here are scarcely 8 cm tall.

Other Uses

Trillium ovatum is poisonous to livestock, but various Indian tribes have used the rhizomes for medicinal purposes and for charms. The Thompson Indians of British Columbia dug the roots in the fall, cleaned and dried them; the dry root was then scraped and the fine powder dropped or blown off a piece of bark or finger into a sore eye. The Lummi and Skagit Indians of western Washington also used the rhizome to treat sore eyes. They used either the juice or the water in which it had soaked as an eyewash. The Quileute tribe smeared rhizome scrapings on to a boil to bring it to a head. People of the Makah tribe rubbed the pounded rhizome on to the body as a love medicine, while a Quinalt woman would drop a cooked root into the food of a man whom she desired.

Despite the Indian belief that picking the flowers would cause rain, white people for many years have collected them for indoor decoration. However, this injures the plant (and also is illegal in British Columbia), as the leaves are also removed and the plant is therefore unable to make food to be stored in the rhizome for future use. As a result, flowering may not occur for at least two years afterwards and often not for 4 or 5 years.

Diseases and Problems of Cultivation

The seeds are difficult to germinate, and may not come true in double forms. Great care is needed throughout the whole germination and seedling stages. Once the plant has become established it resents disturbance, but is otherwise easy to grow.

The genus is occasionally subject to leaf and stem rots, which may be caused by several different fungi. *Urocystis trillii* Jacks. has been found to cause smut on *Trillium ovatum* in the Vancouver area (Toms, 1964).

Origin of the Name

The generic name *Trillium* is derived from *tri* (Smith, 1971) or possibly from *trilix, tres* or *triplum*, all Latin words meaning 'three' or 'triple'. These refer to the fact that the leaves and flowering parts are in threes. The specific epithet *ovatum* means 'ovate; egg-shaped, with the broad end at the base', referring to the shape of the leaves. The form name *hibbersonii* commemorates the first collector of this variant, John Arthur Hibberson (1881-1955) of Victoria, B.C., a surveyor and timber cruiser with an interest in plants.

The type locality for the species is "on the rapids of the Columbia River" [at the foot of the Cascades] where it was collected on April 10, 1806 by Meriwether Lewis of the Lewis and Clark expedition. The type locality of the forma *hibbersonii* is "near Boat Basin, Hesquiat Harbour, west coast of Vancouver Island, British Columbia (lat. 49°20'N, long. 136°30'W [49°28'N 126°25'W]), alt. 2,000 feet." It was first collected there by John (Jack) Hibberson on April 25, 1938.

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Climatological Summary*

Data 1977	JANUARY	FEBRUARY	MARCH
Average maximum temperature	5.6°C	9.9°C	8.2°C
Average minimum temperature	0.3°C	4.4°C	2.9°C
Highest maximum temperature	11.1°C	13.9°C	11.1°C
Lowest minimum temperature	-4.4°C	0.0°C	0.0°C
Lowest grass minimum temperature	-11.7°C	-5.0°C	-5.6°C
Rainfall/no. days with rain	88.9 mm/13	88.9 mm/17	80.8 mm/18
Total rainfall since January 1, 1977	88.9 mm	177.8 mm	258.6 mm
Snowfall/no. days with snowfall	10.2 cm/2	0/0	0.8 cm/1
Total snowfall since October 1, 1976	10.2 cm	10.2 cm	11.0 cm
Hours bright sunshine/possible	74.6/265.3	70.6/278.2	124.1/361.1
Ave. daily sunshine/no. days total overcast	2.4 hr/10	2.2 hr/5	4.0 hr/9

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

Botanical Garden News and Notes

The American Association of Botanical Gardens and Arboreta (AABGA) held its first examination for the North American Diploma in Horticulture (NADH) on March 8-10 at the National Arboretum in Washington, D.C. Mr. Ken Wilson, our Supervisor of Operations, served as a member of the Certification Committee. This new program will provide a standardized guide to basic training and instruction for career-oriented professional gardeners. Four levels of achievement, tested by both written and practical examinations, have been established by the AABGA. Further details of the program can be obtained from Dr. Fred B. Widmoyer, Secretary-Treasurer of AABGA, at the Department of Horticulture, New Mexico State University, Las Cruces, New Mexico.

The Friends of the Garden have initiated a project on botanical illustrators of British Columbia plants. It is hoped that a major art exhibition, representing a wide selection of botanical artists, will be held in 1979. The show will feature botanical illustration since 1871, and information on early botanical illustrators in B.C. is now being gathered. Contributions to this project (either information or illustrations) are welcomed, and may be sent to Mrs. Marjorie Johnson, c/o The Botanical Garden at UBC.

Technical Bulletin No. 4, a book entitled *Vascular Plants of British Columbia: A Descriptive Resource Inventory*, is now available. This 778-page inventory is published by The University of British Columbia Press, and enquiries may be directed either to the Press or to the Office of the Botanical Garden.

Tours of the Nitobe Memorial Garden and of the British Columbia Native Garden for educational groups are now available through the Friends of the Garden. Arrangements may be made by contacting the Office of the Botanical Garden (228-3928) at least 2 weeks in advance of the tour.

Mrs. Frances Perry, outstanding horticulturist from England, will visit Vancouver in May. A special evening lecture on "Perennials in the Garden", sponsored by the UBC Botanical Garden, VanDusen Botanical Display Garden, and Park and Tilford Garden will be held at the VanDusen Botanical Display Garden on May 5 at 7:30 p.m.

A special field day for commercial nurseries and landscape architects will be held at the UBC Botanical Garden in June. Special emphasis will be given to the display and discussion of new woody plant introductions for British Columbia. In July the Vancouver Rose Society will hold their monthly meeting at UBC, in order to view the Rose Garden and see new and recent cultivars in the collection.

Forthcoming educational activities at the Botanical Garden include: (1) A four-week program for Senior Citizens from July 11 to August 5, 1977. The course will include general topics of horticultural interest, plus a special program on B.C. native plants held in the B.C. Native Garden component. (2) A three-week tour to Holland, England, and Scotland, which leaves Vancouver on May 1, 1977. The tour will be led by Mr. David Tarrant, Educational Co-ordinator for the Garden.

Mrs. Bodil Leamy, member of the Garden staff, recently became the president of the Alpine Garden Club of British Columbia for the year 1977.

The Botanical Garden Office and Educational Centre

The present Office and Educational Centre of the Botanical Garden was formerly the President's Residence. It was built in 1950, and was first occupied by Dr. N.A.M. MacKenzie and his family. The building was designed by Mr. R.A.D. Berwick of the Vancouver architectural firm of Sharp, Thompson, Berwick & Pratt and was constructed by University staff under the direction of Mr. Jack McGlashan. Consultants to the architect and builder were Mrs. Margaret MacKenzie and Dr. Bert Binning. The house is unique in that all the rooms look out over the ocean. The view is one of the finest on Point Grey, and includes the Strait of Georgia, the North Shore mountains and Howe Sound.

The original site contained radio towers belonging to the Northwest Telephone Company, and Old Marine Drive (a paved roadway) ran along the brow of the cliff and gave access to these towers. Plans for a President's Residence on this site were contemplated by former U.B.C. President Dr. Wesbrook and his wife, but were not initiated until Dr. MacKenzie became President. Nearly four acres of forest land were cleared for the development, together with a corridor through the forest to bring in services from the University.

The landscape development was coordinated by Dr. John W. Neill in consultation with Mrs. MacKenzie. Boulders from the excavation were piled to one side and left at the request of the President for the development by Mrs. MacKenzie of a "wild" rock garden (now largely overgrown). Old Marine Drive was taken out and seeded to lawn. The unobstructed view was broken up into vistas by allowing seedling Western Red Cedars and Douglas Fir from the escarpment to grow up in selected areas. The radio towers (which have since been removed) were screened by a planting of *Chamaecyparis lawsoniania*, which still remains.

Lawn specimen trees (moved from the University nurseries) included *Paulownia tomentosa*, two oaks, a walnut, a sugar maple, *Ginkgo biloba*, many *Malus, Picea pungens*, and several *Prunus serrulata* 'Kwanzan' along the entrance drive. *Larix occidentalis* was introduced in the service clearing. Two crabapple trees (cultivars of Russian origin, obtained from the Central Experimental Farm in Ottawa) were planted in the patios on the north side of the building. All of these trees remain. Several hedges were planted, including *Chamaecyparis pisifera* 'Plumosa' (which has now been removed), *Thuja occidentalis* 'Aurea' and *Prunus laurocerasus* 'Schipkaensis'. The vegetable garden was screened by cordoned pears and cherries, and cordoned apples were a feature of the private lawn area.

Plantings at the edge of the forest clearing included *Prunus lusitanica, Acer palmatum, Rhododendron* species and hybrids, *Pieris japonica* and *Cornus nuttallii*. The strip between the lawn and the edge of the escarpment was planted with various junipers, brooms and heathers, through which a winding path led to a flagpole.

Original plantings near the house and garage included *Magnolia soulangeana, Ilex aquifolium, Camellia japonica, Syringa vulgaris* hybrids, *Chamaecyparis lawsoniana* cultivars, *Prunus laurocerasus* 'Zabeliana', *Juniperus chinensis* 'Pfitzeriana Aurea', *Rhododendron* 'Letty Edwards' and an espaliered peach tree on the west wall. Much of this planting remains. Favourite plants of the President were roses and azaleas, and these were used extensively in the landscape.

Many aspects of the original landscaping at the President's Residence are still intact, and new components such as the extensive heather collection, the fruit and vegetable garden, and several large perennial beds have been added. The entire site is now part of the Upper Campus region of the Botanical Garden, which includes Graham House, Cecil Green Park, Mary Bollert Hall, the Department of Anthropology and the new Museum of Anthropology.

The U.B.C. Botanical Garden Office and Educational Centre, as seen from the entrance off Marine Drive.

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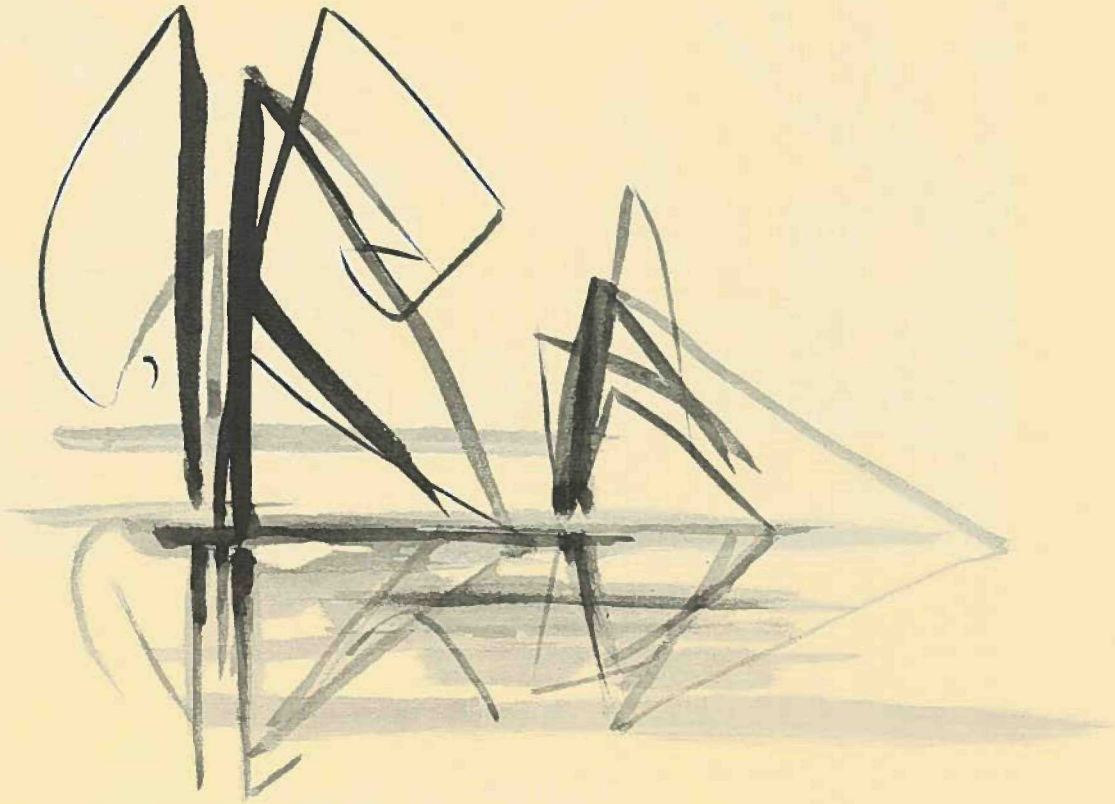

DAVIDSONIA

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