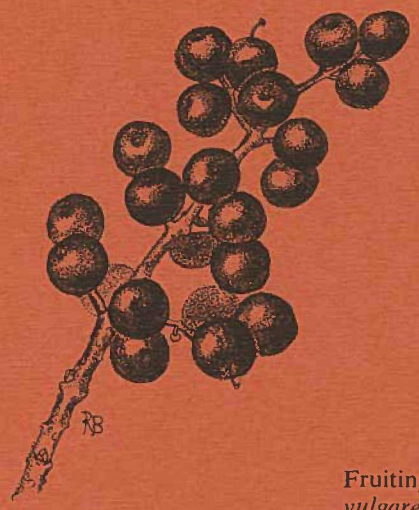
# DAVIDSONIA

*VOLUME 3* *NUMBER 4* *Winter 1972*

## *Cover*

Habit of young specimen of *Tsuga heterophylla* growing in a typical situation amongst mature forest trees. The characteristic drooping leader is clearly visible.



Fruiting inflorescence of *Ligustrum vulgare*, Common Privet.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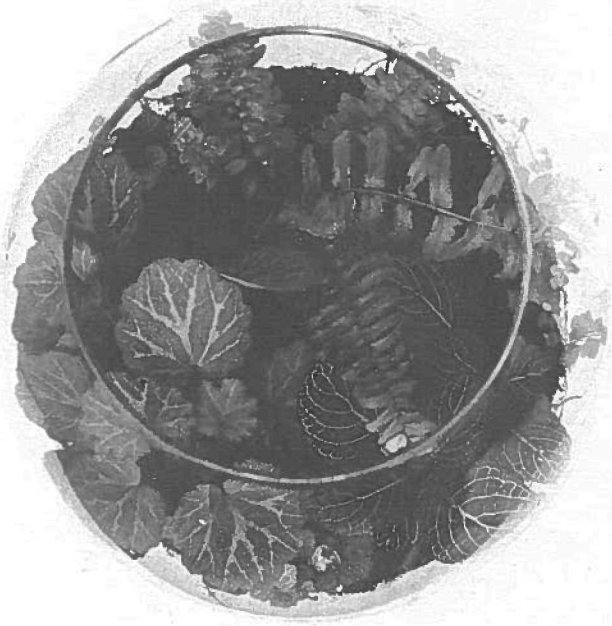
# BOTTLE GARDENING

DAVID TARRANT

The interesting hobby of terrarium and bottle gardening was probably first introduced over a century ago by a London physician, Nathaniel Ward. He found that plants could survive for many years without care or watering under certain enclosed conditions. He also believed it would be possible to grow mosses and ferns for a hundred years in tightly sealed cases! In this day and age of centrally heated buildings, sealed container gardens allow certain tropical plants to be grown in our dry apartments and homes quite successfully for one or two years without watering. This is an ideal situation for those who spend most weekdays away.

Acid carboys make excellent gardens. However, various containers may be used from fish aquariums and brandy snifters to one-gallon wine bottles and goldfish bowls.

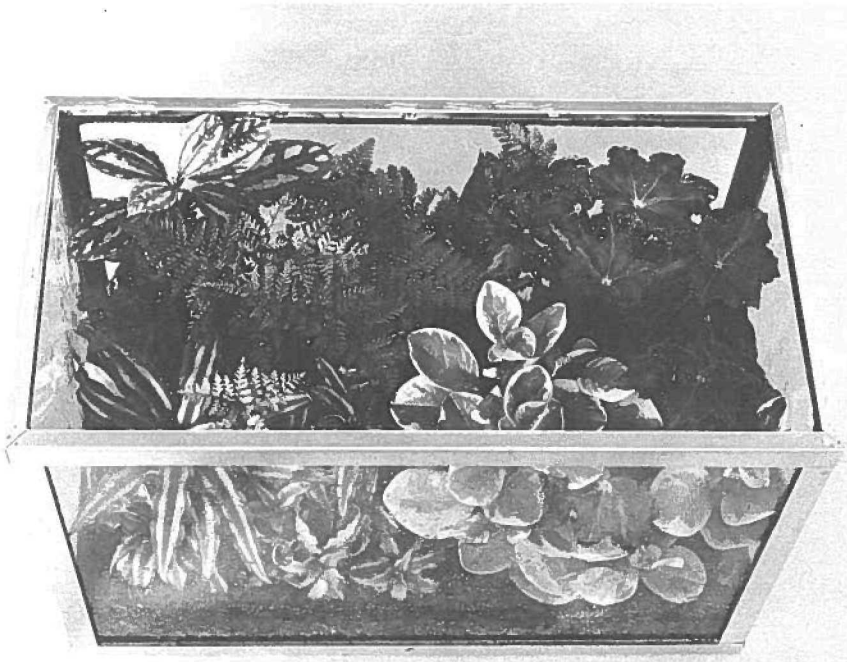
The first step in construction is to make sure the container is well washed out, especially if it has been used for acid. If the large carboys are to be used, stand them outside and let a garden hose run into them



Glass bowl containing *Saxifraga sarmentosa* (strawberry begonia), *Fittonia argyroneura* and *Polystichum munitum* (sword fern).



A fish aquarium used as a terrarium and planted with (at rear) *Davallia* sp. (Hare's-foot fern), *Cryptanthus zonatus* (Earth star), *Peperomia* sp., *Bergonia rex* and *Pilea cadieri* (Aluminum plant).



and overflow for a while. The tools for the job are made quite simply by taping or tying a teaspoon, a fork, and a cork onto single strong canes first making sure they will pass through the neck of the bottle.

Soil mixtures for bottles and terrariums should not contain fertilizer as the plants grow quickly enough in the high humidity. The mix I use consists of equal parts sterilized loam, peat and sand, which has been screened through a ¼" sieve with some crushed charcoal added (this helps to keep the mixture sweet). Mix well and moisten so that when a handful is squeezed it just sticks together.

Cover the bottom of the bottle with at least ½" of gravel to take care of any excess moisture. To introduce the soil and gravel without making too much mess, a funnel can be made by cutting the bottom out of an old bleach bottle and setting the neck of it inside the neck of the bottle which is to be planted. About 2-3 inches of soil is required which should be roughly levelled and lightly firmed with the cork. In larger bottles, it is a good idea to make a slope towards the front to add interest.

When planting one should bear in mind that the plants do grow very quickly so usually five plants are ample for a carboy, and two or three for a one-gallon wine bottle. Choose where your plants are to be situated and then plant singly by digging a hole with the teaspoon or fork, planting the ones around the edge first. Wash the soil off the roots, fold the leaves and drop through the neck tilting the bottle to make sure the plant lands in the hole. Then scrape soil around it with the fork and firm with the cork.

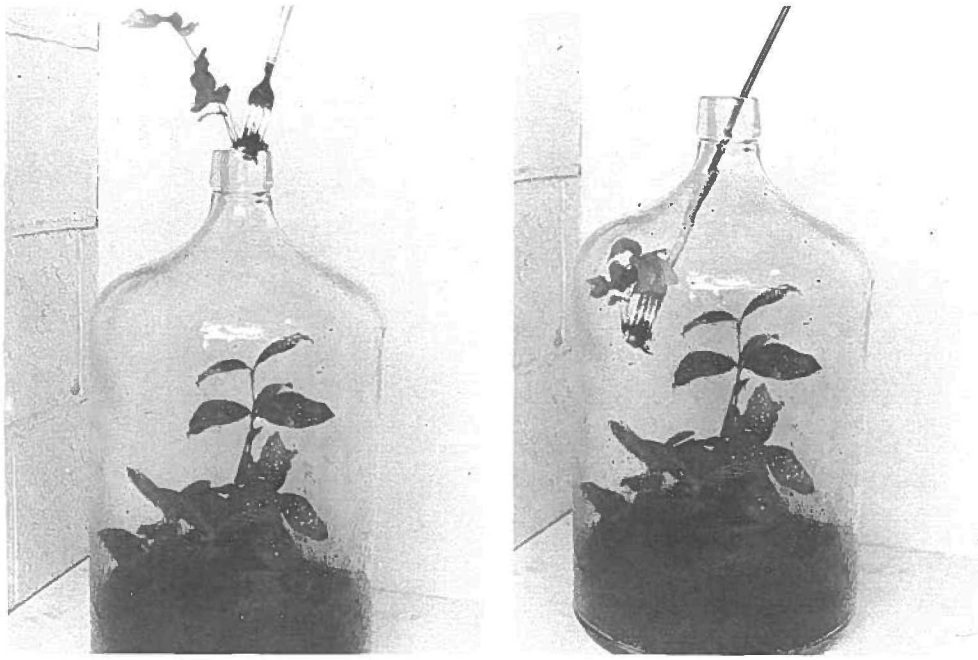
When completed, if you have soil on the inside of the glass use an old windex bottle filled with water and spray lightly around the neck so that it washes down the side. Care should be taken not to get too much moisture in at this stage. Leave the bottle unsealed for about seven days to let any excess moisture evaporate; then seal with saran wrap or an ornamental stopper. Bottle gardens can also be used as interesting bases for end table lamps.

At times it may be necessary to remove the top to let out excess moisture, but once the right humidity level is reached it may be left sealed for a couple of years. The plants enjoy filtered light, but should not be left in a window during the summer.

Types of plants suitable for enclosed gardens are: *Selaginella kraussiana, S. emmeliana, Fittonia vershaffeltii, F. argyroneura, Maranta leuconeura, M. kerchoveana* (Prayer Plant), certain varieties of *Begonia rex, Dracaena godseffiana, Peperomia magnoliaefolia* and some ferns.



Stages in the removal of unwanted or dead plants from an established bottle garden. The use of the household fork for this task is clearly illustrated.



As a general rule plants in pots up to three inches may be used. Marantas do tend to get out of hand but can be trimmed with a sharp kitchen knife taped to a cane. The cut pieces may then be removed with a fork. The same method can be used to empty a bottle garden.

Aquariums and brandy snifters can have the same sort of plants plus African violets and other gesneriads. The large open mouths of the containers make it possible to remove dead flowers.

Another interesting type of bottle garden, especially for apartment dwellers who do not have balconies, is the wine bottle that is planted from the base. A dark bottle with recessed bottom is used. First place the inverted bottle on the ground, holding it firmly with your foot. With a hammer, drive a six-inch nail into the center of the dent with one sharp tap. Shake out the broken pieces. Run a wire through the bottle making a hook up on the outside of the bottle. Leave plenty of wire protruding from the top of the bottle so that the bottle may be hung up. Stuff moss or pieces of foam rubber in the neck and turn the whole bottle upside down. Fill the bottle with soil from the base, being careful not to cut your fingers on the rough edges.



The mix I use for this is a regular potting compost: six parts sterilized loam, three parts peat, two parts sand with four ounces of Osmocote 14-14-14 per bushel. The mixture should be well mixed and moistened.

A miniature geranium or bushy type of annual plant, e.g. *Petunia* or *Impatiens* is planted in the bottom of the bottle. Leave the bottle propped upside down for about three weeks until roots are visible through the glass, then hang the bottle right side up. Remove moss or foam rubber from neck and water whenever necessary. Wine bottle gardens are ideal for hanging outside an apartment window during summer. They are also good for growing parsley, sage, and thyme indoors during the winter over the kitchen sink.

Try one of these and you will be surpised how much pleasure they can give you.

*Hanging wine bottle containing a well-established plant of miniature pelargonium cv. Kleine Liebling.*

# Tsuga heterophylla (Raf.) Sarg.

## PACIFIC *or* WESTERN HEMLOCK

Member of the Family Pinaceae

*Natural Distribution*

*Tsuga heterophylla* occurs from Prince William Sound in Alaska south to northern California and east to southeastern British Columbia, northern Idaho and northwestern Montana, from sea level to about 5000′ elevation. In British Columbia the species is found all along the Pacific slope, and in moist valleys of the Interior as far north as Parsnip River at latitude 56°N, extending to about 5000′ altitude in the lower levels of the Subalpine Forest Region where it is very stunted even when good soil and moisture are available. The eastern limit is Donald on the Columbia River where it grows at 2500′. On Vancouver Island it occurs to 4700′ elevation at Elk River.

*Habitat*

*Tsuga heterophylla* grows best in virgin stands in the cool moist locations found to the west of the Cascades at about 1500′-3500′ elevations, particularly in British Columbia and Washington where it forms the climax vegetation. It is more abundant on west mountain slopes than on the drier east slopes. In the drier Interior it is generally found in deep woods, draws and canyon bottoms. It seldom grows in pure stands, being often mixed with Western red cedar, Douglas fir, Grand fir, Black cottonwood and Red alder. It prefers a climate with a long vegetative season; hence, it is not a very common tree in the Mountain hemlock and Engelmann spruce/Subalpine fir zone of the Interior of B.C., both of which have short vegetative seasons (i.e., long winters). A suitable climate for growth is characterized as humid or superhumid or rainy (up to 150″ of rain per year), usually with mild temperatures and dry summers.



*Description*

A tree, 100-180 (-250) feet high with a DBH of 1.6-5(-10) feet. Young trees have graceful appearance with a pyramidal or columnar crown while in older trees the crown is narrow and pyramidal in dense forest but in an open grown tree is much broader and may extend to the base. The crown becomes uneven as the tree matures, often with a few irregularly widespreading branches interspersed among numerous shorter ones, some of which may have lost their foliage but remain attached to the tree for years. The overall appearance is of a very graceful tree with slender, heavily foliaged horizontal or slightly drooping branches growing at intervals along the trunk and with a whiplike flexible leader which curves away from the prevailing winds and usually droops at the tip. The trunk is long, clean and cylindrical, usually with a pronounced taper and the base is often suddenly buttressed. Because of the tree's shade tolerance the lower branches are shed from the trunk somewhat slowly, even in dense forest. Resinous.

The root system is fibrous and shallow but widespreading.

The bark is russet brown and scaly when young becoming darker and deeply furrowed forming flat-topped scaly ridges with age, is comparatively thin (25-40mm thick) and is astringent and rich in tannin (12-15%). The inner bark is bright cinnamon-red.

Twigs are slender, dark reddish-brown, horizontal or drooping at the ends, irregularly whorled and finely pubescent, particularly when young. The branchlets are pale yellowish-brown, pubescent and slender when young, older branchlets are roughened by the persistent leaf bases and form flattened and drooping sprays.

Buds are small (about 2mm long), ovoid, obtuse, pubescent, terminal and lateral, and not resinous.

Mature needles are nearly flat, obtuse or rounded at the apex, narrowing abruptly at the base, distinctly grooved on the upper surface, entire or finely spinulose-serrate at least toward the apex, glaucous above and below, 6-18(-25)mm long, 1.5-2mm wide, yellow-green to dark green and glossy above and marked on the lower surface with 2 broad whitish bands, each containing 7-8 rows of stomata. Leaves

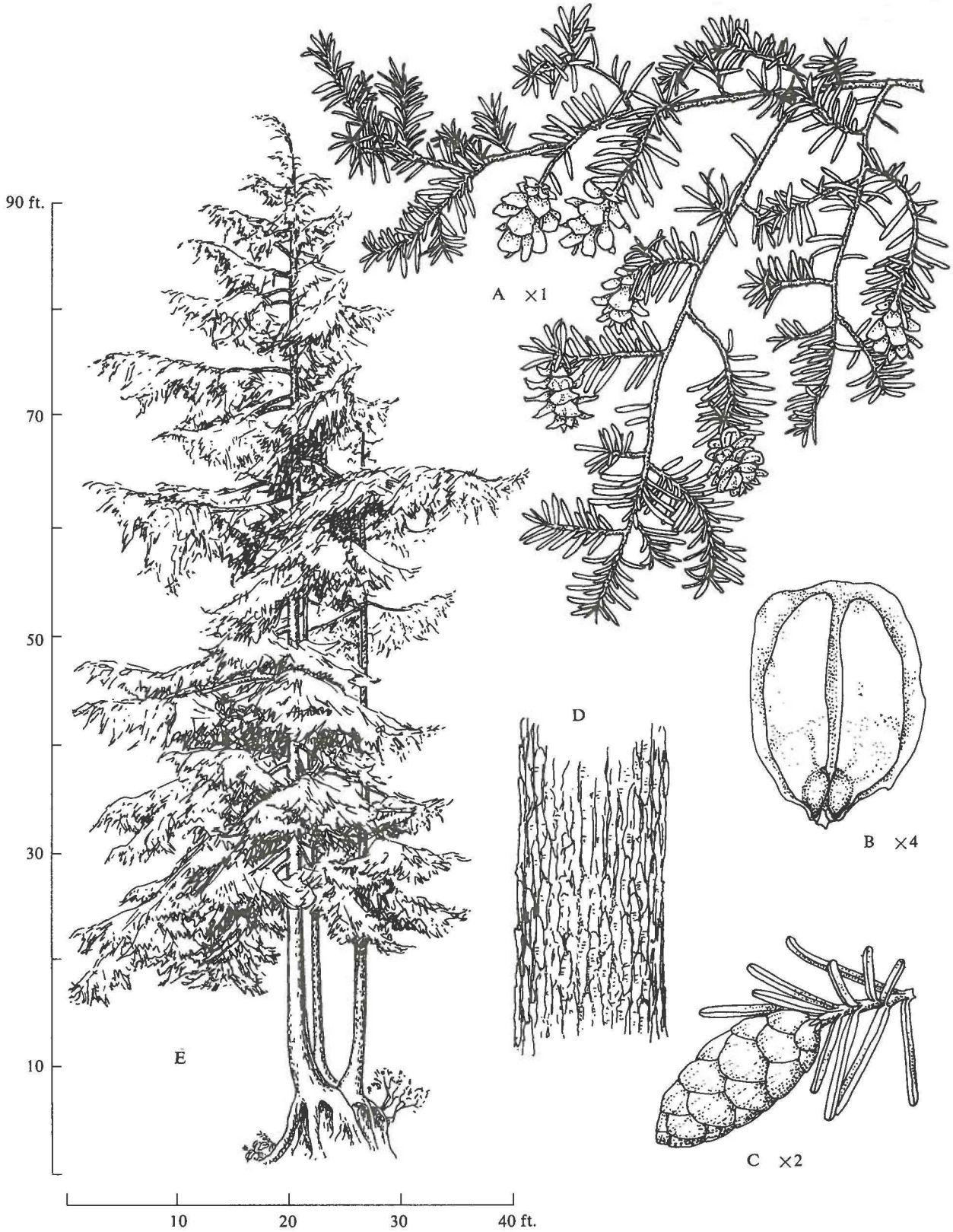



FIGURE 1. *Tsuga heterophylla*. A. Branch with mature female cones, B. bract of female cone with two winged seeds attached, C. female cone before seeds are shed, D. texture of bark on mature trunk, E. habit of mature tree.

spirally arranged though apparently two-ranked because of the twisting of the petiole. Resinous with 1 resin duct near the centre of the lower surface. Petiole very thin and short but partially persistent as a minute peg after the needle has fallen. Needles quickly deciduous from cut branches but normally persistent for 3-6 years. The needles are markedly unequal on the same twig—those apparently on the upper side being the shortest.

Wood is pale yellow-brown or whitish with a thin band of nearly white sapwood which is not sharply distinct from the heartwood. It is moderately light, fairly hard, moderately tough—it is stronger and more durable than other American hemlocks. It is non-resinous and odorless when dry but has a distinctive fragrance when freshly sawn, and is of moderately fine and even texture with a straight grain.

Flowers in May to June on branchlets of the previous year. Monoecious (male and female flowers on different parts of the same tree). The female or pistillate flowers are greenish to purplish, subsessile, erect and single at the tips of upper branchlets. The scales are rounded. The male flowers are 3-4mm long, yellow, globose, single, pendulous, slenderly pedunculate from small buds in the axils of needles near the tips of upper branchlets and contain many subglobose two-chambered anthers which are compactly and spirally arranged on the axis.

The cones are greenish or purplish to ultimately brown or reddish brown, 1.5-2.5cm long, oblong-ovoid, pointed at the apex, single at the branchlet tips, subsessile to sessile, erect at first but becoming pendulous with maturity. Scales puberulent, flexible, thin, entire, concave and rounded, longer than broad, rounded at apex, appear to have parallel sides when closed, numerous, those near the centre of the cone bearing two seeds on the adaxial surface, those above and below sterile, spreading widely to release the seeds. Bracts minute (1/3-1/6 size of scales), broadly triangular, abruptly rounded at the apex and abruptly contracted at the base, apex notched, adnate to the scales and completely concealed by them. Cone matures in one season, releasing the seeds in September, and is then shed as a unit during the succeeding winter.

Seeds are about 4mm long, compressed, dotted with minute resin blisters, light brown or brownish, almost surrounded by the wing which is 5-6mm long and broadly oblong, usually shed in the autumn and carried considerable distances by the wings. Open grown trees begin to bear seed when 25-30 years old, those growing in dense forest at a much older age. Some seed is produced nearly every year, heavy crops occur approximately every three years. A heavy cone crop may result in an open grown tree having a purplish or brownish hue lasting until the cones drop.



*Propagation*

Seeds are fairly high (50%) in germinative ability, retain their viability and can be propagated with little difficulty for several years. The seed should be stratified for 2-4 months at about 40°F and then sown in sandy soil outdoors in April or in pans in gentle warmth in March. Sowing in the fall after stratification also results in good germination the following spring. The seed may be used fresh or stored dry in an airtight container in a cool place for up to a year (possibly longer) before stratification and sowing.

Cuttings are somewhat difficult to root but ripened shoots may be inserted in sandy soil in cold frames during September and October. Some success has been reported with cuttings taken at any time of the year if root-promoting substances are used. Varieties are always raised from cuttings. Layering has also been used successfully.

Seedings should be given partial shade during at least the first season and kept moist. In nature shelter from direct sunlight and plentiful moisture in both the soil and the atmosphere are extremely important for regeneration.

*Transplantation*

Because of the shallow root system *Tsuga heterophylla* can be easily transplanted in the autumn with a ball of soil around the roots, although young trees do not transplant well from the wild and it is best to use nursery grown stock. Seedlings do well if shaded, especially when duff from their natural habitat is mixed with the planting soil.

*Conditions for Cultivation*

The growth rate is slow during seedling establishment but then is rapid in rich humid soil—under the most favorable conditions the tree will grow approximately 2′ annually to reach 130′-150′ in height and

from 1.6′-1.9′ in diameter in 100 years when it begins to slow down again. It is mature at about 200 years. Larger trees up to 250′ have been recorded and are believed to be about 500 years old. Trees in the Queen Charlotte Islands have been estimated to be over 700 years old. The recommended hardiness zone for *Tsuga heterophylla* in Canada is Zone 5. The soil should be deep rich well-drained loam with a plentiful supply of moisture and a well-balanced supply of nutrients in small quantities, although it will grow well on shallow soil provided the other conditions are fulfilled. Young trees are susceptible to drought and often do not survive during long dry summers. In nature it regenerates best on mor humus which is rather acid (pH 3.5-5.0). It will not tolerate chalky or akaline soils. The species appears to have a low frost resistance based on its natural distribution, although it will survive considerable frost if the ground is well covered with snow. It is extremely tolerant of deep shade although it will also grow well in the open provided it is not exposed to direct sunlight. Although little pruning is usually necessary for a specimen tree, the species will withstand a considerable amount of pruning and can be sheared to make a hedge.

*Landscape Value*

*Tsuga heterophylla* forms an excellent ornamental or specimen tree for the larger lot and, because of its very rapid growth, is excellent for screening as tall hedges. It is grown principally for its graceful and dignified appearance and handsome evergreen foliage and must be ranked amongst the most ornamental and useful tree for park planting.

*Availability*

The species is readily available in British Columbia although it is not stocked by every nursery.

*Varieties and Ornamental Cultivars*

Occasional trees in nature are intermediate in form between *Tsuga heterophylla* and *T. mertensiana*, and are sometimes more common than the parents in areas where the ranges overlap, especially on the east side of the Cascades. The intermediate is comparatively slow-growing, eventually reaching 30′-100′ in height; the leaves are dull or dark green, upper part usually finely toothed, longitudinally grooved, with some broken lines of stomata near the apex above and lines of stomata along the entire length beneath. This form is usually called *T.* × *jeffreyi* Henry (the Jeffrey hemlock). It was only known in cultivation from seeds collected on the Mount Baker Range in B.C. in 1851 by Dr. Jeffrey and sent to Edinburgh, until about 1940 when a young plant was discovered among seedlings from Cowichan Lake, B.C.



*Tsuga heterophylla* var *argento-variegata* Schneid. or cv. 'Argento-variegata' is a form in which the tips of the young branchlets are white, giving a powdered appearance to the tree.

The species has given rise to only a few cultivars: 'Conica', a dense conical to ovoid shrub, to 6′ high, branches ascending, drooping at the tips; 'Dumosa', a dwarf, bushy, slow growing shrub with stout spreading branches, short stout branchlets and numerous very short sprays, leaves 12-15mm long, about 2mm broad and dark green above, the original shrub was less than 2′ high and broad at 10 years; 'Flaccida', a pendulous form; 'Greenmantle', a graceful, tall, narrow tree with pendulous branches which originated in Windsor Great Park, England; and 'Laursen's Column', a striking tree of loosely columnar habit, resembling *Podocarpus andinus* in general appearance, the leaves irregularly, almost radially, arranged on the ascending branches.

*Other Uses*

*Tsuga heterophylla* is the strongest and most durable of all American hemlocks. Until 20 years ago it was considered of low value but is now widely used for building purposes, although it must be treated with preservative if it is to be used under conditions that favour decay. When the wood is commercially dried (often sold under the trade name Alaska Pine), it is suitable for all but the heaviest construction work and is extensively used for framing material, house material, house sheathing, interior finishes, planing mill products, kitchen cabinets, veneer for plywood, boxes, barrels, railroad ties, and concrete forms. Western hemlock is rapidly becoming one of the most important pulp woods for paper, paper board and products such as rayon. The bark is rich in tannin and is a potential source of this product for tanning hides.

The West Coast Indians have always used *T. heterophylla* for many purposes. Alaska Indians made a coarse bread from the inner bark of cambium mixed with that from Shore pine, while more southern tribes either ate the inner bark fresh, dipped in oil or baked into cakes which were stored. The cambium had to be collected in the spring. The Haida Indians made cakes of hemlock cambium and High bush cranberries as a favourite dish, which is also mentioned in myths as a feast food of supernatural beings.

The tips of young branches were used as a flavour when cooking bear meat and the fresh needles were used to make tea by steeping in hot water for a few minutes. Boughs with needles intact were used to collect herring spawn, to make temporary shelters or blinds for hunters, while the wood was used to make halibut and cod hooks, dishes (particularly from bent trees in which the lower trunks were horizontal so that large long feast dishes could be carved), for fishing weirs at the mouths of rivers, grouse snares, children's bows, ridge poles for portable lodges, spears, roasting spits, spoons, eelgrass twisting poles, handles for fishing nets, etc. The bark when boiled produces a red-brown dye which has been used for spears, paddles, baskets (some Washington tribes believed that this made spruce-root baskets waterproof), to take the rust off traps and to give them a clean smell and to dye fish nets brown—some tribes believed that the nets were thus made invisible while the smell attracted the fish. Girls of some tribes used the bark dye on their cheeks. A black dye was obtained by mixing the bark with urine, a dark brown dye by mixing it with pitch while a yellow-orange colour resulted from mashing the bark with salmon eggs. Otherwise, bark was used to form a lining for the cooking pit, as a storage container for elderberries and for tanning hides. Hemlock roots were sometimes spliced into fishing lines to make them stronger. The Haidas used to fashion a ring from hemlock twigs for use in two games.

Medicinally every part of Western hemlock was used for something—pitch was believed to have wonderful healing properties and was used for cuts, wounds, splinters, to prevent sunburn and chapping, to remove vermin, for a child's cold (when mixed with ground hemlock bark and applied to the chest) and a mixture of pitch and marrow from an elk tibia was rubbed into the eyebrows to make them beautiful by the Quinault Indians of Washington. As a poultice for heat it was mixed with various parts of *Veratrum viride* Ait. The bark when boiled to form a tea was used as a laxative (although the Squamish used it for diarrhoea), an emetic, a treatment for sore eyes, sores (either in both sexes or in women only, depending on the tribe), to stop hemorrhages (licorice fern was sometimes added to make it more effective), for syphilis, tuberculosis, sore throats, as an astringent in certain feminine complaints or as an ingredient in a complex uterine tonic. The young tips were chewed and spat onto a swelling to reduce it or boiled and the liquid drunk to cure tuberculosis and to stimulate the appetite. Twigs were ignited and used to cauterize moles and warts or applied to the skin for various internal ailments. Twigs from very young hemlocks growing on stumps were soaked in warm water and used to wash the eyes. Leaves were chewed and applied to burns.



Hemlock also played a large part in the religious rituals and ceremonies of various tribes. When a Haida girl reached puberty hemlock boughs were hung above her bed and the falling needles symbolized the property which would fall on her when she married. Men of the Southern Kwakiutl tribe would purify themselves before hunting, fishing or ceremonies by rubbing their bodies four times with hemlock branches, often until they were bleeding, while they made special shelters and beds from the "supernatural tips" of hemlock branches. A boy novitiate in the winter ceremonials decorated himself with a skirt and headdress of hemlock boughs—hemlock headbands are still used in ceremonial dances. They made a girl at puberty live in a hut of hemlock boughs for four days after her first menstruation. Pregnant women prayed to the tips of four young hemlock trees for an easy delivery and washed faithfully with hemlock every day. A sick person or a widow was passed through four rings of hemlock to remove any contamination by evil spirits. The Quinault Indians of Washington braided hemlock and rubbed themselves with it during bathing while in training. They also hollowed out a small log of hemlock, filled it with small objects, decorated it and manipulated it to cause a storm by magic.

It is frequently mentioned in Haida myths—'Hemlock-bark-scraping-knife' and 'Among-the-hemlock-boughs' were the names of two supernatural beings.

*Diseases and Problems of Cultivation*

*Tsuga heterophylla* is susceptible to windthrow because of the shallow root system and to fire injury because of the relatively thin bark. Sunscorch may occur if the temperature reaches 95°F. The ends of the branches may be killed for several inches back so that the sunscorched tips may appear as if injured by a strong solution of nicotine sulphate. In drought conditions the needles will drop while still green, if it is too prolonged the tree will die. Damage by drought is most severe on sites with a southern exposure or on rocky slopes where the roots cannot penetrate into the soil. Drying winds in both winter and summer will eventually have the same effect on an exposed tree as a lack of water. *Tsuga* is one of the species most sensitive to damage by sulphur dioxide from ore smelting.

In nature *T. heterophylla* may suffer heavily from insects and fungi but ornamental plantings seem to be more resistant than other conifers, especially when they are maintained in good vigour.

Trees planted in newly cleared forest land may be attacked by one of the root rots while those planted

near matured stands may be attacked by several heart rots when mature. The following are diseases and insects which may occur on *T. heterophylla*:

*Armillaria mellea* Vahl. ex Fr.—'Honey mushroom' occurs widely on the roots of many species of ornamental trees and shrubs including *Tsuga* but it seldom kills.

*Fomes annosus, F. pini* (Thore) Lloyd, *F. pinicola* (Swartz ex Fr.) Cke., *F. robustus* Karst, *Echinodontium tinctorium* (E. & E.) E. & E., *Polyporus sulphureus* Bull. ex Fr., *P. schweintzii* and *Stereum* spp. are all fungi which cause heart rot on western hemlock. All are associated initially with wound and breakage injuries.

*Didymascella (Keithia) tsugae* (Farl.) Maire causes a browning of the needles and may occur on *T. heterophylla.*

*Arceuthobium campylopodum* Engelm. f. *tsugensis* (Rosendahl) Gill—'Western dwarf mistletoe' or 'Hemlock dwarf mistletoe'.

*Acleris variana* Fern.—'Black-headed budworm' is an important defoliator which occasionally occurs in large numbers and may result in the killing of the trees.

*Lambdina fiscellaria* ssp. *lugubrosa* Hulst. (or *L. lugubrosa*) 'Hemlock looper' is a destructive defoliator occurring in the forests along the coast of Oregon, Washington and British Columbia.

*Nepytia phantasmaria* Stkr. 'Phantom hemlock looper'.

*Neodiprion tsugae* Midd. 'Hemlock sawfly' attacks needles.

*Chermes tsugae* Annand 'Hemlock chermes' appears as a white cottony encrustation on the bark and as white tufts on the needles of *Tsuga.*

*Phenacaspis pinifoliae* 'Pine needle scale' occasionally attacks hemlock. The needles turn yellow and drop prematurely.

*Oligonychus ununguis* 'Spruce mite' or 'Spruce spider mite' and *Tetranychus urticae* 'Two spotted mite' may both attack hemlock in ornamental plantings.

Several bark borers, e.g. *Tetropium velutinum* and *Melanophila drummondi,* attack the western hemlock but are usually found only where the trees are already weakened by attacks of other insects or diseased or damaged mechanically.



*Origin of the Name*

The generic name *Tsuga* is derived from the Japanese word Tsu-ga, the elements for 'Tree' and 'Mother' meaning 'Treemother'. The specific name *heterophylla* is derived from two Greek words meaning other (or different) leaves. It was apparently used by Rafinesque in an attempt to indicate the slight distinguishing differences of the leaf from that of the eastern hemlock. The common name hemlock has been said to be derived from the descriptive term Oh-ney-tah (Pronounced Hoe-o-na-dia) used by the New York Indians. Their name for the North Country (=Canada) was also Hoe-nadia which means 'a land of the hemlock'. Alternatively, it is said that the early settlers named the hemlock after a European herbaceous weed because of the similar odour when the needles are crushed.

*Tsuga heterophylla* was first discovered by David Douglas in 1826 and introduced into cultivation in the British Isles in 1851 by Dr. John Jeffrey who sent seed from "the Mount Baker Range, British Columbia". The type locality is "mouth of the Columbia River, Oregon".

*Tsuga heterophylla* is the State Tree of Washington.

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# Botanical Garden News and Notes

*Seed Exchange Program 1972*—Of 8019 requests for seed during 1972, 6371 were filled. Four hundred seventy-eight taxa were available from 71 families and 430 of these were distributed. The highest number of requests was for *Abies amabilis.* Other items listed with over 70 requests were *Tsuga mertensiana* and *T. heterophylla, Erythronium columbianum* and *E. revolutum, Lilium columbianum* and *Fritillaria camschatcensis.* In some cases demand exceeded supply.

*Staff Activities*—Mr. Ken Wilson and Dr. John Neill attended meetings of the B.C. Nursery Trades Association at Harrison Hot Springs, December 6th and 7th. Dr. Neill outlined the work on radiation induced mutations, electrolytic methods in plant propagation and the establishment of the mother block of virus free flowering cherries and crabapples. Mr. Wilson had an opportunity to give a progress report on the Botanical Garden stressing the Rhododendron species collection and the plans for the Alpine Garden. Mr. Jim MacPhail has been appointed co-chairman of the Planning Committee for the International Rock Garden Conference to be held in Seattle and Vancouver in 1976. Mr. David Tarrant has just completed a five-month series entitled "Q-Gardens" on radio station CHQM Vancouver. The series, which involves weekend flashes on seasonal gardening hints, is scheduled to resume in March, 1973. Mr. Tarrant also appeared on TV Channel 2 on December 14th on the Bob Switzer show, when he spoke about 'Bottle gardens—their construction and maintenance.' Dr. Chris Marchant was elected to the executive committee of the Alpine Garden Club of British Columbia. Mr. Kenneth Wilson was re-elected President of the Vancouver Rose Society.



*Technical Bulletin No. 2*—The Botanical Garden initiated a computerized accession system for plants in the Botanical Garden more than two years ago, and a specialized program has been developed to provide for the input and update of information. The bulletin provides a general discussion of the aims and goals of the program and in addition serves as the operation manual for the system. A limited number of copies are available and may be obtained by writing to the Director of the Botanical Garden.

*Nitobe Memorial Garden 1972*—The Nitobe Garden continued to be a major attraction for visitors to The University of British Columbia campus during 1972. More than 84,000 people visited the garden in the period from March to November. In addition, the garden continues to provide an important place for enjoyment and class use by members of the student body and staff of the University. Mr. Roy Sumi and Mr. Sam Oyama continued to serve as the principle gardeners. The replanted iris beds have grown well and it is anticipated that the iris display should be excellent this coming year.

*First Honorary Life Membership*—The Garden awarded its first honorary life membership in September of 1972. The award was made to Mrs. Morag Brown, former secretary of the Botanical Garden, for her active support and participation for more than three years in the initial phase of the development of the new Botanical Garden Department. It is appropriate that the Garden's first award should be made to one of the staff of the Garden as the development of the program of any new Botanical Garden is so dependent upon the activities of its encumbent staff members. The Garden staff expresses its deep appreciation to Mrs. Brown for her work with the Garden and wishes her well in her new endeavors.

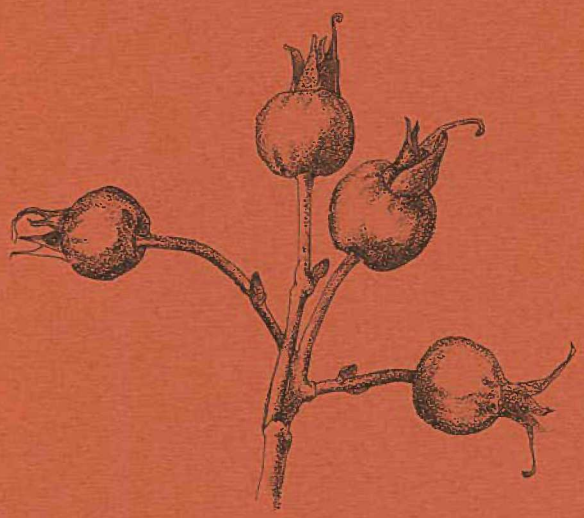
*Gifts to the Library*—During 1972 books were received by the Botanical Garden from a number of donors. Mr. M. Harbeck (references on orchids and their culture), Dr. G. C. Hughes (reference to plants of Townsville, Australia), Mr. N. Shah (several reference works on Ugandan plants) and Mr. H. N. W. Toms (a collection of early ethnobotanical references).

ROCKWELL
VERMEER

VERMEER

*Opposite*

*One of the many operations performed during the shipment of nursery stock from the E. H. Lohbrunner garden in Victoria to the nursery of the Botanical Garden at Vancouver. Shown are steps in the operation of a mechanical digger. The transfer of plant material has been completed.*



*The mature fruits of the cultivated rose.*

## *BOTANICAL GARDEN STAFF*

*Director*
Dr. Roy L. Taylor

*Supervisor of Operations*
Mr. Kenneth Wilson

*Research Scientist (Cytogenetics)*
Dr. Christopher J. Marchant

*Research Scientist (Horticulture)*
Dr. John W. Neill

*Research Assistants*
Mrs. Marilyn G. Hirsekorn
Mrs. Sylvia Taylor

*Secretary to the Office*
Mrs. Susan Weiner

*Senior Technician (Horticulture)*
Mr. A. James MacPhail

*Plant Accession System*
Mrs. Annie Y. M. Cheng

*Senior Gardener*
Mr. James O'Friel

*Gardeners*
Mr. Harold Duffill
Mr. Leonard Gibbs
Mr. Sam Oyama
Mr. Pierre Rykuiter
Mr. Tomomichi Sumi
Mr. David Tarrant
Mr. Isao Watanabe
Mr. William S. White

*Flora North America Program*
Dr. Roy L. Taylor (Editor)
Dr. Bruce MacBryde (Associate Editor)
Miss Deborah Smyth (Secretary)



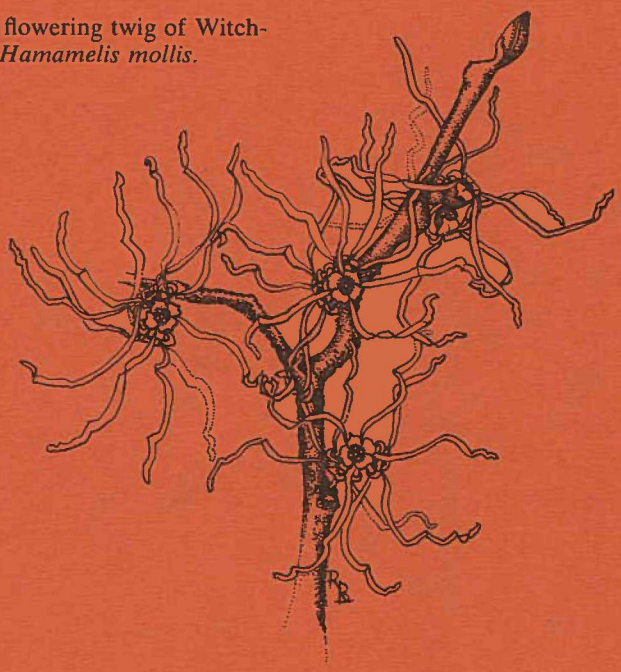
## CLIMATOLOGICAL SUMMARY FOR 1972*

An all-time record rainfall in any 24-hour period of 3.35 inches on Christmas Day together with a record of 12.60 inches for the month of December were the most significant events in the 1972 weather records. The year's total rainfall of 52.90 inches was 6.67 inches above the ten-year average. Temperatures ranged from a high of 82°F in July to a low of 14°F in January. Freezing temperatures were recorded on 45 days. The last frost occurred on April 11th and the first on October 30th. Total hours of bright sunshine for the year at 1835.8 was almost average although July, August, October and December were well above the average.

| *Data* *1972* | *October* | *November* | *December* |
|---|---|---|---|
| Mean temperature | 47.6°F | 44.4°F | 35.8°F |
| Highest temperature | 62°F | 55°F | 51°F |
| Lowest temperature | 31°F | 32°F | 15°F |
| Grass Minimum temperature | 23°F | 23°F | 6°F |
| Total rainfall/No. days with rainfall | 2.67"/13 | 5.26"/17 | 12.60"/18 |
| Total snowfall/No. days with snowfall | nil | nil | 8.1"/17 |
| Total hours bright sunshine/possible | 168.7/318.48 | 66.8/268.23 | 54.5/253.11 |
| Max. wind speed (m.p.h.) 1 hour/direction | 15/NW | 15/SE | 15/SE |
| Mean mileage of wind at 3' | 57.8 | 80.4 | 92.5 |
| Mean mileage of wind at 40' | 85.8 | 120.7 | 134.2 |

**Site: The University of British Columbia, Vancouver, B.C., Canada*
*Position: lat. 49°15'29"N; long. 123°14'58"W. Elevation: 342.6'*

Winter flowering twig of Witch-Hazel, *Hamamelis mollis.*



DAVIDSONIA

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