DAVIDSONIA

VOLUME 1 NUMBER 3 *Fall 1970*

NEW BOTANICAL GARDEN PROGRAM

Cover

Summer flowering condition of *Gaultheria shallon,* the common Salal bush of the Pacific Northwest.

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New Botanical Garden Program Approved

ROY L. TAYLOR, *Director*

The date of July 7th, 1970 represents a major turning point in the development of the Botanical Garden at the University of British Columbia. The last meeting of the Board of Governors of the University during the spring session was held on that day and approval was given to the new program for the development of the Botanical Garden Research Administrative Center and associated gardens. The approval of this five million dollar program culminated the work initiated in the fall of 1969 by the Design Team. I believe it to be of interest to outline the general development of the new plans for the Botanical Garden program as well as detail the components that form the new areas.

In October of 1969 the Board of Governors of the University approved the Garden program outlined by the Director in the prospectus entitled "Plants and Man". This program outlined three major criteria for the need of an enlarged Botanical Garden program at the University.

1. *Provision for greenhouse facilities and establishment of plant collections for research in the plant sciences.*
2. *Provision for facilities for teaching and training of graduate students, propagation of plant materials for University courses, and continuing adult education programs, development and participation in gardener training programs and establishment of materials for public school garden projects.*
3. *Provision for plant display and the development of a public information service.*

The Board of Governors recognized the need for the development of the Garden program as an integral part of the University, as well as part of a National Botanical Garden system in Canada and as an important element in the consortium of international botanical gardens. This recognition was expressed in the contemporary framework of the growing need and demand for better research and information concerning our natural plant resources. Such information is of paramount importance to long range planning and management of our deteriorating resources.

The physical setting of the Botanical Garden at the University of British Columbia consists of a series of individual units. The Garden components have been divided into five operating areas:

1. The Upper Campus Gardens consisting of 13.9 acres and including the Nitobe Memorial garden and Totem Park.
2. The Main Gardens consisting of 20 acres and including the new Botanical Garden Center.
3. Marine Drive Gardens 26.5 acres.
4. The Natural Stand Forest 13.5 acres.
5. Nursery 3.6 acres.

The Upper Campus Gardens are complete. The Main Gardens will be connected with the Marine Drive Gardens to form approximately 50 acres of garden. This complex will front on to the ocean. The Natural Stand Forest will be retained as an ecological resource unit to be used for study and research by U.B.C.

personnel. The Nursery has now been completed and will be fully operational at the end of November 1970. It will serve as the foundation planting area for *Rhododendron* species. The emphasis in the new development is associated with the Main Gardens and the Marine Drive Gardens and the development of the building complex and associated gardens.

A Design Team was established to consider and develop the structural and landscape components that would best satisfy the objectives of the Garden. A four man team was established with each member of the team having an additional member of his staff as a resource person. The members of the team were: Roy L. Taylor, Director of the Botanical Garden; Kenneth Wilson, Supervisor of Operations of the Botanical Garden; Arthur W. Slipper, Assistant Director, Department of Physical Plant, Design and Planning Division, Miklos Baranszky-Job, Landscape Architect, Design and Planning Division, Department of Physical Plant; Barry V. Downs and Richard B. Archambault of the architectural firm of Downs-Archambault; Clive L. Justice and Harry V. Webb of the landscape architectural firm of Justice and Webb.

The team began its program of research in November of 1969. An overall review of the role of the Botanical Garden in the University and the community was carried out in relation to the objectives established by the Director of the Garden. Careful consideration was given to the achievement of the long range objectives of the Garden program and the utilization of the Garden by various user groups. Integration of the development with existing and proposed developments at the University and in the community at large were considered. Following the extensive review a preliminary design of the building and landscape components was begun. The overall plan was completed in June and subsequently presented to the University Board of Governors. A scale model was produced of the Main Gardens and the Botanical Garden Center. The Main Gardens area, consisting of twenty acres, contained not only the building complex but the principal specialized garden components.

A two screen 35 mm colour slide presentation of approximately 25 minutes duration was produced under the direction of Victor Doray. This was designed to be given by the Director of the Garden with the object of informing public audiences about the planned U.B.C. Botanical Garden developments. It is a general presentation of the history and development of botanical gardens with emphasis on the specific desirability for the development of a modern garden program at the University of British Columbia.

The overall plan for the 60 acres in the new garden development is best described as an urban approach to botanical gardens. This underlying philosophy seems most appropriate as the shift from a rural to an urban setting for most of the population becomes more evident. Special emphasis is directed to research, teaching, and development of an information system that will provide better understanding of the relationship of man to plants in the modern environment. Such an emphasis will give new insight into the problems relating to the use of plants in the burgeoning concrete megalopolises.

The Botanical Garden will emphasize not only the urban aspects of plant growth and development, but will have an overall objective of achieving a plant bank of economically important plants. Plans call for the development of three major collections: plants native to British Columbia, plants of eastern Asia and a major alpine scree garden with six components representing plants from six continents. The accumulation and display of the genus *Rhododendron* will be continued. Many other garden components will be developed and although not of the magnitude of the three major components cited, they will form an important part of the garden with respect to teaching and research. A complete list of the components is found on page 28.

The Research and Administrative Center is a new and exciting concept that will provide maximum utilization of space and promote the development of an efficient operative unit. Careful consideration has been given in the design to the problems of operations related to the growth and production of plant materials.

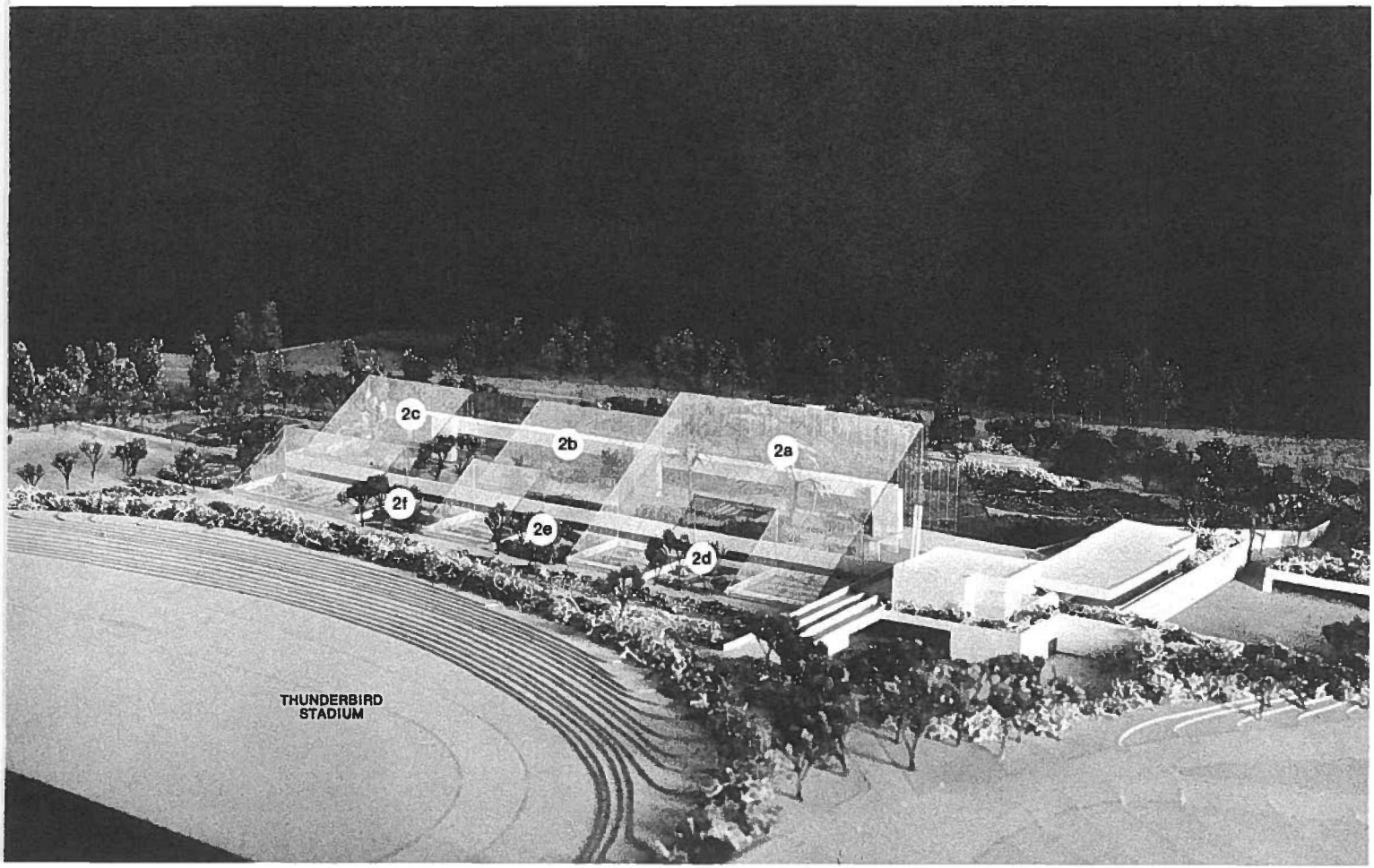
The building complex consists of two floors, a lower service and research floor over which the administrative, public service areas and conservatories are constructed. This design permits segregation of various resources. The upper floor features an administrative suite, orientation and lecture-meeting hall, library, conservatories and a restaurant. This floor will be open to the public seven days a week. The public will be able to view the activities of the lower floor through the glass walled construction of the conservatories. Special tours will be arranged to provide public access to the lower research and service areas.

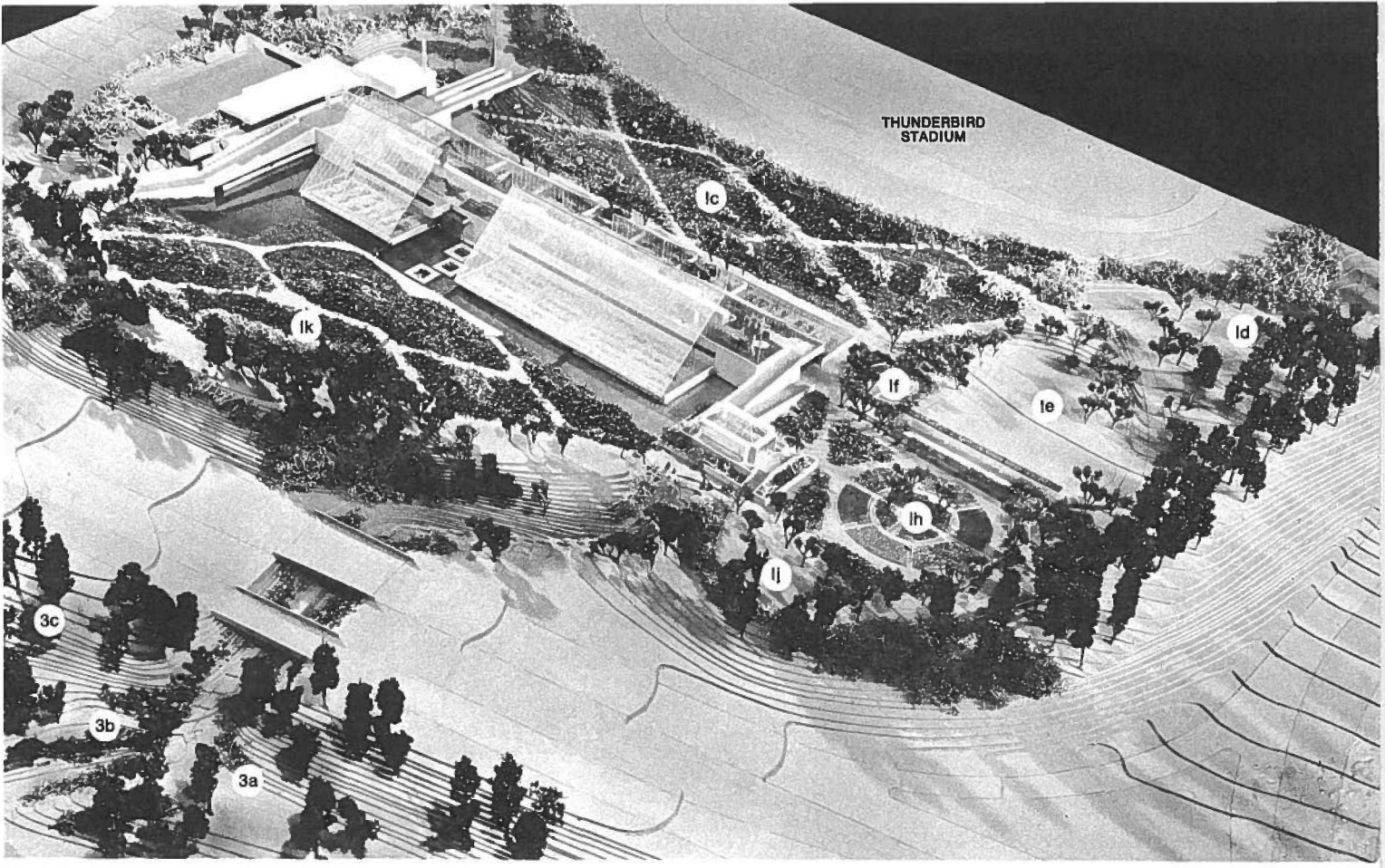
In the lower level provision has been made for a herbarium of one million specimens. This will provide a long awaited and needed facility for the various herbaria currently housed on the campus. The Garden Center which is sited at the southern perimeter of the main University campus will provide easy access for both researchers and students on the main campus. In addition to the herbarium service facilities, research laboratories and offices and research facilities for staff and students will be provided on the lower floor. Provision has been made for campus staff members to use the facilities and establish a working office in the complex.

The building complex has a north-south orientation to provide maximum utilization of the natural sunlight. The lower floor can be traversed by a standard vehicle and a crane system is proposed for both the upper and lower floors to permit easy transfer of plant materials. The structural framework that supports the crane system on the upper floor will also serve as a base for a continuous aerial walkway through the conservatories. The building is designed to create an indoor/outdoor concept with special courtyard gardens interdigitated with the research greenhouses on the east side of the main building. The south side of the building is surrounded by a series of water gardens. The presence of these water gardens and the courtyard gardens provides a natural system of barriers between the main building complex and the remaining garden components. Numerous patio and terrace gardens are found in and around the building complex and these will provide experimental facilities for the study of the urban garden problems.

The external garden components take special cognizance of the plants that have been produced by man. A special man-made hybrid garden with a formal economic display garden at the south end of the main garden area will provide a highly useful teaching and display component. This specialized man-made garden is connected directly with the Marine Drive Gardens where special emphasis will be placed on plants of Asian origin. It is hoped that many of the genera and species of Asian plants that are directly related to those found in the Pacific Northwest will find a home in this component. The composition of the other external gardens are listed on page 28.

The initial start on the project will be made in 1971 with full completion slated for 1981.





U.B.C. BOTANICAL GARDEN

I BUILDING COMPONENTS (116,060 sq. ft.)

Plant display conservatories—3 (20,100 sq. ft.)
Teaching and research greenhouses—11 (30,500 sq. ft.)
Facility room for controlled growth equipment—1
Herbarium facilities for 1,000,000 specimens
Herbarium preparation rooms—2
Fumigation room—1
Microtechnique laboratory—1
Photographic technique room—1
Seed exchange laboratory—1
Seed storage—1
Dry research laboratory—student use
Wet research laboratory—student use
Service and work areas
Staff research office/laboratory—5
Student offices—14
Study carrels near herbarium—8
Campus staff offices—5
Herbarium administration offices—2
Classroom—1
Library with public reading room
Conference-Seminar room
Orientation hall
Plant records center
Administrative suite
Restaurant (5,600 sq. ft.)

II GARDEN COMPONENTS

1 *Main Garden (20 acres)*
- a. Upper entry garden
- b. Lower entry garden
- c. Alpine-scree garden
- d. B.C. native garden
- e. Contemporary landscape garden
- f. Herb-poisonous plant garden
- g. Arbor garden
- h. Economic Garden
- i. Terrace gardens
- j. Hybrid-cultivar garden
- k. Systematic garden
- l. Living fossil garden
- m. Aquatic garden
- n. South screen garden
- o. North highway screen garden
- p. South highway screen garden

2 *Conservatory—Court Patio Gardens*
- a. Tropical Greenhouse
- b. Temperate Greenhouse
- c. Xeric Greenhouse
- d. Lichen-Moss Court Garden
- e. Tree Fern Court Garden
- f. Fern Court Garden
- g. Roof and patio gardens

3 *Marine Drive Garden (26.5 acres)*
- a. Asian-Rhododendron Garden
- b. Perennial shade garden
- c. Non-asian temperate garden

4 *Faculty Club and Graduate Centre Gardens (6.2 acres)**
- a. Triangle and Faculty Club Garden
- b. Rose Garden
- c. Graduate Center Garden
- d. International House and Panhellenic House Gardens

5 *Nitobe Memorial Garden (2.2 acres)**

6 *Totem Park (3.1 acres)**

7 *Natural Stand Forest (13.5 acres)*

8 *Nursery (3.6 acres)**

* Functioning components

Gaultheria shallon Pursh

'SALAL BUSH *or* SHALLON'

Member of the Family Ericaceae

Natural Distribution

Gaultheria shallon is found from the panhandle of Alaska south along the coast to southern California. All populations in British Columbia occur west of the Coast Mountains except for an isolated population in the Kootenay Lake area of southern British Columbia.

Habitat

This species is almost always associated with the lowland coniferous coastal forest, but may occur at low elevations on the Coast Mountains. It is also well-established on open habitats near the coast, especially along bluffs and open rocky knolls. In the open coniferous forest near the shoreline, it may form almost impenetrable thickets. The species is a rapid invader of logged-over areas in coastal British Columbia. It is commonly found on the top of decaying stumps through lowland coastal forests. One of the more unusual sites for Salal is the tops of deteriorating totem poles.

Description

A dense to scraggly growing shrub ranging from a nearly prostrate form along exposed coastal sites to a well-grown shrub of 2.5 m in protected lowland forests. Shrubs are freely and diffusely branched, the branches rigid and often forming dense thickets.

The root system is shallow and spreading with many fine rhizomatous-like structures spreading from a central point. Vegetative reproduction provides a means for rapid colonization of newly disturbed sites.

The bark is normally smooth, but may become scored with age.

Twigs are green when young, pilose to hirsute, and often glandular. Mature twigs are red or brown in color.

Buds are 1-1.5 cm long, usually green but sometimes tinged red, ovoid and acute-tipped.

Leaves are petiolate and alternate. Mature leaves are 3-10 cm long, 3-5 cm wide, oblong elliptic to circular with a rounded or subcordate base, tip short acuminate. Leaves are glabrous, the upper surface glossy green giving a leathery appearance, the lower surface pale green with prominent venation. Margins of leaves are often finely toothed. Petioles are 2-4 mm long.

Flowers are born in terminal or subterminal axillary racemes that usually appear one-sided because pedicels are deflexed. Raceme usually has 5-15 flowers and is approximately 5-12 cm long. Bracts are reddish, 6-10 mm long and prominent. Calyx lobes triangular to lanceolate, glandular-pilose and red in color, usually ⅓ to ½ the length of the corolla, but often increasing in size with age. Corolla is urn-shaped, white or pink, with 5 short recurved lobes, glandular, 6-11 mm long. Stamens 10. *Gaultheria shallon* flowers throughout most of the growing season, but most prominently during the period April to July.

Fruit is a depressed capsule, berry-like because of the thickening of the calyx or its base, fleshy, ellipsoidal. When mature, the fruit is purplish-black and 6-10 mm broad.

Propagation

Plants may be grown from seed, layers, suckers, divisions of older plants or by cuttings. Turner and Gould (in press) have reported that seeds were subjected to a cold treatment of 4.4°C for 45 days prior to planting in 4.5 cm peat pots. The seedlings were transferred to 10.75 cm plastic pots after 11 weeks. Potting material was forest soil. Good growth was obtained with the addition of nitrogen. The addition of other elements did not influence the growth significantly. Mansfield (1948) suggests taking cuttings of green wood in August and propagating in sand or peat in a closed cold frame or under mist.

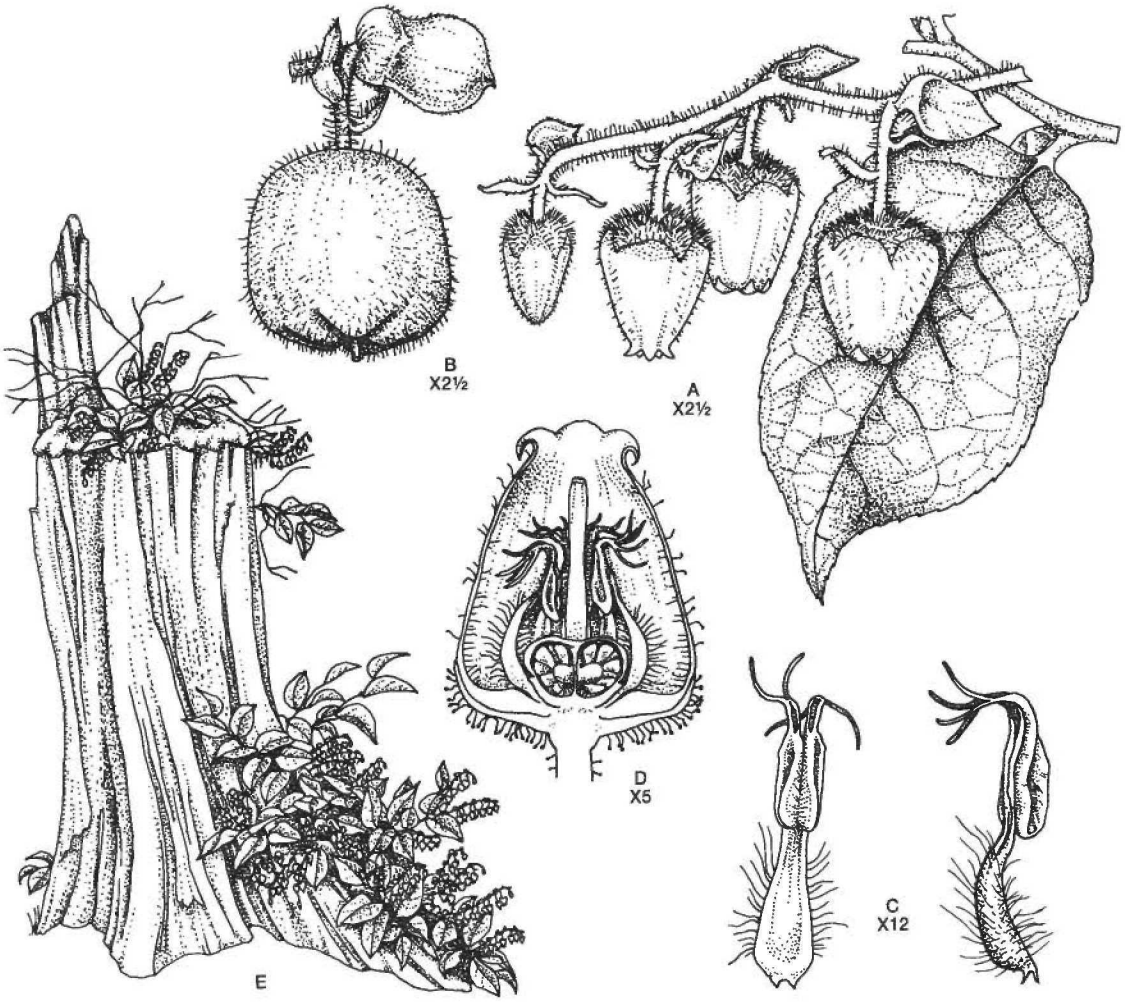


FIGURE 2. A. floral raceme and detail of leaf venation, B. individual fruit, C. stamen, left-adaxial view, right-lateral view, D. longitudinal section through one flower, E. typical habit of plant on old stump.

Conditions for cultivation

Salal prefers a partly shaded site with moist sandy or peaty soil, however plants can be successfully grown in full sun. If the soil is poor, the plants often produce a low mat forming habit. In shaded conditions with good soil and plenty of moisture, plants tend to become vigorous upright shrubs. Planting in limy soils should be avoided. Plants do not normally require pruning.

Plants are best transplanted in the early spring or late fall. Feeding with a nitrogen rich fertilizer will produce good plant growth, with lustrous foliage. Recommended hardiness zone in Canada is Zone 7 (Sherk and Buckley 1968).

Landscape value

Plants provide good ground cover, particularly in shaded conditions under tall coniferous trees. Salal may be used for shrub borders or as foundation plantings in large gardens. The mature plants have attractive flowers, but plants are best known for their evergreen foliage. *Gaultheria shallon* should undoubtedly be more widely used in landscaping.

Availability

Plants are abundant throughout the Pacific Northwest coastal region in natural habitats. The species is only moderately available in British Columbia from local nurseries.

Other uses

Salal is extensively used in the florist industry as a foliage supplement for cut flowers and is known in the trade as "lemon leaves".

The berries of Salal were the most widely used fruits among the Indians of the Northwest Coast. They were eaten fresh in large quantities, but their main value was a dried fruit for winter use. Some Indian groups dried them individually like raisins, but the most common means of preparation was to boil them until soft, using red hot rocks, and pour them into rectangular wooden frames set on skunk cabbage leaves. The frames were placed on racks over a fire and the berries were allowed to dry. The resulting cakes were removed from the molds, rolled up, and stored in cedar boxes. Before using, the cakes were broken into pieces and soaked overnight. They were often mixed with other less palatable berries, such as elderberries (*Sambucus racemosa*) or currants (*Ribes bracteosum*). Salal berries are still used today, but they are usually frozen or made into jam.

Diseases and pests

The most common and difficult disease of *Gaultheria shallon* appears to be Leaf Spot caused by *Phyllosticta gaultheriae*. This fungus produces abundant asexual spores during June, July and August. The presumed perfect stage, known as *Mycosphaerella gaultheriae* sporulates heavily from May through to August from an old leaf spot infection of the previous year. Young leaves of Salal usually expand in May and most infection presumably occurs at that time from *Mycosphaerella*. The complete life cycle of this fungus is not well known. Feeding the plants with nitrogen has often helped to reduce the incidence of infection of this common disease. Infected leaves, whether living or dead should not be composted, but removed and burned as an additional control measure for Leaf Spot.

A number of other diseases are known to occur on Salal (Toms 1964) but most are not as serious as Leaf Spot.

Probably the most disturbing pest of Salal for the home gardener in the Lower Mainland of British Columbia is the grey weevil. The life cycle of this insect is not well known. This pest can produce severe leaf damage and one frequently sees plants that have leaf margins cut up by the weevil. Chemical control can be used to rid the garden of this pest. Reference should be made to the publication of the British Columbia Department of Agriculture entitled "Insect, Disease and Weed Control for the Home Gardener" for the latest information re chemical control.

Origin of name

The genus was named for Dr. Jean-François Gaultier (1708-1756) a physician and botanist of Quebec. The most common name for the species is Salal which represents an anglicized version of the name given to the plant by the Coastal Indians. The specific name *shallon* was thought to be the correct interpretation of the Coastal Indian name and was first published by Frederick Pursh in 1814.

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Botanical Garden News and Notes

New Appointments—Mrs. Annie Y. M. Cheng joined the department as supervisor of the Plant Accession System this past summer. Mrs. Cheng is a graduate of McGill University where she obtained her masters degree in botany upon completion of a study of coprophilous pyrenomycetes found in the vicinity of Montreal.

Mr. Isao Watanabe joined the staff as a gardener in the Upper Campus gardens during the summer.

Pacific National Exhibition—For the first time in many years, the Botanical Garden presented a display in the Horticultural exhibit. Special features included the model of the new gardens, propagation trials conducted on geranium cuttings placed in various media, the story of why *Dieffenbachia* is called 'Dumb Cane' and a general exhibit of a number of the garden activities. Display of unusual tropicals served as a foundation to the exhibit.

Technical Bulletin issued—The first technical bulletin from the Botanical Garden was issued in October. This first number contains a detailed report entitled 'An Automated Information Filing System for Plants Desired for Botanical Garden Components'. The development of the computer assisted programs in the Botanical Garden was undertaken by Mr. Stephen Sziklai, computer science student, who worked as a summer student in the department. Two programs were initiated, one designed to assist in the systematic planning and development of plant materials required for garden components (subject of the first bulletin) and the second to provide automated storage and retrieval of plants accessioned in the garden. A limited number of these technical bulletins are available to institutions that have a special interest in the use of computers in garden management.

Nitobe Garden Anniversary—The 10th Anniversary of the Nitobe Memorial Garden was held on one of the hottest days this summer, but the large attendance indicated the importance that the invitees attached to the occasion. We were particularly pleased to have Mr. K. Nozawa of Kobe, Japan come to the ceremony. A formal presentation of a portrait of the late Dr. Nitobe was made to the University and the portrait is now displayed in the Nitobe Garden Tea House.

Visitors—Dr. Milton V. Walker, Secretary of the Rhododendron Species Foundation visited the *Rhododendron* species collection following his most recent visitation to private gardens in Great Britain.

Dr. A. P. Chan, Director of the Plant Research Institute, Ottawa visited the campus in September and reviewed the model, plans, and areas of the proposed new garden development.

In mid summer, the Garden had the opportunity to review our program with Mr. Paul R. Miles of Woodbridge, Suffolk, England who is travelling to Botanical Gardens on a fellowship program. Particularly useful discussions were held on the new alpine scree garden program.

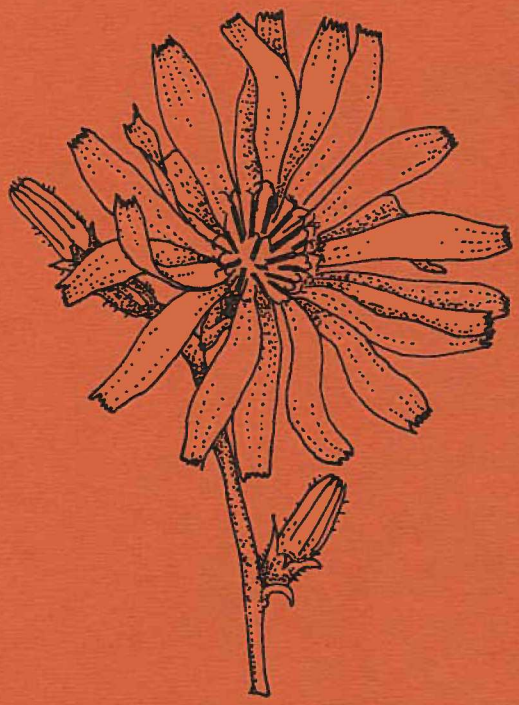
In early October, Dr. Warren H. Wagner, Director Matthaei Botanical Garden at the University of Michigan spent several days at the University and had an opportunity to review our current activities.

The Vancouver Rose Society and the Vancouver Chapter of the American Rhododendron Society both had field days at the garden. The summer tour of the Horticultural Society of New York visited the gardens in late July.

CLIMATOLOGICAL SUMMARY*

Data	*June*	*July*	*August*
Mean temperature	61.1°F	68.6°F	61.4°F
Highest temperature	86°F	81°F	76°F
Lowest temperature	47°F	49°F	49°F
Grass minimum temperature	39°F	39°F	38°F
Total rainfall/No. days with rainfall	1.19/7	1.82/6	.52/6
Total snowfall/No. days with snowfall	NIL	NIL	NIL
Total hours bright sunshine/possible	266.8/482.29	282.0/482.51	295.2/439.03
Mean mileage of wind at 3'	88.3	82.0	74.6
Mean mileage of wind at 40'	126.2	120.5	111.7

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



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Mr. Sam Oyama
Mr. Tomomichi Sumi
Mr. David Tarrant
Mr. Isao Watanabe

Botanists, it seems to me are scientists who don't agree.
Some seek the source of floral power, pulling petals off a flower.
Others delve within the cell, or better still an organelle
Whilst biochemists analyse, to find the truth they idolize.

A shadow lingers over all. Plants live beneath a man-made pall
As noxious vapours reek the sky, shall green plants simply wilt and die?
The problem's not plants' actual power, but how they're dying hour by hour.
The power is going from the flower.

Alan Bailey 1970

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