

**Vascular plants of Wells Gray Provincial Park and its vicinity,
in eastern British Columbia**

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In 1961 I had an opportunity to spend about one and a half months (June 14 – August 3) in the southernmost portion of Wells Gray Provincial Park and its vicinity, collecting vascular plants and bryophytes and studying the vegetation of forests and timber-line meadows. This paper contains a list of the vascular plants with notes on their ecology and zonal distribution in the park. There has apparently been only one previous small collection of vascular plants from the park, gathered by F. HARTMAN and R. RITCEY, in the Provincial Museum, Victoria, whilst occasional records in the papers by SZCZAWINSKI (1959, 1962) and by some game ecologists (e.g. EDWARDS 1954, GEIST 1959, EDWARDS and RITCEY 1959, 1960, EDWARDS, SOOS and RITCEY 1960) are the only literature notes on the flora of the park. The unpublished report by the late FAY HARTMAN (1957), who died in an air crash, contains a list of the commonest plants in the park with some indications of their abundance, although a few identifications are doubtful. There is also a report by AHTI (1962 a), which chiefly deals with the lichens and tree species in the park. KUJALA's (1945) phytosociological tables include a number of records along the railway on the east side of the park. His collections, made with AARNO CAJANDER

(KALELA) and deposited in Helsinki, have also been checked.

The nomenclature in this paper mainly follows HITCHCOCK, CRONQUIST, OWNBAY and THOMPSON (1955, 1959, 1961, 1964), HULTÉN (1941 – 1950), and MOSS (1959). Since there is no flora that includes all the vascular plants of this area, the nomenclature is not homogenous. In some cases, for instance, the rank of subspecies would be preferable to variety, which is much used in the American taxonomy, but the writer has avoided intricate nomenclatural problems.

The specimens were determined by myself, partly at the British Columbia Provincial Museum, Victoria, B. C. (1961) but mainly at the Botanical Museum, University of Helsinki, Finland (1963 – 64). Some species of *Agropyron*, *Castilleja*, *Carex*, *Draba*, *Elymus*, *Poa*, etc., were identified or checked by Mr. J. A. CALDER, Dr. W. BOWDEN and Dr. W. G. DORE, Science Service, Department of Agriculture, Ottawa, Ontario, for whose valuable help I wish to express my thanks. I am also indebted to Dr. J. JALAS and Dr. I. HIITONEN, Department of Botany, University of Helsinki, Finland, for checking a few identifications.

During my stay in Wells Gray Park I was helped by Mr. R. Y. EDWARDS, Mr. R. W. RITCEY and my husband, Dr. T. AHTI, to whom I convey my gratitude.

Financial support for this study was received from the Finnish National Research Council for Sciences and from the Finnish Zoological and Botanical Society 'Vanamo'.

I. General description of the park

Wells Gray Park is situated in the Cariboo Mountains, eastern British Columbia, the southern portion being at approximately lat. 52° N and long. 120° W (Fig. 1). The lowest elevations in the park are in the valleys of the southernmost parts: Clearwater River ca. 2 000 feet (ca. 600 m) Mahood Lake 2 058 feet (617 m), and Hemp Creek (Ranger Station) 2 100 feet (630 m). The highest peaks covered by permanent snow and ice are in the northern portion of the park: Buc Hanan 8 500 feet (2 600 m), Mt. Hogue 8 000 feet (2 400 m), Azure Mtn. 8 186 feet (2 456 m). Characteristic of Wells Gray Park are big lakes between the mountains (Hobson, Azure, Clearwater, Murtle and Mahood Lake) and rivers with frequent rapids (Murtle River, Clearwater River).

From the vegetation it may be concluded that the bedrock in the areas studied consists largely of schistose rocks. Most of the fens are mesotrophic or meso-eutrophic (at Murtle Lake and Stevens Lakes); the only highly eutrophic fen was seen in the Hemp Creek Valley, where the soil is clearly calcareous. The fens on Battle Mtn. and on Fish Lake Hill are oligotrophic or sometimes mesotrophic. The peak of Battle Mtn. – the only extensive area visited that is without a thick soil mantle – is composed of apparently gneissoid rocks. In the low parts of the park the bedrock is usually covered by thick, fine or coarse sandy till and only a few small bare outcrops are found on lake shores and riversides.

In many places there are marks of lightning fires of limited extent (Murtle Lake, Stevens Lakes, Battle Mtn., etc.), but the largest forest fire occurred in 1926, when about 200 square

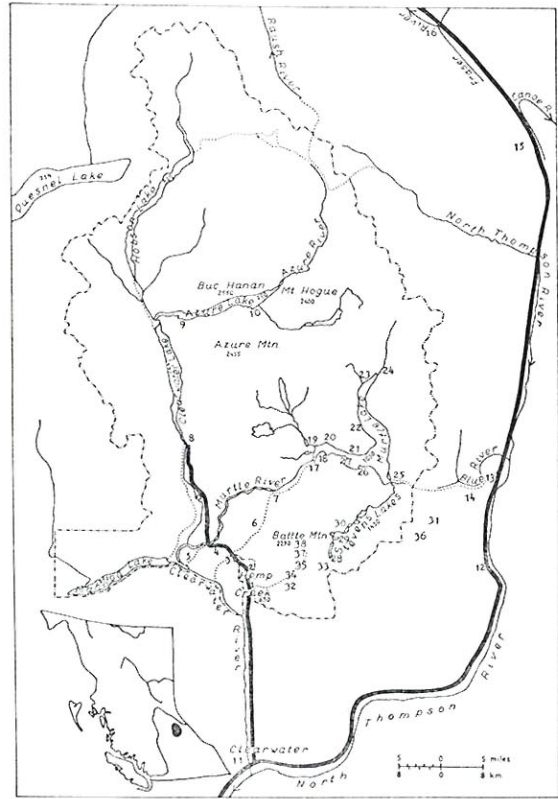


Fig. 1. The situation of Wells Gray Provincial Park and the localities studied, which are indicated by the numbers.

miles of forested land was denuded in the southern part of the park (EDWARDS 1954).

Climatically, Wells Gray Park belongs to the Interior Wet Belt. Very little information is

Table 1. Mean monthly and annual temperatures and precipitations at Hemp Creek, Blue River and Vavenby, according to MACKIE (1963).

		Mean monthly and annual temperature												
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Hemp Creek	°F	16	22	28	40	49	55	59	57	48	40	28	22	39
alt. 2 100 feet (630 m)	°C	-8.9	-5.6	-2.2	4.4	9.4	12.8	15.0	13.9	8.9	4.4	-2.2	-5.6	3.9
Blue River (14 years)	°F	12	21	29	38	50	56	61	59	51	40	28	20	39
alt. 2 243 feet (673 m)	°C	-11.1	-6.1	-1.7	3.3	10.0	13.3	16.1	15.0	10.5	4.4	-2.2	-6.7	3.9
Vavenby (30 years)	°F	18	24	35	45	54	59	64	62	55	44	32	24	43
alt. 1 545 feet (464 m)	°C	-7.8	-4.4	1.6	7.2	12.2	15.0	17.8	16.7	12.8	6.7	0	-4.4	6.1
		Mean monthly and annual precipitation												
Hemp Creek	inches	2.13	1.43	1.15	0.92	1.92	2.94	1.71	2.47	2.24	1.84	1.87	2.31	22.93
(10 years)	mm	54	36	29	23	49	75	43	63	57	47	47	59	582
Blue River	inches	4.27	3.28	2.79	2.11	2.49	3.30	3.19	3.33	2.88	3.90	4.41	4.97	40.92
(14 years)	mm	108	83	71	54	63	84	81	85	73	99	112	126	1039
Vavenby	inches	1.53	1.05	0.80	0.92	1.40	2.01	1.49	1.72	1.42	1.52	1.39	1.56	16.81
(30 years)	mm	39	26	20	23	36	51	38	44	36	39	35	40	427

available concerning the climate of most of the park, although at Hemp Creek meteorological observations have been made since the year 1952. The mean monthly and annual precipitation and temperature are given in Table 1 for Hemp Creek and for two other stations (Blue River and Vayenby) situated near the park (MACKIE 1963).

II. Effect of human activities on the flora of the park

The history of the park has not been published and it is not very well known. Mr. R. Y. EDWARDS has kindly told me some facts about it. The area was never permanently settled by Indians and was also always by-passed by early explorers. The first record of European man in the area that is now the park was in 1883, when some prospecting was done there. Since that date there has probably been continuous fur trapping, and no doubt also continuous use of packhorses. Various small mining projects have been undertaken, beginning about 1902. All have been small. Access, in these early days, was mainly from the west, via Mahood Lake, or Quesnel Lake. Interest in the timber increased about 1910, some logging equipment being brought into the area. Surveys about 1912 resulted in glowing and erroneous reports on the agricultural potential of the area. There was a small rush of settlers as a result, but they did not stay long, except south of the park. JOHN RAY was an exception. He remained there until he died, about 1950.

Until 1940, the present Wells Gray Park road went only as far as Hemp Creek. By 1955 it was extended to Clearwater Lake. However, a good, well-used horse trail always started where the road ended, and men, horses, and agricultural supplies have been going up the valley for half a century. Trails climbing out of the valley, if used by horses, would repeatedly have been supplied with the seeds of weeds which might be associated with horse feed.

The area became a provincial park in 1939, and a major addition, the Battle Mountain area, was made about 1954. Many of the settlers left the valley after the big fire in 1926 (cf. EDWARDS 1954), which also destroyed buildings.

To-day, Hemp Creek is the only part by the park where there are people living all the year round, taking care of their farms, hunting and

In most parts of the park the precipitation is probably close to that at Blue River; the valley of Hemp Creek is in the driest portion of the park. Further, the temperature in the other parts of the park is lower than at Hemp Creek, which is obviously situated near the boundary between the Interior Wet Belt and the Dry Belt.

guiding sportsmen. In other portions of the park there are only solitary cabins for fire-patrolmen and hunters.

The park is not a major tourist attraction yet but its importance is steadily increasing (TAYLOR and EDWARDS 1960).

Several plant species have been introduced into the park by man. At Hemp Creek, for instance, weeds are widespread around the farms (*Capsella bursa-pastoris*, *Galeopsis bifida*, *Matricaria matricarioides*, *Poa trivialis*, *Stellaria media*, etc.) and a horse pasture was rich in species obviously not native to this area (*Achillea lanulosa*, *Carex crawfordii*, *C. stipata*, *Cirsium vulgare*, *Juncus ensifolius*, *Ranunculus pennsylvanicus*, *Rumex crispus*, *Sisyrinchium montanum*, *Trifolium agrarium*, *T. dubium*, *Vicia americana* var. *truncata*).

Most aliens are confined to man-made habitats but some seem to have become naturalized at Hemp Creek (e.g. *Agrostis gigantea*, *Bromus inermis*, *Carex pachystachya*, *Lychnis alba*, *Ranunculus abortivus* var. *acrolasius*, *R. macounii*, *Trifolium repens*). On dry, warm roadsides there are also several species, often solitary and casual, that are common in the Interior Dry Belt (*Bromus tectorum*, *Hordeum jubatum*, *Melilotus albus*, *Sisymbrium altissimum*, *S. loeselii*, *Tragopogon pratense*, *Verbascum thapsus*) and have been introduced from that direction with the traffic.

Far from settlements there are some adventive plants to be found, e.g. *Trifolium repens* is abundant in places in the burned area of the lower part and *Poa compressa* was growing in the second-growth *Populus tremuloides* forest near the Murtle River trail about six miles from Hemp Creek. These, as well as plants found in yards of solitary cabins, must have been carried by people or horses. For instance, at Diamond Lake cabin on Murtle Lake *Phleum pratense*,

Plantago major, *Poa annua* and *Trifolium hybridum* were found.

Several indigenous species in the park are also spread by human activities, e.g. *Agoseris*

aurantiaca, *Aster ciliolatus*, *A. modestus*, *Juncus mertensianus*, *Carex mertensii*, *Ranunculus uncinatus* var. *parviflorus*, *Veronica americana*.

III. Zonal distribution of the vascular plants

When MERRIAM's well-known life-zone system (MERRIAM 1899, etc., PIPER 1906, JONES 1936, BROCKMAN 1938, etc.) is applied to the vegetation of the study area, the zones from the Arctic-Alpine to the Canadian zone are to be found. Perhaps the bottom of Clearwater Canyon has features of the Transition zone, but it has not been included in this study. The *Canadian zone* occupies the lower elevations (below ca. 4 000 feet) and was met at Blue River, Hemp Creek, Clearwater River Valley, Clearwater Lake, Azure Lake, Murtle River Valley and Murtle Lake (Fig. 1). The *Hudsonian zone* was seen at Stevens Lakes, on Battle Mtn. and on Fish Lake Hill. The *Arctic-Alpine zone* has been studied only on Battle Mtn.

According to DAUBENMIRE (1943), Wells Gray Park belongs floristically to the Northern Rocky Mountains division. Of his vegetation zones (DAUBENMIRE 1942, 1946) there exist the Sedge-grass zone, the Spruce-fir zone and the Arborvitae-hemlock zone.

Of the forest regions of HALLIDAY (1937) and ROWE (1959) there occur the Columbia forest and the subalpine forest region, although in their maps the limits are not at all correctly indicated in the park.

According to COWAN and GUIGUET (1960), the study area belongs to the southern alplands, the subalpine forest and the Columbian forest, although in their map the last-mentioned biotic region does not extend to Wells Gray Park.

KRAJINA (1959) has outlined the major bioclimatic zones of British Columbia and, according to him, the park belongs to the Interior Western Hemlock zone, to the Subalpine Engelmann Spruce-Subalpine Fir zone and to the Alpine zone.

Lately, the writer and two colleagues have proposed a zonal division for northwestern Europe (АНТИ et al. 1964), which seems to cover the entire boreal and arctic area and which can also be employed in mountains with vegetation closely related to the strictly arctic

and boreal. In such comparatively small areas as Wells Gray Park the zones proposed by MERRIAM, DAUBENMIRE, KRAJINA and others are too broad to be used as categories in the description of the vegetation and distribution of the flora, and therefore the present author has chosen the refined «Finnish» system in this paper. The various systems used in western North America are compared in Table 2.

Because a subsequent paper will be published on the forest and the orohemiarctic meadow vegetation in Wells Gray Park the zones will only be briefly characterized here.

Oroarctic zone. The treeless zone, to which a great number of oroarctic («alpine», «arctic») species are restricted. On Battle Mtn. this flora includes *Campanula lasiocarpa*, *Cardamine bellidiflora*, *Cassiope tetragona* ssp. *saximontana*, *Erigeron humile*, *Hierochloë alpina*, *Luzula arcuata*, *Oxyria digyna*, *Salix cascadiensis*, *Saxifraga lyallii* var. *hullenii*, *S. oregonensis*, *S. mertensiana*, *Silene parryi*, *Solidago mulliradiata* var. *scopulorum*.

Orohemi-arctic zone. The zone of the timberline meadows («subalpine meadows») intermingled with small or thin stands of *Abies lasiocarpa* and *Picea engelmannii*. In the meadows there are found *Agoseris aurantiaca*, *Antennaria lanata*, *A. umbrinella*, *Cassiope mertensiana*, *Carex illota*, *C. nigricans*, *Gentiana glauca*, *Luzula spicata*, *Pedicularis bracteosa*, *Salix barclayi* and in the tree stands *Arnica latifolia*, *Luetkea pectinata*, *Mitella breweri*, etc.

Upper oroboreal zone. The dominant vegetation of this zone is *Abies lasiocarpa* – *Picea engelmannii* forest. Hardly any species in Wells Gray Park are confined to this zone. Many of them also occur in the preceding zone (*Arnica latifolia*, *Epilobium hornemannii*, *Luetkea pectinata*, *Mitella breweri*, *Osmorhiza purpurea*, etc.) and some frequently descend to the following zone (e.g. *Menziesia ferruginea* var. *ferruginea*). The upper limit of this zone is characterized by dense thickets of *Rhododendron albiflorum*.

Table 2. The zonal division of the study area compared with systems outlined by various authors.

The study areas	The North American life zones of MERRIAM (1899), PRIPER (1906). JONES (1936), etc.	The life zones in the northern intermountain region of DAUBENMIRE (1942, 1946).	The western forested regions of Canada of HALLIDAY (1937) and ROWE (1959)	The bioclimatic zones in B. C. of KRAJINA (1959)	The biotic areas in B. C. of COWAN and GUIGUET (1960)	The vegetation zones of AHRI et al. (1964)	
						Mountains	(Lowland)
The peak of Battle Mtn. (above ca. 2 000 m)	Arctic-alpine zone	Sedge-grass zone	Alpine tundra	Alpine zone	Southern alplands	Oroarctic	(Arctic)
Battle Mtn. and Fish Lake Hill (ca. 1 600 – 2 000 m)	Hudsonian zone	Spruce-fir zone	Subalpine forest region	Subalpine Engelman Spruce Subalpine Fir zone	Subalpine forest	Orohemi-arctic	(Hemi-arctic)
Fish Lake Hill and Stevens Lakes (ca. 1 200 – 1 600 m)						Upper oroboreal	(Northern boreal)
Murtle Lake (ca. 1 200 – 900 m)	Canadian zone	Arbovitae-hemlock zone	Columbian forest region (northern section)	Interior Western Hemlock zone	Columbia forest	Middle oroboreal	(Middle boreal)
The valleys of Blue River, Hemp Creek, Clearwater River and Lake, Azure Lake and lower part of Murtle River (below ca. 900 m).						Lower oroboreal	(Southern boreal)

Middle oroboreal zone. The abundant trees in the old forests are *Abies lasiocarpa*, *Picea engelmannii*, *Thuja plicata* and *Tsuga heterophylla*. A few species were found in the park only in this zone (*Carex chordorrhiza*, *C. sitchensis*, *C. tenuiflora*, *C. trisperma*, *Salix sitchensis*); several are also found in the next zone, where they are often more abundant (e.g. *Betula papyrifera* var. *commutata*, *Chimaphila umbellata* ssp. *occidentalis*, *Cinna latifolia*, *Circaea alpina* var. *pacifica*, *Clintonia uniflora*, *Galium triflorum*, *Lysichiton americanum*, *Osmorhiza chilensis*, *Pachystima myrsinites*, *Picea glauca*, *Populus tremuloides*, *Pteridium aquilinum* var. *pubescens*, *Salix lasiandra*). A great number of species common to the Pacific coastal forests and to the Interior Wet Belt are found in this and the next zone (*Lonicera involucrata*, *Oplopanax horridus*, *Pinus monticola*, *Rubus parviflorus*, *Spiraea douglasii*, *Thuja plicata*, etc.).

Some species common in the orohemiarctic zone are still found in this zone: *Erigeron peregrinus*, *Senecio triangularis*, *Valeriana sitchensis*, *Veratrum eschscholtzii*, *Veronica wormskjoldii*. It is possible that the last-mentioned species, at least, has different races in the park. At

Murtle Lake, which is the only place really studied in this zone, some essentially orohemiarctic species are found sparsely and occasionally in fens and other sites situated near the lake shore and the bank of Murtle River (*Danthonia intermedia*, *Luzula parviflora*, *Pedicularis bracteosa*, etc.). Their seeds have presumably been transported by water from mountains and they can thrive here, perhaps on account of the great cold lake.

Lower oroboreal zone. The dominant trees of the forest are the same as in the preceding zone. Typical plants of this zone in the park are *Antennaria howellii*, *A. racemosa*, *Apocynum androsaemifolium*, *Asarum caudatum*, *Aster conspicuus*, *Bromus ciliatus*, *Carex aenea*, *C. retrorsa*, *Corylus cornuta*, *Crataegus douglasii*, *Glyceria grandis*, *Lilium columbianum*, *Mahonia aquifolium*, *Menziesia ferruginea* var. *glabella*, *Oryzopsis asperifolia*, *Prunus emarginata*, *P. pensylvanica*, *Salix pseudocordata*, *S. scouleriana*, *Schizachne purpurascens*, etc. In the burned areas of this zone *Populus tremuloides* and *Salix scouleriana* are commonly dominant; in the other zones in the park coniferous trees mainly form the second-growth forests.

There are at least two sections¹ of the lower oroboreal zone in the study area. The one represented by the Hemp Creek Valley is dry and in it are found some species common in the Interior Dry Belt (*Antennaria rosea*, *Apocynum androsaemifolium*, *Aretostaphylos uva-ursi*, *Corylus cf. cornuta*, *Fragaria virginiana* var. *glauca*,

Lilium columbianum, *Mahonia aquifolium*, etc.), and the other, including the valleys of Blue River, Clearwater Lake, Azure Lake, Clearwater River and the lower course of Murtle River, is more rainy. The climatic differences between these sections are accentuated by the burned forests of Hemp Creek and its calcareous soil.

IV. The localities

Lower oroboreal zone

Hemp Creek

- (1. Outside the park boundary at the south entrance, c. 2 mi. SE of Hemp Creek Ranger Station, on Battle Mtn. Trail.)²
- (2. Outside the park boundary at the south entrance, the vicinity of Hemp Creek Ranger Station)
3. On Clearwater Lake road, c. 1 – 1.5 mi. NW of Hemp Creek Ranger Station.

Murtle River

4. C. 5 mi. WSW of Mahood Lake, by Dawson and Mushroom Falls.
5. C. 3 – 4 mi. WSW of Mahood Lake, on Helmcken Falls Trail and above the falls.
6. C. 6 mi. NE of Hemp Creek Ranger Station, on Murtle Lake Trail.
7. C. 10 mi. NE of Hemp Creek Ranger Station, by the Stillwater cabin.

Clearwater Lake

8. Southern end of the lake, by the patrolman's cabin.

Azure Lake

9. Southern shore of the lake, c. 3 mi. E of the western end.
10. Rainbow Falls at the mouth of Angus Horne Creek.

Clearwater

- (11. Clearwater Station)

Messiter

- (12. Messiter Station)

Blue River

- (13. Blue River Station, also including collections of A. Cajander and V. Kujala 1931 and records by KUJALA (1945).)
- (14. C. 2 mi. SW of Blue River Station)
- (15. Canoe Creek; collections of A. Cajander and V. Kujala 1931 and records by KUJALA (1945).)
- (16. Valemount³, Jackman³ and Cedarside³; collections of A. Cajander and V. Kujala 1931 and records by KUJALA (1945).)

¹ In the adopted here vegetation zone system the zones are essentially separated by features controlled by quantity of heat; the zones are divided into sections by means of features depending on the degree of continentality (cf. AHTEI et al. 1964).

² The places in parentheses are situated outside the park boundary.

³ Because I have not visited these places, I cannot be quite sure about their zonal situation.

Middle oroboreal zone

Murtle Lake

17. SW end, c. 0.5 mi. S of Diamond Lake.
18. SW end, east side of Diamond Lake.
19. W end, 0.5 mi. N of the mouth of File Creek.
20. N shore of the western arm, c. 0.5 mi. E of the mouth of Anderson Creek.
21. N shore of the western arm, foot of Ramsay Mtn.
22. S shore of the northern arm, c. 6.5 mi. S of the mouth of Vachon Creek.
23. W shore of the northern arm, c. 0.3 mi. NE of the mouth of Vachon Creek.
24. N end, c. 1 mi. up Murtle River.
25. SE end, the mouth of Snookwa Creek and the end of Blue River Trail.
26. S shore of western arm, by patrolman's cabin.
27. S shore of the western arm, c. 1.5 mi. W of patrolman's cabin, on the bay and cape and a little island opposite to Ramsay Mtn.

Upper oroboreal zone

Stevens Lakes

28. Southern and eastern shore of the southernmost of Stevens Lakes.
29. The northern end of the southernmost of Stevens Lakes.
30. C. 1.5 – 2 mi. NE of the southernmost of Stevens Lakes.

Fish Lake Hill I

- (31. 10 – 11 mi. SW of Blue River Station).

Orohemiarctic zone

Battle Mtn. I

32. S slope, c. 0.5 mi. S of Fight Lake, Caribou Meadows.
33. E slope, c. 1 mi. SW of the southernmost of Stevens Lakes.
34. S slope, Fight Lake Meadow.
35. S slope, #52 Ridge and Bowl Valley.

Fish Lake Hill II

- (36. 11 – 12 mi. SW of Blue River Station).

Oroarctic zone

Battle Mtn. II

37. Southern slopes of the highest peak and the southwestern peak.
38. Summits of the highest peak and the southwestern peak.

V. The plant list

The following list includes all the collections gathered by myself and my husband, Dr. T. AHTI, in 1961, and by Prof. V. KUJALA and Prof. A. KALELA (then CAJANDER) in 1931; these specimens are now deposited at the Botanical Museum, University of Helsinki, Finland, and a great number of duplicates were sent to the British Columbia Provincial Museum, Victoria, B. C. In parentheses are given records based on field notes or on literature only. In many cases the numbered localities are not indicated, because the field notes were not precise enough.

The abbreviations used in the plant list

- r = rare
 fr = fairly rare
 sc = scattered
 ffq = fairly frequent
 fq = frequent
 H = the specimen is at the Botanical Museum, University of Helsinki, Finland.
 V = the specimen is at the British Columbia Provincial Museum, Victoria, B. C.
 * = the plant was found outside the park boundary only.

Ophioglossaceae

Botrychium boreale (Fr.) Milde ssp. *obtusilobum* (Rupr.) Clausen – Murtle River: 6, very sparse in dry second-growth *Populus tremuloides* forest. – Battle Mtn. I: 34, sparse in mesic *Artemisia* – *Lupinus* meadow.

**B. lunaria* (L.) Sw. – Hemp Creek: 2, two shoots in dry second growth *Populus tremuloides* forest.

B. multijidum (Gmel.) Rupr. – Murtle Lake: (26), sparse in narrow alluvial meadow strip on lake shore.

B. virginianum (L.) Sw., s.lat. – Hemp Creek: (3), r. Blue River: (13), KUJALA 1945. – Murtle River: 6, r.

Sparse in moist, rich forests. The specimen is var. *euro-paeum* Ångstr.

Polypodiaceae

Asplenium viride Huds. – Azure Lake: 10, locally abundant on wet rock wall by water-falls.

According to TAYLOR (1956), apparently rare and known only from the southern Rockies in eastern B. C.

Athyrium filix-femina (L.) Roth ssp. *cyclosorum* (Rupr.) C. Chr. – Hemp Creek: 2, sparse in alluvial *Alnus* swamp along brook. Blue River: (13), KUJALA 1945. – Murtle Lake: (17, 23, 24, 26).

Cryptogramma crista (L.) R. Br. var. *sitchensis* (Rupr.) C. Chr. – Murtle Lake: 21, sparse in wide open boulder bed near the lake shore.

This collection is very typical and its locality is far outside the range of this variety as mapped by RAUP (1947).

Cystopteris fragilis (L.) Bernh. cf. ssp. *fragilis* – Murtle River: 4, sparse in rock crevice by falls. Spores of this collection are echinate.

C. montana (Lam.) Bernh. – Azure Lake: 10, sparse on wet rock wall by water-falls.

According to TAYLOR (1956), known only from a few localities in B. C.

**Dryopteris cristata* (L.) A. Gray – Blue River: 13, A. Cajander and V. Kujala 1931.

This species is rare in B. C. and according to TAYLOR (1956) it has only been collected in the vicinity of Revelstoke and Kitchener.

D. dilatata (Hoffm.) A. Gray – Hemp Creek: 3, sc. Blue River: 13, A. Cajander and V. Kujala (also KUJALA 1945). – Murtle Lake: 17, (18 – 20, 22 – 24), ffq. – Fish Lake Hill II: 36, sc.

The specimens from Hemp Creek and Murtle Lake seem to fit well with the description of the poorly known «western *D. dilatata*» of WAGNER and HAGENAH (1962) and of WALKER (1961). The specimen from Fish Lake Hill agrees neither with that type nor with the other *Dryopteris* types described from western North America. Its fronds are rather narrow, about 20 cm in breadth, 45 cm long and lanceolate; the angles between the rachis and the pinnae are often less than 45°. The segments of the pinnules are serrate, the teeth large, deep (0.5 mm) and acuminate. The writer has seen a specimen of the same type from Pine Pass, northern B. C., collected by Calder, Savile and Ferguson (no. 13983; H).

Gymnocarpium dryopteris (L.) Newm. (*Dryopteris linnaeana* C. Chr.) – Hemp Creek: (2), 3, ffq. Blue River: (13, 15, 16), KUJALA 1945. – Murtle Lake: (17 – 19, 21 – 24, 26), fq. – Stevens Lakes: (30), f. fq.

Common and often abundant in fresh forests up to the upper oroboreal zone.

**Matteuccia struthiopteris* (L.) Todaro var. *pennsylvanica* (Willd.) Morton – Blue River: (13), KUJALA 1945.

TAYLOR (1956) did not report this from Eastern British Columbia.

Pteridium aquilinum (L.) Kuhn var. *pubescens* Underw. – Hemp Creek: (2), rare in dry second-growth *Populus tremuloides* forest. Blue River: (13), KUJALA 1945. – Murtle Lake: (23), very dense stand 2 m high in a stony furrow caused by an avalanche, with *Alnus crispa* ssp. *sinuata*.

Thelypteris phegopteris (L.) Slosson (*Dryopteris phegopteris* (L.) C. Chr.)

Murtle Lake: 17, abundant in a rich swamp forest.

Woodsia scopulina D. C. Eat. – Murtle River: 4, locally abundant in a boulder bed by water-falls.

Equiselaceae

Equisetum arvense L. var. *boreale* (Bong.) Ledeb. – Hemp Creek: 2, 3, abundant in the margins of the eutrophic and spring-fed fens. Blue River: (13, 16), KUJALA 1945. – Murtle Lake: 18, sparse in a moist coniferous forest. – Battle Mtn. I: 35, scattered along brooks.

E. fluviatile L. – Murtle Lake: 18, scattered in mesotrophic fens and in muddy bays of the lake.

**E. × ferrissii* Clute (*E. hyemale* L. × *E. laevigatum* A. Br.) – Clearwater: 11, fq. Messiter: 12, fq.

Common on dry to moist roadsides and gravelly railroad banks, often forming large pure stands.

The ridges of the specimens are bituberculate (cf. HAUKE 1963, p. 97).

**E. hyemale* L. var. *affine* (Engelm.) A. A. Eat. – Hemp Creek: 2, locally abundant on dry roadside. Blue River: (16), KUJALA 1945.

E. palustre L. – Murtle Lake: 18, rare in eutrophic fens. – Stevens Lakes: (28), rare in mesotrophic fens. – Battle Mtn. I: (32, 34), sparse along brooks.

The specimen collected does not fit the description of *var. americanum*.

**E. pratense* Ehrh. — Hemp Creek: 2, sparse in an alluvial *Alnus* swamp. Blue River: 16, A. Cajander and V. Kujala, (13, 16), KUJALA 1945.

E. scirpoides Michx. — Hemp Creek: 3, sparse along a moist spring-fed brook in shaded coniferous forest. Blue River: 16, A. Cajander and V. Kujala (also KUJALA 1945).

E. sylvaticum L. var. *pauciramsum* Milde — Hemp Creek: (2), r. Blue River: (13), KUJALA 1945. — Murtle Lake: 18, (19), f r. — Stevens Lakes: (30), r.

Often locally abundant in swamps and swamp forests up to the upper oroboreal zone.

E. variegatum Schleich. *var. *variegatum* — Hemp Creek: 2, sparsely along a eutrophic spring-fed brook.

This specimen fits the description of this variety very well and seems to differ from the following type in its ecology as well.

var. *alaskanum* A. A. Eat. \approx var. *variegatum* — Murtle Lake: 25, on sandy lake shore.

This specimen has a robust habit, straight teeth with white margins, and narrow sheaths (cf. HAUKE 1963).

Lycopodiaceae

Lycopodium annotinum L. cf. var. *annotinum* — Hemp Creek: (3), f, fq. Blue River: (13, 15), KUJALA 1945. — Murtle Lake: 18, (24, 25), f fq.

In fresh and sandy alluvial coniferous forests.

var. *alpestre* Hartm. — Stevens Lakes: 28, sparsely at the margin of a swamp forest on lake shore.

L. clavatum L., s.lat. — Blue River: (16), KUJALA 1945. — Stevens Lakes: r.

L. complanatum L. ssp. *complanatum* — Hemp Creek: 2, r. Blue River: (13, 15, 16), KUJALA, 1945. — Murtle Lake: r. — Stevens Lakes: r.

On dry rock outcrop in second-growth *Populus tremuloides* forest, in dry coniferous forests and in burned areas.

L. obscurum L. — Blue River: (15, 16), KUJALA 1945. — Murtle Lake: (26), a dead shoot (an uncertain observation made by Dr. Ahti).

L. selago L. var. *appressum* Desv. — Murtle Lake: 27, sparse on alluvial sandy lake shore

var. *patens* (Beauv.) Desv. — Murtle River: 5, sparse in fresh coniferous forest on river bank.

*var. *selago* — Fish Lake Hill II: 36, abundant in a dry meadow at margin of forest.

L. sitchense Rupr. — Battle Mtn. I: (32, 33), 34, sc. Fish Lake Hill II: 36, sc.

Fairly common in dry orohemiarctic meadows at margins of forests.

Selaginellaceae

Selaginella wallacei Hieron. — Battle Mtn. I: 32, sparsely in a crevice by small rapids. — Battle Mtn. II: (37), scattered in rocky meadows.

Isoëtaceae

Isoetes bolanderi Engelm. — Murtle Lake: 18, few individuals driven ashore.

Taxaceae

Taxus brevifolia Nutt. — Azure Lake: 10, locally abundant in a rich coniferous forest. Blue River: 13, A. Cajander and V. Kujala, (15), KUJALA 1945.

Pinaceae

Abies lasiocarpa (Hook.) Nutt. — Hemp Creek: (3), sc. Murtle River: (4, 5). Azure Lake: (9). Blue River: (13, 15, 16), KUJALA 1945. — Murtle Lake: (17), 18, (19–24, 26), f fq. — Stevens Lakes: (28–30), fq. Fish Lake Hill I: (31), fq. — Battle Mtn. I: (32–35), fq. Fish Lake Hill II: (36), fq. — Battle Mtn. II: (37), r.

In the lower and middle oroboreal zones common but not dominant, mainly in fresh old forests, usually forming a lower tree layer. Dominant tree in forests of the upper oroboreal and the orohemiarctic zones. Very rare, small bush in the oroarctic zone.

Juniperus communis L. var. *depressa* Pursh — Hemp Creek: 2, (3), scattered in dry second-growth *Populus tremuloides* forests and in dry pastures. — Murtle Lake: (25), sparsely in dry sandy *Pinus contorta* forest.

var. *saxatilis* Pall. — Murtle Lake: 21, sparse in a wide boulder bed on a lake shore. — Battle Mtn. II: (38), sparsely in the rocky oroarctic zone.

Picea engelmannii Parry — Hemp Creek: 3, f fq. Murtle River: (5). Blue River: (13, 15, 16), KUJALA 1945. — Murtle Lake: (17–20, 22–27), fq. — Stevens Lakes: (28–30), fq. Fish Lake Hill I: (29), fq. — Battle Mtn. I: (32–35), fq. Fish Lake Hill II: (36), fq. — Battle Mtn. II: (37), r.

Common in fresh to wet forests up to the orohemiarctic zone; very sparsely in the lower part of the oroarctic zone as small bushes.

**P. engelmannii* \times *P. glauca* — Hemp Creek: 2, (3) fq. Apparently the most common *Picea* in the Hemp Creek Valley. GARMAN (1957) reported that this hybrid is abundant in the Clearwater area.

P. glauca (Moench) Voss. — Hemp Creek: (2, 3), sc. — Murtle Lake: 18, r. — Battle Mtn. I: (34), one small stand.

Sparse in fresh coniferous forests up to the middle oroboreal zone.

**P. mariana* (Mill.) BSP. — Blue River: (16), KUJALA 1945.

Pinus albicaulis Engelm. Reported by HARTMAN (1957).

P. contorta Loudon var. *latifolia* Engelm. — Hemp Creek: (2, 3), sc. Murtle River: (4). Blue River: (13, 15, 16), KUJALA 1945, (13, 14). — Murtle Lake: 18, (24–26), fq. — Stevens Lakes: (30), sc. — [Battle Mtn. I: (32), r.]

In dry second-growth forests and in mesotrophic to eutrophic fens as a small tree up to the upper oroboreal zone. In the observation from Battle Mtn. the identification is uncertain.

P. monticola Dougl. — Blue River: (13), KUJALA 1945, (14), f fq. — Murtle Lake: (25), 26, f r.

Locally abundant in dry to fresh coniferous forests.

Pseudotsuga menziesii (Mirb.) Franco — Hemp Creek: 2, (3), fq. Murtle River: (4). Blue River: 16, A. Cajander and V. Kujala, (13, 16), KUJALA 1945, (14). — Murtle Lake: (25), sc.

Common in dry second-growth *Populus tremuloides* stands and in dry to fresh coniferous forests in the lower oroboreal zone. Sparsely in the middle oroboreal zone.

Thuja plicata D. Don — Hemp Creek: (2, 3), fq. Murtle River: (4), 5, (6, 7). Clearwater Lake: (8). Azure Lake: (9, 10).

Blue River: (13, 15), KUJALA 1945. – Murtle Lake: (17, 18, 21, 22, 25, 26), fq.

Common and often abundant in rich, mesic and moist sites up to the middle oroboreal zone, in dry habitats more sparsely. Frequently a tree 30–35 m high in forest; also characteristically a thick bush, 2–4 m high, on shores of Azure, Clearwater and Murtle Lakes.

Tsuga heterophylla (Raf.) Sarg. – Hemp Creek: (2, 3), fq. Murtle River: (4, 5, 7). Azure Lake: (9, 10). Blue River: (13, 15, 16), KUJALA 1945, (13, 14). – Murtle Lake: (17), 18, (20, 22, 25, 26), fq.

Common but scattered in dry to fresh forests up to the middle oroboreal zone. Dominant only in dry to fresh old forests, which are infrequent.

Typhaceae

Typha latifolia L. – Hemp Creek: 3, abundant in a eutrophic fen, obviously native.

Juncaginaceae

Scheuchzeria palustris L. var. *americana* Fern. – Murtle Lake: 18, sparse in wet hollows in a mesotrophic fen.

Triglochin maritimum L., s. lat. (cf. LÖVE & LÖVE 1958). – Hemp Creek: 3, sparsely in a eutrophic fen.

Gramineae

**Agropyron (Elytrogia) repens* (L.) Beauv. – Hemp Creek: 2, in the yard of the Ranger Station, abundant, adventive.

**A. (Roegneria) trachycaulum* (Link) Malte var. *trachycaulum* – Hemp Creek: 2, in second-growth *Populus tremuloides* forests and in a rich alluvial swamp forest, scattered.

**Agrostis exarata* Trin. – Hemp Creek: 2, along brook.

A. gigantea Roth (*A. alba* auct. Amer.) – Hemp Creek: 2, (3), fq. Murtle River: (4, 5). Blue River: (13). Fully naturalized on roadsides and in alluvial forests at Hemp Creek. – Murtle Lake: 18, in the yard of the cabin sparsely,

A. idahoensis Nash – Battle Mtn. I: 34, on bare mull in pits made by ground squirrels.

A. scabra Willd. – Hemp Creek: 2, fq. on roadsides and on bare ground along a brook. – Murtle Lake: 21, in an extensive boulder bed, sparsely, apparently native. – Stevens Lakes: 28, in a wide open burnt area abundant, possibly native.

A. thurberiana Hitchc. – Murtle Lake: 17, r. – Battle Mtn. I: (32), 34, (35), fq. Fish Lake Hill II: 36, fq. – Battle Mtn. II: (37), sc.

In cool seepages, along brooks and in spring-fed fens.

**Alopecurus aequalis* Sobol. – Hemp Creek: 2, in alluvial meadow near road, sparse.

This specimen differs from the North European *A. aequalis* in its tall size (45 cm), narrow leaves, only weakly distended sheaths, long (5–7 cm) and thin (3–4 mm) panicle, and in the erect culms not rooting at the nodes. This type seems to be the common one in North America.

**Anthoxanthum odoratum* L. – Hemp Creek: 1, on trail in dry second-growth *Populus tremuloides* forest, sparse, alien.

Bromus ciliatus L. – Hemp Creek: 2, sc. Murtle River: 5. Blue River: 16, A. Cajander and V. Kujala.

Fairly abundant in fresh forests on river banks and in rich alluvial swamps and swamp forests, native.

**B. inermis* Leyss. – Hemp Creek: 2, naturalized in *Alnus* forest along the creek near the road.

**B. marginalis* Nees – Hemp Creek: 2, on roadside, introduced and casual.

**B. tectorum* L. – Hemp Creek: 2, on dry roadside sparse, introduced, apparently casual.

Calamagrostis canadensis (Michx.) Beauv. – Hemp Creek: 2, sc. Blue River: 16, A. Cajander and V. Kujala, (13, 16), KUJALA 1945. – Murtle Lake: (18), 19, (24, 25), sc. – Stevens Lakes: (28, 30), r. – Battle Mtn. I: (32, 33), 34, r.

Common along brooks up to the orohemiarctic zone; also seen in alluvial mesotrophic fens, in wet meadows and abundant in an orohemiarctic burned-over fresh forest.

All the other specimens collected seem to fit to var. *canadensis*; only that one gathered by Cajander and Kujala is closest to var. *robusta* Vasey.

C. inexpansa A. Gray – Hemp Creek: 3, in eutrophic fen in *Sphagnum fuscum* hummocks.

Cinna latifolia (Trev.) Griseb. – Hemp Creek: 2, sc. Blue River: (13), KUJALA 1945. – Murtle Lake: (17), f fq.

In moist and rich forests up to the middle oroboreal zone, common and often abundant.

**Dactylis glomerata* L. – Hemp Creek: 2, sparse on roadside, introduced.

Danthonia intermedia Vasey – Murtle Lake: 24, r. – Stevens Lakes: (28), 30, sc. – Battle Mtn. I: (32, 33), 34, (35), fq. – Fish Lake Hill II: (36), fq.

Very common and often abundant in fresh orohemiarctic meadows, also in eutrophic fens in the middle and upper oroboreal zones.

**D. spicata* (L.) Beauv. var. *pinetorum* Piper – Hemp Creek: 2, sparse in dry second-growth *Populus tremuloides* forest, probably native.

Deschampsia caespitosa (L.) Beauv. ssp. *littoralis* (Reut.) Rehb., s. lat. – Murtle Lake: 25, on alluvial, sandy lake shore, sparse.

The specimens are about 35–40 cm tall, with basal leaves strongly involute, panicle 12 cm long, the spikelets have three florets, the lower glumes are about 4–4.5 mm long, the anthers about 1.2–1.5 mm long and yellow. The last-mentioned features do not agree with those published by KAWANO (1963) and others for the typical *Deschampsia caespitosa* ssp. *littoralis*.

Elymus glaucus Buckl. var. *glaucus* (det. W. BOWDEN) – Hemp Creek: 2, (3), fq. Murtle River: fq. [Blue River: (13), KUJALA 1945 under *Agropyron caninoides*?]. – Murtle Lake: 18, 24, 27, sc. – Battle Mtn. I: 35, r.

In dry second-growth *Populus tremuloides* forests, on river banks and on sandy lake shores, common. It was also found in a swamp forest (18) and in an orohemiarctic *Valeriana sitchensis* meadow. This zonal distribution does not seem to fit with the data given in the literature (cf. PIPER 1905, ABRAMS 1940, HITCHCOCK 1950, etc.).

This species is very variable in the study area, as it also is elsewhere. The population found on Battle Mtn. is stout, with leaves 10–12 mm broad, and an erect stiff spike, about 6 cm in length, 10–12 mm in thickness and spikelets in threes; length of glumes 10–12 mm and of awn about 12–18 mm. Thus it shows a resemblance to *E. aristatus* Merr.

**E. innovatus* Beal – Blue River: 16, A. Cajander and V. Kujala, also KUJALA 1945.

Festuca brachyphylla Schultes (det. J. A. CALDER) – Battle Mtn. I: 34, in dry stony *Antennaria* meadows, scattered.

F. pratensis Huds. (*F. elatior* L.) – Murtle River: 4, on a roadside, sparsely, casual.

F. occidentalis Hook. – Hemp Creek: 2, f fq. Murtle River: 4, f fq. – Stevens Lakes: (30), r.

In dry second-growth forests, burned areas and on roadsides. Evidently native, spread by human activities.

F. rubra L. – Murtle River: 4, on roadside, sparse, probably introduced.

F. saximontana Rydb. (conf. J. A. CALDER) – Battle Mtn. II: 38, locally abundant in dry, rocky meadows.

F. subulata Trin. – Hemp Creek: 3, r. In shady old fresh *Tuja* forest along brook, abundant.

**Glyceria elata* (Nash) Hitchc. – Blue River: (13), KUJALA 1945.

**G. grandis* S. Wats. – Hemp Creek: 2, in alluvial moist meadows and *Alnus* swamps along the creek, common and often abundant.

G. pauciflora Presl (det. J. A. CALDER) – Hemp Creek: 2, sparse in moist meadow along brook. – Battle Mtn. I: 34, in a small pool on trail.

G. striata (Lam.) Hitchc. var. *striata* – Hemp Creek: 2, in alluvial *Alnus* swamp, fairly abundant. Azure Lake: 10, on wet rock by water-falls.

var. *striata* (Scribn.) Fern. – Hemp Creek: 2, in an alluvial grazed meadow, sparse, probably not indigenous.

Hierochloë alpina (Sw.) R. & S. – Battle Mtn. II: 38, very sparse in the rocky oroarctic zone.

Probably the southernmost locality of this species in B. C. (cf. EASTHAM 1947, HUBBARD 1955, PORSILD 1957).

H. odorata (L.) Beauv. – Hemp Creek: 2, r. – Murtle Lake: (18), r. – Stevens Lakes: 28, r.

In alluvial willow thickets and meadows, sparse.

Holcus lanatus L. – Murtle River: 4, introduced on roadside, sparse.

**Hordeum jubatum* L. – Hemp Creek: (2), adventive on roadside, casual.

Muehlenbergia glomerata (Willd.) Trin. – Hemp Creek: 3, on hummocks in eutrophic fen, fairly abundant.

**Oryzopsis asperifolia* Michx. – Hemp Creek: 2, fq. Blue River: (13, 16), KUJALA 1945. In dry second-growth forests, abundant.

O. pungens (Torr.) Hitchc. (det. partly J. A. CALDER) – Hemp Creek: 2, r. Murtle River (4). Blue River: (13, 16), KUJALA 1945.

In dry second-growth forests, sparse.

**Phalaris arundinacea* L. – Hemp Creek: 2, in an alluvial meadow along the creek, sparse.

Phleum alpinum L., s. lat. – Stevens Lakes: (28), r. – Battle Mtn. I: (32, 33), 34, (35), fq. Fish Lake Hill II: 36, fq. – Battle Mtn. II: (37, 38), sc.

In dry to moist meadows. In the study area it does not seem to be spread by human activities, as it is in northern Europe.

P. pratense L. – Hemp Creek: 2, on roadsides, sparse. – Murtle Lake: (26), in cabin yard. Adventive.

Poa alpina L. – Battle Mtn. I: (34), 35, sc. – Battle Mtn. II: 37, r.

Along brooks and in rocky meadows.

P. annua L. – Hemp Creek: 2, in a moist pasture, sparse. – Murtle Lake: (24), in cabin yard. Adventive.

P. compressa L. – Murtle River: 6, in dry recently burned-over forest by trail far from the Hemp Creek village, locally abundant.

P. cusickii Vasey? (det. J. A. CALDER) – Battle Mtn. II: 38, in a rocky oroarctic meadow, sparse.

P. epilix Scribn. (conf. J. A. CALDER) – Battle Mtn. I: 32, (33, 34), in dry meadows, common and abundant. – Battle Mtn. II: 37, along a brook, sparse.

P. gracillima Vasey? (det. J. A. CALDER) – Battle Mtn. I: 35, on a rock outcrop beside a brook, sparse.

P. leptocoma Trin. (det. J. A. CALDER) – Hemp Creek: 2, along a spring-fed brook, sparse. – Battle Mtn. II: 38, in a dry rocky oroarctic meadow, sparse.

P. palustris L. – Hemp Creek: 2, in alluvial *Alnus* swamps and along brooks, abundant; also in dry second-growth *Populus tremuloides* forests, scattered. – Murtle Lake: 18, in cabin yard, probably adventive.

P. pratensis L., s. lat. – Hemp Creek: 2, in dry second-growth *Populus tremuloides* forests, on roadsides and in moist pasture, common; apparently introduced, partly at least. – Murtle Lake: 18, in eutrophic fen, sparse, native. – Battle Mtn. I: 32, (34, 35), in moist meadows along brooks, scattered, native.

One specimen from Hemp Creek growing on a small rock outcrop in dry *Populus tremuloides* forest seems to fit well with *Poa agassizensis* described by BOIVIN and D. LÖVE (1960). Another one from the same forest near the road was referred to ssp. *angustifolia* (L.) H. Lindb. by Dr. I. Hiitonen. The native bluegrasses collected from Murtle Lake and Battle Mtn. do not belong to *Poa alpigena* (Fries) Lindm. s. str.

**P. trivialis* L. – Hemp Creek: 2, sparsely on moist roadside ditch, naturalized.

**Schizachne purpurascens* (Torr.) Swallen – Hemp Creek: 2, sparsely in dry second-growth *Populus tremuloides* forest.

Trisetum spicatum (L.) Richt. cf. ssp. *alaskanum* (Nash) Hult. – Stevens Lakes: (28), r. – Battle Mtn. I: (32, 34, 35), fq. Fish Lake Hill II: 36. – Battle Mtn. II: (37, 38), sc.

According to HULTÉN'S (1959) treatment, these specimens probably belong to ssp. *alaskanum*.

ssp. *molle* (Michx.) Hult. – Hemp Creek: 2, sc. Murtle River: 4. – Murtle Lake: 18, r.

Scattered on dry, sandy roadsides, in a rock crevice and in a cabin yard, strongly spread by human activities.

The specimen from Murtle Lake has slightly purple spikelets, the others are greenish.

Vahlodea atropurpurea (Wahlenb.) Fries, s. lat. – Battle Mtn. I: (32, 33, 34, 35), fq. Fish Lake Hill II: 36, fq. – Battle Mtn. II: 37, sc.

Common in fresh meadows and in fresh forests at the timber-line.

Two different types of this species were found. One is very common, occurring in the habitats mentioned above. Its leaves are nearly glabrous, 4–6 mm wide, the panicle branches are very slightly strigose, the glumes 4–5 mm long, nearly glabrous, the lemma 2.5 mm, its awn is ca. 3 mm long and attached to the middle of the lemma. Callus hairs are ca. $\frac{1}{3}$ of the length of the lemma; a few may be longer. This apparently belongs to ssp. *latifolia* (Hook.) A. E. Porsild. A. Cajander and V. Kujala have also collected similar specimens from Field and Longworth, B. C.

The other type, only seen on a small rock outcrop beside a brook at the tree-line on Battle Mtn. (37), has leaves pubescent on both sides, 2–3 mm wide, and the panicle

branches are densely strigose. The glumes are ca. 4.5 mm long, pubescent, the lemma ca. 2.5 mm long, its awn 2.5 mm but attached to the upper part of the lemma and so projecting more than in ssp. *latifolia*. Several callus hairs are about ½ the length of the lemma. The pubescence of the leaves and some other features in this collection resemble ssp. *paramushirensis* (Kudo) Hult., which HULTÉN (1942) reports as occurring in western North America and with which he unites ssp. *latifolia*. It is possible that in western North America there are two races of this species: cf. the discussions of HULTÉN (1942, 1960), PORSILD (1951) and GJAEREVOLL (1958). In any case, not all the western North American specimens are pubescent, as implied by HULTÉN (1942), but they are not all essentially glabrous, either, as suspected by PORSILD (op.cit.).

Cyperaceae

**Carex aenea* Fern. – Hemp Creek: 2, on dry roadsides, sparse. Adventive.

C. aquatilis Wahlenb. var. *altior* (Rydb.) Fern. – Hemp Creek: 3, scattered in a eutrophic fen.

**C. aurea* Nutt. – Hemp Creek: 2, sparse on bare alluvial soil along a brook.

C. brunnescens (Pers.) Poir. ssp. *alaskana* Kalela (det. AARNO KALELA) – Murtle Lake: 21, sparse in a rock outcrop on the lake shore. Native.

The subspecies was recently described by KALELA (1965). ssp. *sphaerostachya* (Tuckerm.) Kalela (conf. AARNO KALELA) – Hemp Creek: 2, common in alluvial willow stands and on roadside. – Murtle Lake: 17, abundant in swamp forests.

C. buxbaumii Wahlenb., s.lat. – Murtle Lake: 24, scattered in a mesotrophic alluvial fen.

C. canescens L. – Hemp Creek: 2, sc. – Murtle Lake: (19), f r. – Stevens Lakes: (28) r. – Battle Mtn. I: (34), r.

Sparse along brooks and in alluvial fens up to the orohemiarctic zone.

C. canescens × *C. praeceptorium* – Battle Mtn. I: 34, on margin of a pool in poor fen with the parental species.

This collection seems to be without achenes and it has features of both parental species (e.g. colour slightly glaucous, the sheaths hyaline and yellowish brown, 5–6 spikes, densely aggregated head 1.5 cm long, the lowest bract as long as its spike, the perigynia and scales brownish). Mr. J. A. Calder determined it as an 'atypical' *C. canescens*, but in my opinion it obviously represents a hybrid.

C. canescens × *C. tenuiflora*. – Murtle Lake: 18, on margin of a eutrophic fen with the parental species.

These specimens are also without achenes, although the parents already had well-developed achenes. They also conform well with European specimens of this hybrid.

C. cephalantha (Bailey) Bickn. – Murtle Lake: 18, f r. – Stevens Lake: (28), r.

Sparse in mesotrophic fens.

Possibly the northernmost station known in eastern British Columbia (cf. ABRAMS 1940, EASTHAM 1947).

C. chordorrhiza Ehrh. – Murtle Lake: 18, very sparse in a mesotrophic fen.

Evidently there is only one record from B. C. before (along Hart Highway 1 mi. S of Summit Lake, 1954 Calder, Savile and Ferguson 12 486; V).

**C. crawfordii* Fern. – Hemp Creek: 2, common in man-made meadows and on roadsides, dry to moist, probably introduced.

C. deflexa Hornem. – Stevens Lakes: 30, fairly abundant in a sandy second-growth *Pinus contorta* forest.

**C. deweyana* Schwein. – Hemp Creek: 2, locally on wet roadside ditch.

C. diandra Schrank – Hemp Creek: 3, scattered in a eutrophic fen.

C. disperma Dewey – Hemp Creek: 2, r. – Murtle Lake: (18, 19, 24), fq. – Stevens Lakes: (30), r.

Common in moist forests and alluvial *Alnus* swamps.

C. exsiccata Bailey – Murtle Lake: 18, locally abundant in a mesotrophic fen along lake shore.

C. festivella Mack. (conf. J. A. CALDER) – Murtle River: 6, on trail in alluvial meadow along brook. – Battle Mtn. I: 33, in burned-over swamp forest.

C. heleonastes Ehrh. – Murtle Lake: 18, r. – Stevens Lakes: 28, r.

In meso-eutrophic fens.

Probably the southernmost locality known in B. C., HULTÉN (1962) did not record this species from B. C. at all.

C. illota Bailey (det. J. A. CALDER) – Battle Mtn. I: 34, sc. Fish Lake Hill II: 36, r.

In moist meadows along ponds and seasonally wet depressions and poor fens, often forming pure strips between those of *Carex nigricans* and *C. physocarpa*. In many individuals some of the perigynia are not developed.

According to HENRY (1915), this species has been collected from Griffin Lake, B. C.

C. kelloggii W. Boott (incl. *C. hindsii* C. B. Clarke; conf. J. A. CALDER) – Hemp Creek: 2, fairly sparsely in moist pastures on roadside. – Murtle Lake: (18), sparse along brooks. – Stevens Lakes: (28), sparse along brooks. – Battle Mtn. I: 34, in shallow pool.

C. laeiculmis Meinsh. – Murtle Lake: 18, locally in a rich swamp forest along brook.

C. lasiocarpa Ehrh. var. *americana* Fern. – Murtle Lake: 18, scattered in a mesotrophic fen.

C. leptalea Wahlenb. – Hemp Creek: 3, along a spring-fed brook in shaded coniferous forest. Blue River: (13), KUJALA 1945.

C. limosa L. – Murtle Lake: 18, (24), fairly abundant in meso-eutrophic fens. – Battle Mtn. I: (34), Fish Lake Hill II: (36), in poor fens with wet hollows, abundant.

C. macrochaeta C. A. Meyer (det. J. A. CALDER) – Battle Mtn. II: 38, in dry rocky orohemiarctic meadows, sparse.

C. mertensii Prescott – Murtle River: 7. – Murtle Lake: (17), r.

Sparse in wet meadows along brooks and on wet trails in swamps. To some extent spread by human activities.

C. nigricans C. A. Meyer – Battle Mtn. I: (32, 34, 35), fq. Fish Lake Hill II: 36, fq.

Dominant in poor fens and in a moist meadow type in the orohemiarctic zone.

C. pachystachya Cham. – Hemp Creek: 2, scattered in moist pastures and on moist roadsides, adventive. – Murtle Lake: 18, sparse in a cabin yard, adventive.

C. pauciflora Lightf. – Murtle Lake: 18, sparse on hummocks of mesotrophic fen. – Stevens Lakes: (30), in oligotrophic fens.

C. paupercula Michx. var. *pallens* Fern. – Murtle Lake: 18, sparse on hummocks in swamps and swamp forests.

var. *paupercula* (*C. magellanica* Lam. ssp. *irrigua* (Wah-

lenb.) Hiit.) – Battle Mtn. II: 34, scattered in alluvial mesotrophic fens.

**C. peckii* Howe – Hemp Creek: 2, fairly abundant in a dry second-growth *Populus tremuloides* forest.

C. phaeocephala Piper (conf. J. A. CALDER) – Battle Mtn. II: 38, in dry rocky oroarctic zone.

C. physocarpa Presl – Murtle Lake: 26, (27), sparse on sandy lake shores. – Battle Mtn. I: (32), 34, (35), very abundant in poor fens.

C. physocarpa Presl × *C. rostrata* Stokes – Battle Mtn. I: 34, locally abundant along margins of a small pool between zones of *C. physocarpa* and of *C. rostrata* var. *rostrata* growing in water.

C. praeceptorium Mack. (det. J. A. CALDER) – Battle Mtn. I: 34, fairly abundant in a mesotrophic fen.

Obviously the first record of this species for Canada. See also *C. canescens* × *praeceptorium*.

C. pyrenaica Wahlenb., s. lat. – Battle Mtn. II: 37, sparse in rocky meadows.

The specimen has three stigmas, perigynia 3 mm long and strongly channelled leaves; it does not fit to *C. pyrenaica* ssp. *micropoda* (C. A. Meyer) Hult. (cf. MACKENZIE 1931, HULTÉN 1942).

**C. retrorsa* Schwein. – Hemp Creek: 2, fairly common in alluvial thickets, meadows and swamps along brooks.

C. rossii Boott – Murtle River 4, locally abundant in dry coniferous forest near road.

C. rostrata Stokes – Hemp Creek: 2, common along brook, in moist meadows and in moist pastures. – Murtle Lake: 18, (19, 24), rather sparse in meso-eutrophic fens. – Battle Mtn. I: 34, locally abundant in a small pool.

The collection from Hemp Creek consists of var. *utriculata* Boott, from Murtle Lake of both var. *utriculata* and var. *rostrata*, from Battle Mtn. only of var. *rostrata*; the last-mentioned population has some *C. physocarpa* in it. However, the status of the races of *C. rostrata* is still very poorly known.

C. sitchensis Prescott (conf. J. A. CALDER) – Murtle Lake: 18, in a mesotrophic fen, abundant.

A coastal species which is rare in the interior.

C. spectabilis Dewey (conf. J. A. CALDER) – Battle Mtn. I: (32, 33), 34, (35), fq. Fish Lake Hill II: 36. – Battle Mtn. II: 38 (specimen not determinable with certainty).

Abundant in orohemiarctic meadows, dry to wet, but best developed in moist habitats. Also one of the commonest plants in the orohemiarctic forest stands, even in deep shade.

**C. stipata* Muhl. – Hemp Creek: 2, in moist grazed meadows and on wet roadsides, apparently introduced.

C. tenuiflora Wahlenb. – Murtle Lake: 18, locally abundant on the margin of a meso-eutrophic fen.

Possibly the southernmost locality in B. C. (cf. EASTHAM 1947). See also *C. canescens* × *tenuiflora*.

C. trisperma Dewey – Blue River: (13), KUJALA 1945. – Murtle Lake: 24, sparse on hummocks in bog forests.

HENRY (1915) and EASTHAM (1947) did not mention this eastern species from B. C.; MOSS and PEGG (1963) recently reported it from Swan Hills, westcentral Alberta.

Eleocharis acicularis (L.) R. & S. – Stevens Lakes: 28, locally abundant on an alluvial clayey lake shore.

This specimen is too young for identification of the variety.

E. compressa Sull. – Hemp Creek: 3, abundant in a eutrophic fen.

Reported before in B. C. only from Kinbasket on Big Bend Highway (EASTHAM 1947).

E. fernaldii (Svenson) Löve (*E. pauciflora* var. *fernalidii*) – Murtle Lake: 18, r. – Stevens Lakes: 28, r.

Sparsely in mesotrophic and meso-eutrophic fens.

The habitats of *E. fernaldii* in the study area do not seem to be as rich in nutrients as fen habitats of *E. pauciflora* in northeastern Europe.

E. palustris (L.) R. & S., s. str. – Hemp Creek: 2, scattered in alluvial meadow. – Murtle Lake: (18), r.

According to the treatment of FERNALD and BRACKETT (1929), the specimens fit the descriptions of this species well. However, it is too young, being without mature achenes.

Eriophorum angustifolium Honck. – Murtle Lake: 17, 24, f r. – Stevens Lakes: (28), r. – Battle Mtn. I: (32), 34, (35), r. – Battle Mtn. II: (37), r.

In mesotrophic fens with or without wet hollows from the middle to upper oroboreal zones, and in seepage meadows in the orohemiarctic and oroarctic zones.

The specimens from stations 24 and 34 have scabrous peduncles and dark scales and thus apparently represent *E. angustifolium* ssp. *scabriusculum* Hult.

E. gracile Koch var. *caurianum* Fern. – Murtle Lake: 18, r. – Stevens Lakes: (28), r.

Sparsely in eutrophic fens.

The specimens have a straw-coloured involucre and scales in the flowers, and the achenes are about 2.5–3 mm long (cf. FERNALD 1905).

E. chamissonis C. A. Meyer – Stevens Lakes: 28, locally abundant in a spring-fed eutrophic fen.

E. viridi-carinatum (Engelm.) Fern. – Hemp Creek: 3, abundant in a eutrophic fen.

Scirpus caespitosus L. ssp. *caespitosus* (*S. caespitosus* var. *callosus* Bigel.) – Murtle Lake: 24, abundant in a mesotrophic fen with wet hollows.

S. hudsonianus (Michx.) Fern. – Murtle Lake: 24, sparse in a eutrophic fen.

**S. microcarpus* Presl – Hemp Creek: 2, in alluvial *Alnus* swamps along brook, abundant. Blue River: (13), KUJALA 1945.

Araceae

Lysichiton americanum Hult. & St. John – Hemp Creek: (2), f r. Murtle River: (4, 5, 6). Blue River: (13), KUJALA 1945. – Murtle Lake: (18), 19, f r.

Fairly common in swamps, especially *Alnus* swamps.

Juncaceae

Juncus bufonius L. – Murtle River: 4, sparse on moist roadsides, adventive.

J. drummondii E. Meyer – Battle Mtn. I: (32, 34, 35), fq. Fish Lake Hill II: 36, fq.

In fresh to moist meadows and in poor fens.

J. ensifolius Wikstr. – Hemp Creek: 2, r. – Murtle Lake: (18), r.

Occasional in grazed alluvial meadows, in the yard of the Ranger Station, and on wet trails. Probably alien.

J. filiformis L. – Hemp Creek: 2, r. – Stevens Lakes: (30), r. – Battle Mtn. I: (34), r.

Very sparsely in moist horse pasture and in moist meadows along brooks. Evidently spread by horses.

J. mertensianus Bong. – Hemp Creek: (2), r. – Murtle Lake: 18, r. – Stevens Lakes: (30), r. – Battle Mtn. I: 32, (34, 35), f fq. Fish Lake Hill II: 36.

Fairly common in periodically wet pools in forests and meadows, in poor fens and in wet to moist meadows in the orohemiarctic zone. In the other zones rare, but sometimes locally abundant on wet trails, being spread by human activities.

J. parryi Engelm. – Battle Mtn. II: 37, in a rocky meadow at the tree-line.

J. stygius L. ssp. *americanus* (Buchenau) Hult. – Murtle Lake: 18, (24), very sparse in mesotrophic fens with wet hollows.

Perhaps the first record of this species in B. C.

**J. tenuis* Willd., coll. – Hemp Creek: (1), occasional on trail.

Luzula arcuata (Wahlenb.) Sw. – Battle Mtn. II: 38, sparse in dry rocky meadows.

L. parviflora (Erhrh.) Desv., s. lat. – Murtle Lake: 18, adventive in cabin yard. – Stevens Lakes: (28), sparse and rare along brooks. – Battle Mtn. I: (32, 35), abundant in fresh meadows.

L. piperi (Cov.) Jones – Battle Mtn. II: 38, very sparse in dry rocky meadows.

Having seen *Luzula wahlenbergii* Rupr. several times in Fennoscandia, I cannot accept the suggestion made by HULTÉN (1962) and some American authors that *L. piperi* is only its synonym. I have also examined the large collections of *L. piperi* gathered by Aarno Cajander and Viljo Kujala from B. C. and the differences between these types seem to be quite clear. *L. piperi* is usually taller than *L. wahlenbergii*, its leaves are up to 5 mm wide, *firm* and *thick*, *dull*; it often has more than two cauline leaves, the bract of the cyme is usually 1.5–3 cm long and at least partly green. The panicle has more flowers and it is larger than in *L. wahlenbergii*. The seeds are *yellow* or *yellowish* brown, lanceolate-oblong, tapering to each end, while in *L. wahlenbergii* the seeds are brown (the same colour as in the seeds of *L. parviflora*) and ellipsoid. *L. wahlenbergii* is also characterized by more numerous white fibres in the seeds, which remain in open capsules for a longer time than in *L. piperi*, and therefore in the herbaria the specimens of *L. piperi* are generally poor in seeds. The *L. wahlenbergii* specimens in the herbaria have plenty of seeds.

Perhaps the rank of species is too high for the two types with their different areas; they might better be called subspecies.

L. spicata (L.) DC., s. lat. – Battle Mtn. I: 34, in dry meadows sparse.

The specimen does not fit to var. *nova* described by SMILEY (1921) from California; it is also not identical with the North European ssp. *spicata* (CHRTEK & KRÍSA 1962), from which it differs in having anthers about 0.4–0.5 mm long and slightly longer than the filaments, capsules about 2 mm long, and seeds 1.2 mm, which are also broader, blunter and shinier.

Liliaceae

Allium cernuum Roth – Reported by HARTMAN (1957).

Clintonia uniflora (Schult.) Kunth – Hemp Creek: (2, 3), fq. Murtle River: fq. Azure Lake: (9). Messiter: (12). Blue River: (13, 15, 16), KUJALA 1945, (13, 14). – Murtle Lake: 18, (19–27), fq.

Very common and often abundant in dry and fresh coniferous forests up to the middle oroboreal zone. Not seen in rich forests.

Disporum hookeri (Torr.) Britt. var. *oreganum* (Wats.) Q. Jones (det. J. A. CALDER) – Hemp Creek: 3, sc. Blue River: (13, 16), KUJALA 1945. – Murtle Lake: (17, 18, 22, 24, 26, 27), sc.

Scattered in fresh and in rich coniferous forests.

Erythronium grandiflorum Pursh – Reported by HARTMAN (1957) and EDWARDS and RITCEY (1960).

Lilium columbianum Hanson – Hemp Creek: 2, (3), f fq. Murtle River: (4), r.

In warm second-growth forests; fairly common in *Populus tremuloides* forests, sparse in *Pinus contorta* forests.

**L. montanum* A. Nels. – Blue River: (13), KUJALA 1945.

**Maianthemum canadense* Desf., s. lat. – Blue River: 16, A. Cajander and V. Kujala (var. *interius* Fern.), (13, 15, 16), KUJALA 1945, (13), scattered in dry *Pinus contorta* forests.

Smilacina liliacea (Greene) Wynd. – Hemp Creek: 3, abundant in a eutrophic fen.

S. racemosa (L.) Desf. var. *amplexicaulis* (Nutt.) S. Wats. – Hemp Creek: 2, (3), sc. Blue River: (13, 16), KUJALA 1945. – Murtle Lake: (17), fr.

Sparse in second-growth *Populus tremuloides* forest, and scattered in fresh and in rich coniferous forests.

S. stellata (Baker) Nutt. – Hemp Creek: 2, 3, locally in a dry alluvial meadow and in a periodically moist *Thuja* swamp. – Murtle Lake: 18, in fresh coniferous forests near the lake, scattered.

Streptopus amplexifolius (L.) DC. – Hemp Creek: 3, sc. Blue River: (13), KUJALA 1945. – Murtle Lake: (17, 18, 20, 21, 23, 25, 26), f fq. – Stevens Lakes: r.

In fresh coniferous forests, often near brooks.

All the specimens collected from forest sites seem to fit with var. *denticulatus* Fassett. On hummock in an open mesotrophic fen at Murtle Lake a specimen (no. 6776) was gathered which is low, 25–30 cm in height, and its leaves are small, very narrow and pale green. I cannot determine it according to FASSETT (1935), neither can I regard this type as a mere modification due to the special habitat.

S. roseus Michx. ssp. *curvipes* (Vail) Hult. – Blue River: (13, 15, 16), KUJALA 1945. – Murtle Lake: (17, 18, (19–27), fq. – Stevens Lakes: (30), f fq.

Common and abundant in fresh and in rich coniferous forests up to the upper oroboreal zone. In Wells Gray Park it was not seen in the lower oroboreal zone, which in this area may be too dry for this species.

**S. streptopoides* (Ledeb.) Frye & Rigg. – Blue River: (13), KUJALA 1945.

Tofieldia occidentalis S. Wats. – Murtle Lake: 18, r. – Stevens Lakes: (28), r.

In eutrophic fens, fairly abundant.

T. intermedia Rydb. – Murtle Lake: 27, locally on an alluvial sandy lake shore.

Veratrum eschscholtzii A. Gray – Blue River: (13), KUJALA 1945 (**V. viride*). – Murtle Lake: (17), scattered in rich, wet woods. – Stevens Lakes: (28), common in fresh forests. – Battle Mtn. I: (32, 33, 34, 35), abundant in *Valeriana sitchensis* meadows and at margins of forests.

Iridaceae

**Sisyrinchium montanum* Greene – Hemp Creek: 2, in a grazed alluvial meadow sparsely, naturalized.

The species is here close to its western limit (cf. HULTÉN 1958).

Orchidaceae

Calypso bulbosa (L.) Oakes – Murtle River: 4, some individuals in a dry second-growth *Pinus contorta* – *Populus tremuloides* forest. Blue River: (16), KUJALA 1945. – Murtle Lake: (27), one individual on a small sandy island.

Corallorhiza maculata Raf. var. *punicea* H. H. Bartlett – Murtle River: 4, sparse in fresh *Pinus contorta* forest. Blue River: (14), sparse in old *Tsuga* forest.

Cypripedium passerinum Richards – Clearwater Lake: P. Martin & R. Ritcey (SZCZAWINSKI 1959).

Goodyera oblongifolia Raf. – Hemp Creek: (3), f fq. Murtle River: 4, (5), Azure Lake: (9). Blue River: 16, A. Cajander and V. Kujala. (13, 16), KUJALA 1945. – Murtle Lake: (25, 26), r. – Collected from the park, according to SZCZAWINSKI (1959).

In fresh coniferous forests.

G. repens (L.) R. Br. var. *repens* – Hemp Creek: 3, sc. – Murtle Lake: (23), r.

var. *ophioides* Fern. – Hemp Creek: (3). Blue River: (13, 15, 16), KUJALA 1945. Scattered in old *Tsuga* forests.

Habenaria dilatata (Pursh) Hook. – Hemp Creek: 2, r. – Murtle Lake: 18, r. – Stevens Lakes: (28), r. – Battle Mtn. I: (32), r. Fish Lake Hill II: 36, r. – Collected from the park, according to SZCZAWINSKI (1959).

Scattered in eutrophic and mesotrophic fens, in alluvial meadows, along brooks and in swamp forests.

H. orbiculata (Pursh) Torr. – Hemp Creek: (3), r. Murtle River: 5. Azure Lake: (9). Blue River: (13, 15), KUJALA 1945. (14).

Sparse both in dry old *Tsuga* forests and in fresh, rich *Thuja* forests.

H. saccata Greene – Hemp Creek: (2, 3), r. – Murtle Lake: 18, (19, 24), f r. – Stevens Lakes: (28, 30), f fq. – Battle Mtn. I: (32, 34), f fq. Fish Lake Hill II: 36, f fq.

In mesotrophic and eutrophic fens and in wet to dry meadows along brooks.

H. unalascensis (Spreng.) S. Wats. – Hemp Creek: 2, one individual in dry second-growth *Populus tremuloides* forest. – Murtle River: 5, a few individuals in dry second-growth coniferous forest. – Collected from the park, according to SZCZAWINSKI (1959).

Listera cordata (L.) R. Br. var. *cordata* – Hemp Creek: 2, r. – Murtle Lake: 18, (25), f fq. – Stevens Lakes: (30), r. var. *nephrophylla* (Rydb.) Hult. – Hemp Creek: 2, r. – Murtle River: 4. – Murtle Lake: (18, 21, 24, 26, 29), fq.

Scattered in fresh coniferous forests.

Often these two varieties (or forms?) grow together; var. *nephrophylla* seems to be commoner in the park than var. *cordata*.

Spiranthes romanzoffiana Cham. & Schl. – Stevens Lakes: 28, fairly abundant in a meso-eutrophic fen.

Salicaceae

Populus tremuloides Michx. – Hemp Creek: (1, 2), fq. Blue River: (13, 15, 16), KUJALA 1945. – Murtle Lake: r.

The dominant tree in dry burned-over areas in the lower oroboreal zone, very sparsely in the middle oroboreal zone.

P. trichocarpa T. & G. – Hemp Creek: 2, 3, in fresh second-growth *Populus tremuloides* forests, often as a bush, in seasonally moist old *Thuja* forests and along brooks also as very big trees. Blue River: (13), KUJALA 1945. – Murtle Lake: (18), in fresh coniferous forests near lake shore only.

Salix arbusculoides Anders. – Murtle Lake: 18, sparse in alluvial thickets on lake shore.

The specimens have entire leaves.

S. barclayi Anders. – Battle Mtn. I: (32), 34, (35), fq. Fish Lake Hill II: (36), fq.

Abundant along brooks.

S. barclayi Anders. × *S. commutata* Bebb – Battle Mtn. I: 34, locally along a brook.

Leaves are pubescent, glaucous beneath, bracts dark, with long hairs, ca. 2 mm long, pedicels 1 mm. Only some capsules are developed but they are without seeds.

S. bebbiana Sarg. – Hemp Creek: 2, f fq. Blue River: 16, A. Cajander and V. Kujala.

Common in dry meadows and pastures and in dry second-growth *Populus tremuloides* forests.

S. candida Fluegge – Hemp Creek: 2, r. – Murtle Lake: (18), r.

In eutrophic fens.

S. cascadenis Cockerell – Battle Mtn. II: 37, sparse in moist snow-bed along brook.

S. commutata Bebb – Stevens Lakes: 30, sparse in spring-fed eutrophic fen on lake shore.

S. lasiandra Benth var. *lancifolia* (Anders.) Bebb. – Hemp Creek: 2, scattered in meadows along brook. Blue River: 16, A. Cajander and V. Kujala. – Murtle Lake: 25, abundant on sandy alluvial lake shores.

var. *lasiandra* – Blue River: 16, A. Cajander and V. Kujala. – Murtle Lake: 24, sparse on sandy alluvial lake shores.

S. maccalliana Rowlee – Hemp Creek: 2, r. – Murtle Lake: (18), r.

In eutrophic fens, abundant.

S. mackenzieana (Hook.) Barratt – Blue River: 16, A. Cajander and V. Kujala. – Murtle Lake: 18, common and abundant in alluvial willow thickets on lake shores.

S. nivalis Hook. – Battle Mtn. II: 37, common in dry, rocky meadows.

S. pedicellaris Pursh var. *hypoglauca* Fern. – Murtle Lake: 18, (24), f r. – Stevens Lakes: (28), r. Locally abundant in meso- and eutrophic fens.

S. padophylla Rydb. – Murtle Lake: 18, sparse in alluvial willow thickets on lake shore.

**S. planifolia* Pursh – Hemp Creek: 2, abundant in alluvial willow thickets along brook and in moist pastures.

S. pseudocordata (Anders.) Rydb. – Hemp Creek: 2, sparse in alluvial willow thickets.

S. scouleriana Barratt var. *coetanea* Ball – Hemp Creek: 2, fq. Murtle River: 6, fq. – Murtle Lake: (21), sc.

Very common and often dominant tree in dry to fresh second-growth forests in the Hemp Creek Valley.

S. sitchensis Sanson – Murtle Lake: 18, 25, locally abundant on alluvial lake shores and river banks.

In the park this species is close to its eastern limit (cf. RAUP 1959).

S. subcoerulea Piper – Hemp Creek: 2, r. Blue River: 16, A. Cajander and V. Kujala. – Murtle Lake: 24, r.

The locality is outside the known range of this species as mapped by FROLAND (1962).

Common in alluvial willow thickets along brooks and on river banks.

Betulaceae

Alnus crispa (Ait.) Pursh ssp. *sinuata* (Regel) Hult. – Murtle River: (3), 4, sc. Blue River: (13, 16), KUJALA 1945. – Murtle Lake: 24, (25), sc. Stevens Lakes: r.

In fresh coniferous forests, on river banks and in stony furrows caused by avalanches (Murtle Lake).

**A. tenuifolia* Nutt. – Hemp Creek: 2, dominant species in alluvial swamps along brook. Blue River: 15, A. Cajander and V. Kujala. (13, 16), KUJALA 1945.

Betula glandulosa Michx. – Hemp Creek: 3, as abundant, 1–2 m high, bush at margins of eutrophic fen. Blue River: (13), KUJALA 1945. – Murtle Lake: 18, a low bush in mesotrophic fens. – Stevens Lakes: (28), in mesotrophic fens.

Also reported from Wells Gray Park by HARTMAN (1957) and EDWARDS and RITCEY (1959),

B. papyrifera Marsh. var. *commutata* (Regel) Fern. – Hemp Creek: 2, (3), fq. Blue River: (14). – Murtle Lake: (17), fq.

In coniferous forests and in second-growth *Populus tremuloides* forests. Not seen in the upper oroboreal zone.

**Corylus* cf. *cornuta* Marsh. – Hemp Creek: 2, (3), scattered in second-growth *Populus tremuloides* forests, in pastures and in seasonally moist *Thuja* forests. Blue River: (13), KUJALA 1945.

Urticaceae

**Urtica gracilis* Ait. – Hemp Creek: 2, scattered in farm yards, on roadsides and in alluvial swamps near road. It may be indigenous, but is spread by human activities.

U. lyallii S. Wats. – Blue River: (13). KUJALA 1945. Also reported by HARTMAN (1957).

Santalaceae

Geocaulon lividum (Richards.) Fern. – Hemp Creek: (3), r. Blue River: (15, 16), KUJALA 1945. – Murtle Lake: 27, r.

In *Sphagnum* hummocks in fens and in bog forests, sparse.

Loranthaceae

**Arceuthobium americanum* Nutt. – Blue River: 16, A. Cajander and V. Kujala.

Aristolochiaceae

Asarum caudatum Lindl. – Hemp Creek: 3, sparse in an old rich *Thuja* forest.

Polygonaceae

Oxyria digyna (L.) Hill – Battle Mtn. II: 38, sparsely in boulder beds.

Polygonum arenastrum Bor. (*P. aviculare* L. ssp. *aequale* (Lindm.) Aschers. & Graebn.) – Hemp Creek: 2, abundant in the yard of the Ranger Sta., naturalized, adventive.

This specimen was identified according to STYLES (1962).

P. lapathifolium L. ssp. *nodosum* (Pers.) Fr. – Hemp Creek: 2, occasionally a few individuals in the yard of the Ranger Sta.

**P. douglasii* Greene var. *douglasii* – Clearwater: 11, in railyard.

P. viviparum L. – Battle Mtn. I: 32, 34, in fresh to moist meadows, sparse.

Rumex acetosa L. ssp. *alpestris* (Scop.) Löve – Battle Mtn. I: 34, sparse in a moist meadow along brook.

**R. acetosella* L., s. lat. – Hemp Creek: 2, abundant on sandy roadsides, naturalized, adventive.

The collection consists only of male individuals.

R. crispus L. – Hemp Creek: 2, r. Clearwater Lake: 8. Scattered in moist man-made meadows and in pastures. Identified according to RECHINGER (1937).

**R. triangulivalvis* (Danser) Rech. f. – Hemp Creek: 2, a few individuals in the yard of the Ranger Sta. Adventive.

Chenopodiaceae

**Chenopodium album* L., s. lat. – Hemp Creek: 2, in the yard of an abandoned farm.

The specimen is young and therefore determination of the subspecies is not possible.

Salsola kali L., s. lat. – Clearwater: 11, in railyard.

Portulacaceae

Claytonia lanceolata Pursh – Battle Mtn. I: 32, r. Fish Lake Hill. II: 36, r.

Scattered in periodically wet seepage meadows. A spring plant, which is very difficult to find after flowering and therefore probably more common.

**Portulaca oleracea* L. – Clearwater: 11, on railway.

Caryophyllaceae

**Arenaria serpyllifolia* L. – Hemp Creek: 2, one individual on dry roadside, adventive.

Cerastium fontanum Baumg. ssp. *triviale* (Link) Jalas (= *Cerastium vulgatum* L. var. *hirsutum* Fries) (det. J. JALAS) – Hemp Creek: 2, scattered along roadside ditches. – Murtle Lake: (26), in the yard of the patrolman's cabin. Introduced and naturalized.

**Lychnis alba* Mill. (*Melandrium album* (Mill.) Garcke) – Hemp Creek: 2, locally in rich *Alnus* swamp along brook. Adventive, naturalized.

Minuartia biflora (L.) Sch. & Thell. (*Arenaria sajanensis* Willd.) (conf. J. A. CALDER) – Battle Mtn. II: 38, sparse in sheltered rock crevice.

M. obtusiloba (Rydb.) House, s. lat. (*Arenaria obtusiloba* (Rydb.) Fern.) (conf. J. A. CALDER) – Battle Mtn. II: 38, sparse in sheltered rock crevice.

M. rubella (Wahlenb.) Hiern. (*Arenaria rubella* (Wahlenb.) J. E. Sm.) (conf. J. A. CALDER) – Battle Mtn. II: 38, sparse in sheltered rock crevice.

Moehringia lateriflora (L.) Fenzl, s. str. excl. *M. macrophylla* (Hook.) Torr. (*Arenaria lateriflora* L.) – Hemp Creek: 2, sparse in a dry warm second-growth *Populus tremuloides* forest.

Sagina saginoides (L.) H. Karst. – Battle Mtn. II: 37, 38, sparse in rocky meadows and sheltered crevices from tree-line up to the peak.

Silene acaulis L. cf. var. *subacaulescens* (Williams) Fern. & St. John. – Battle Mtn. II: (37), 38, fairly common in rocky meadows.

S. parryi (S. Wats.) C. L. Hitchc. & Maguire – Battle Mtn. II: 37, sparse in a dry rocky meadow at the tree-line.

Stellaria calycantha (Ledeb.) Bong. ssp. *calycantha* – Stevens Lakes: (28), sparse along brook-sides. – Battle Mtn. I: 34, sparsely in periodically moist seepage meadows.

S. crispa Cham. & Schl. – Murtle Lake: 17, abundant on bare wet soil in a rich swamp forest.

**S. longifolia* Muehl. – Hemp Creek: 2, sparse in alluvial willow thickets along brook near road and in a moist farm yard.

According to BOIVIN's (1953) treatment, the specimen represents *S. atrata* (J. W. Moore) Boivin var. *eciliata* Boivin.

**S. media* (L.) Cyrillo – Hemp Creek: 2, sparsely in the yard of an abandoned farm.

S. monantha Hult. – Stevens Lakes: (28), sparse in mesotrophic fens. – Battle Mtn. I: (32, 33), 34, (35), scattered in moist meadows.

These localities seem to fit well with PORSILD's map (1963) of this species. BOIVIN (1948) described *S. hullenii* from the Rocky Mts. but it is obviously identical with *S. monantha*.

S. sitchana Steud. – Murtle River: 4, locally in a moist coniferous forest on river bank.

The specimens do not belong to var. *bongardiana* (Fern.) Hult.

**S. stricta* Richards. – Hemp Creek: 2, sparse in alluvial meadows.

Nymphaeaceae

Nuphar polysepalum Engelm. – Murtle Lake: f r. – Stevens Lakes: 28, r.

Scattered in shallow meso-eutrophic bays, being able to grow even on shores above water-level in the middle of summer.

Ranunculaceae

Actaea arguta Nutt. – Hemp Creek: (2), 3, scattered in fresh, old *Thuja* forests and in swamp forest along brook. – Murtle Lake: 17, sparse in swamps along brook.

At Hemp Creek individuals with white berries were also seen, along with the red-fruited ones.

**Anemone multifida* Poir., s. lat. – Hemp Creek: 2, fairly abundant on a dry warm southern slope.

A. occidentalis S. Wats. – Stevens Lakes: (28), r. – Battle Mtn. I: (32 – 35), f fq. Fish Lake Hill II: 36, f r.

In dry meadows, sometimes as a dominant species.

A. richardsonii Hook. – Stevens Lakes: 28, sparse in hummocks on lake shore.

In Wells Gray Park this species is apparently at the southernmost limit of its range. Recently it was reported from Jasper National Park and from the Swan Hills region, Alberta, by Moss and PEGG (1963).

Aquilegia formosa Fisch. – Hemp Creek: 2, (3), fairly common in dry warm second-growth *Populus tremuloides* forests, possibly calciphilous. – Murtle Lake: (26), cultivated in the yard of the patrolman's cabin.

Caltha leptosepala DC. – Stevens Lakes: r. – Battle Mtn. I: (32 – 35), f fq. Fish Lake Hill II: 36, f fq.

Abundant along brooks and in seepage meadows.

Coptis trifolia (L.) Salisb. – Blue River: (13), KUJALA 1945. – Murtle Lake: 19, sparse on *Pleurozium* hummocks in swamp forest.

The specimen fits to *C. trifolia* rather than to *C. groenlandica* (Oeder) Fern. (cf. FERNALD 1929).

**Ranunculus abortivus* L. var. *acrolasius* Fern. – Hemp Creek: 2, sparse in second-growth *Populus tremuloides* forests near roadside, adventive but naturalized.

R. aquatilis L. var. *capillaceus* (Thuill.) DC. – Battle Mtn. I: (34), in a brook.

R. eschscholtzii Schlecht. – Stevens Lakes: (28, 29), scattered along brooks and on lake shore. – Battle Mtn. I: (32 – 35), fq. Fish Lake Hill II: 36, fq. Common and often abundant in fresh meadows and in fresh forests.

R. reptans L. var. *reptans* – Murtle Lake: 18, f r. – Stevens Lakes: r. – Battle Mtn. I: sc.

Scattered on shores of alluvial ponds and along brooks.

R. macounii Britt. – Hemp Creek: 2, fairly abundant and probably naturalized on wet roadsides. – Murtle Lake: 17, occasionally on wet trail.

R. occidentalis Nutt. – Murtle River: 4, one adventive individual on roadside.

**R. pennsylvanicus* L. f. – Hemp Creek: 2, sparsely in a moist pasture.

**R. gmelinii* DC. var. *hookeri* (D. Don) L. Benson – Hemp Creek: (2), sparse in wet roadside ditch.

R. uncinatus D. Don. var. *parviflorus* (Torr.) L. Benson (*R. bongardii* Greene) – Hemp Creek: 2, sc. Messiter: 12, sc. – Murtle Lake: (17), r.

Sparsely in dry to fresh roadsides and on trails.

R. verecundus B. L. Robins. – Murtle Lake: 17, sparse along a spring-fed brook in rich *Thuja* forest.

Thalictrum sparsiflorum Turcz. – Murtle Lake: 25, fairly abundant along a spring-fed brook. (Also at Stevens Lakes a *Thalictrum* was seen).

**T. occidentale* A. Gray – Blue River: (13, 16), KUJALA 1945.

Trollius albiflorus (A. Gray) Rydb. – Battle Mtn. I: (32 – 35), fq. Fish Lake Hill II: 36, fq.

Common in wet seepage meadows with *Caltha leptosepala* in mesotrophic fens and along brooks.

Berberidaceae

Mahonia aquifolium (Pursh) Nutt. – Hemp Creek: 2, (3), fq. Murtle River: (4).

Common in dry second-growth *Populus tremuloides* forests, very sparse in old fresh coniferous forests.

Fumariaceae

Corydalis aurea Willd. – Murtle Lake: 21, sparse in a dry boulder bed with *Rubus viburnifolius*; apparently native.

Cruciferae

Arabis drummondii A. Gray – Battle Mtn. I: 35, locally in a *Valeriana sitchensis* meadow along brook.

**A. holboellii* Hornem. var. *pendulocarpa* (A. Nels.) Rollins. – Hemp Creek: 2, in a small gravel-pit on roadside, evidently adventive.

Capsella bursa-pastoris (L.) Medic. – Hemp Creek: 2, scattered on roadsides. – Murtle Lake: 26, in the yard of the patrolman's cabin.

Introduced.

Cardamine bellidifolia L. – Battle Mtn. II: 38, sparsely in rocky meadows.

C. pensylvanica Muehl. – Hemp Creek: 2, in alluvial *Alnus* swamps and in willow thickets, scattered. – Murtle Lake: 18, sparse along brooks and in swamps. – Battle Mtn. II: very sparse along a brook.

C. umbellata Greene – Murtle Lake: 17, sparse along a spring-fed brook in rich *Thuja* forest.

Draba crassifolia Graham (conf. J. A. CALDER) – Battle Mtn. II: 38, in rocky meadows, sparse.

The specimen is low (5 cm) and it has narrower pods (5 mm. long, 1 mm wide) than in the descriptions of EKMAN (1933), FERNALD (1934), and HITCHCOCK (1941).

D. incerta Payson – Battle Mtn. II: 38, in dry rocky meadows, very sparse.

D. nivalis Liljebl., s. lat. (det. J. A. CALDER) – Battle Mtn. II: 37, in dry *Antennaria* meadow at the tree-line, very sparse.

Another specimen without flowers collected from a boulder bed near the top of Battle Mtn. was also referred to the *D. nivalis* complex by Mr. J. A. Calder.

D. stenoloba Ledeb. (partly det. J. A. CALDER) Battle Mtn. I: 34, in bare mull in pits made by ground squirrels in dry meadow. – Battle Mtn. II: 37, in a rock crevice near the tree-line.

These specimens have yellow petals spotted with red.

**Erysimum cheiranthoides* L. ssp. *cheiranthoides* – Hemp Creek: 2, one individual on roadside, introduced.

According to the specimens of this species in the major herbaria of British Columbia, the tall biennial ssp. *altum* Ahti (or a race very close to it; cf. AHTE 1962 b, p. 27) is commoner in the province than ssp. *cheiranthoides*.

**E. inconspicuum* (S. Wats.) MacMill. – Messiter: (12), on railroad.

**Rorippa islandica* (Oeder) Borb. var. *fernaldiana* Butters & Abbe – Hemp Creek: 2, scattered on moist roadside and in ditches, introduced.

**Sisymbrium altissimum* L. – Hemp Creek: 2, local and sparse on dry roadside, casual adventive.

**S. loeselii* L. – Hemp Creek: 2, very sparse on roadside, casual adventive.

Subularia aquatica L. ssp. *americana* Mulligan & Calder – Stevens Lakes: 28, on alluvial clayey shore, sparse.

**Turrilis glabra* L. (*Arabis glabra* (L.) Bernh.) – Hemp Creek: 2, in small gravel-pit on roadside with *Arabis holboellii* var. *pendulocarpa*, introduced.

Droseraceae

Drosera anglica Huds. – Murtle Lake: 18, abundant in mesotrophic fens with wet hollows.

D. rotundifolia L. – Hemp Creek: 3, abundant on *Sphagnum fuscum* hummocks in a eutrophic fen.

Crassulaceae

Sedum stenopetalum Pursh – Battle Mtn. II: 37, scattered in rocky meadows.

**S. oreganum* Nutt. – Blue River: 16, A. Cajander and V. Kujala.

Saxifragaceae

Chrysosplenium tetrandrum (N. Lund) Fries – Murtle Lake: 17, in a wet swamp forest, sparsely.

According to PACKER (1963), this specimen fits the description of *C. tetrandrum* better than that of *C. iowense* Rydb.

Heuchera glabra Willd. – Murtle River: 4, r. Azure Lake: 10, r.

On shady wet rock wall by waterfalls.

H. cylindrica Dougl. – Reported by HARTMAN (1957).

Leptarrhena pyrolifolia (D. Don) R. Br. – Stevens Lakes: r. Fish Lake Hill I: (31); r. – Battle Mtn. I: (32–35), fq. Fish Lake Hill II: 36, fq. – Battle Mtn. II: 37, sc.

Common along spring-fed brooks and at margins of poor fens.

Mitella breweri A. Gray – Stevens Lakes: (29), 30, r. – Battle Mtn. I: (32, 33), f fq. Fish Lake Hill II: (36), f fq.

A typical plant in fresh orohemiarctic *Abies lasiocarpa* – *Picea engelmannii* forests, rare in meadows and only seen in *Valeriana sitchensis* meadows near forests.

M. nuda L. – Hemp Creek: 2, (3), rather uncommon in fresh second-growth *Populus tremuloides* forests and in fresh old *Thuja* – *Picea* forests. Blue River: (13, 16). KUJALA 1945.

In the park the species seems to be at the westernmost limit of its range (cf. PORSILD 1958, PORSILD and CRUM 1961).

M. pentandra Hook. – Murtle Lake: 18, locally in a moist coniferous forest.

**M. trifida* Graham – Hemp Creek: 2, sparse in dry second-growth *Populus tremuloides* forests.

Parnassia fimbriata König – Azure Lake: (10). – Stevens Lakes: r. – Battle Mtn. I: 32, r.

In moist meadows and by rapids along brooks.

**P. palustris* L. var. *neogaea* Fern. – Hemp Creek: 2, sparse in alluvial man-made meadow along brook.

**Ribes hudsonianum* Richards. var. *hudsonianum* – Hemp Creek: 2, sparse in alluvial swamps. Blue River: (13), KUJALA 1945.

R. lacustre (Pers.) Poir. – Hemp Creek: 2, (3), sc. Blue River: (13, 16), KUJALA 1945, – Murtle Lake: (18, 19, 24, 25, 27), f. fq. – Stevens Lakes: r.

In fresh to moist coniferous forests, not seen in forest glades.

**R. oxyacanthoides* L. – Hemp Creek: 2, in dry second-growth *Populus tremuloides* forests and also in alluvial low thickets.

Saxifraga bronchialis L. ssp. *austromontana* (Wieg.) Piper – Messiter: 12, on cliff by waterfalls in the lower oroboreal zone. – Battle Mtn. II: 38, sparse in rock outcrop in the oroarctic zone.

Both these zonally widely separated specimens represent *S. bronchialis* ssp. *austromontana*, according to the descriptions of CALDER and SAVILE (1959).

S. ferruginea Graham var. *macounii* Engl. & Irmsch. – Battle Mtn. II: 37, sparse on wet rocks near tree-line.

S. lyallii Engler var. *hultenii* Calder & Savile – Battle Mtn. II: 37, sparse along brook.

This specimen fits well with the description of CALDER and SAVILE (1960).

S. mertensiana Bong. – Battle Mtn. II: 38, sparse along brook.

S. oregonensis (Raf.) A. Nels. (*S. ascendens* L. ssp. *oregonensis* (Raf.) Bacigalupi) – Battle Mtn. II: 38, very sparse in rocky meadow.

S. rivularis L. var. *flexuosa* (Sternb.) Engl. – Battle Mtn. II: 37, sparse in rocky meadow.

Tellima grandiflora (Pursh) Dougl. – Murtle Lake: 18, in a glade in swamp forest.

Tiarella trifoliata L. – Murtle Lake: 18, sparse in a dry coniferous forest near lake. Blue River: (13), KUJALA 1945.

T. unifoliata Hook. – Hemp Creek: 2, (3), f fq. Azure Lake: (9). Blue River: (13), KUJALA 1945. – Murtle Lake: (17–22, 24, 26, 27), fq. – Stevens Lakes: (30), sc.

Very abundant in old fresh coniferous forests up to the upper oroboreal zone, sparse in dry second-growth *Populus tremuloides* forests.

Rosaceae

Amelanchier alnifolia Nutt. – Hemp Creek: 2, 3, very common in dry, warm second-growth *Populus tremuloides* forests and scattered in old fresh *Thuja* forests. Blue River (13, 15), KUJALA 1945, 16, A. Cajander and V. Kujala, (14). – Murtle Lake (18), very rare on lake shores.

In Hemp Creek there were *Amelanchier* bushes with big, bad-tasting and others with small, palatable berries. The latter type also has smaller leaves but they are both var. *alnifolia* according to HITCHCOCK et al. (1961).

Aruncus sylvestris Kostel., s. lat. – Murtle River: 6, r. – Murtle Lake: 17, f r.

Sparse in eutrophic swamp forests and rich alder-willow thickets on river bank. Common outside the park boundary in the luxuriant moist valley south of Blue River Station in the lower oroboreal zone.

Crataegus douglasii Lindl. – Hemp Creek: 2, one bush on a warm slope in dry second-growth *Populus tremuloides* forest.

Dryas hookeriana Juz. – Reported by HARTMAN (1957) under the name *D. octopetala*.

**Fragaria vesca* L. var. *bracteata* (Heller) Davis – Hemp Creek: (1), 2, locally common in dry warm second-growth *Populus tremuloides* forests.

**F. virginiana* Duchesne var. *glauca* S. Wats. – Hemp Creek: (1), 2, fairly abundant in dry warm second-growth *Populus tremuloides* forests. Blue River: (16), KUJALA 1945. var. *platypetala* (Rydb.) Hall – Stevens Lakes: (28, 30, no specimens, but probably this variety), sc. – Battle Mtn. I: 32, r.

In dry meadows and on open burns.

Geum cf. *oregonense* (Scheutz) Rydb. – Hemp Creek: 2, sparse in dry pasture and on roadside. – Murtle Lake: (26), in the yard of the patrolman's cabin, adventive.

It was not definitely proved that the specimen is not a hybrid, e.g. *G. macrophyllum* × *G. perincisum* (cf. GAJEWSKI 1955)

Luetkea pectinata (Pursh) Kuntze – Stevens Lakes: (28), sc. Fish Lake Hill I: (31), sc. – Battle Mtn. II: (32, 33), 34, (35), fq. Fish Lake Hill II: 36, fq.

Very abundant in orohemiarctic coniferous forests of the northeastern, apparently more humid slopes of Battle Mtn. and Fish Lake Hill; also abundant in dry treeless heaths and meadows at margins of forests in the same zone.

Potentilla diversifolia Lehm. var. *diversifolia* – Battle Mtn. I: 32, (33–35), fq, common in dry to moist meadows; also

seen (35) sparsely along a brook a type commonly called by the name *glaucophylla* but which, according to CLAUSEN et al. (1946), does not represent a distinct ecotype.

P. emarginata Pursh, s. lat. (det. J. A. CALDER). – Battle Mtn. II: 37, rare on bare soil.

The leaves of this collection are tomentose beneath.

**P. gracilis* Dougl. ssp. *nuttallii* (Lehm.) Keck – Hemp Creek: 2, sparse in the yard of the Ranger Sta., adventive.

According to CLAUSEN et al. (1940), this species is fairly rare in B. C.

**P. norvegica* L. (*P. monspeliensis* L.) – Hemp Creek: 2, in the dry yard of the Ranger Sta., adventive. Blue River: 16, A. Cajander and V. Kujala.

P. palustris (L.) Scop. – Hemp Creek: (3), r. – Murtle Lake: 17, r. – Stevens Lakes: (28), r. – Battle Mtn. I: r.

Sparsely in mesotrophic and eutrophic fens.

Even though this plant grows in soils of good bonity in the park it is low (20 cm), with leaves light green above and glaucous beneath and leaflets spatulate, subtruncate at the tip, thus resembling var. *parvifolia* (Raf.) Fern. & Long.

**Prunus emarginata* (Dougl.) Walpers var. *emarginata* – Hemp Creek: 2, in dry second-growth *Populus tremuloides* forests, sparsely. Blue River: (16), KUJALA 1945.

**P. pennsylvanica* L. f. – Hemp Creek: 2, sparse in dry second-growth *Populus tremuloides* forests.

**Rosa acicularis* Lindl. ssp. *sayi* (Schw.) Lewis – Blue River: (13, 15, 16), KUJALA 1945.

R. gymnocarpa Nutt. – Hemp Creek: 3, fr. Murtle River: 6. Rare in old *Thuja* forests.

**R. nutkana* Presl, coll. – Hemp Creek: 2, abundant in second-growth *Populus tremuloides* forests. The leaflets of this specimen are mostly doubly serrate with glandular teeth and the lower surface as in var. *nutkana*, but the arms are as in var. *hispida* Fern. (cf. HITCHCOCK et al. 1961). Blue River: 16, A. Cajander and V. Kujala (typical var. *hispida*).

**R. cf. woodsii* Lindl. – Blue River: 16, A. Cajander and V. Kujala.

Rubus idaeus L. ssp. *sachalinensis* (Lévl.) Focke – Hemp Creek: 2, (3), fairly abundant in dry second-growth *Populus tremuloides* forests and dry pastures, sparsely in old fresh *Thuja* forests. Blue River: 16, A. Cajander and V. Kujala, (13, 16), KUJALA 1945. – Murtle Lake: (17), locally in a fresh coniferous forest.

R. paracaulis Bailey – Murtle Lake: 18, local in a eutrophic fen. – Stevens Lakes: (30), in a moist meadow.

R. parviflorus Nutt. – Hemp Creek: (1), 2, (3), fq. Murtle River: (4). Blue River: (13, 16), KUJALA 1945, (14). – Murtle Lake: (17, 18, 22), f fq. – Stevens Lakes: (29), r.

Common and often abundant in dry second-growth *Populus tremuloides* forests, scattered in old fresh coniferous forests up to the upper oroboreal zone, but it occurs mainly near lake shores in the middle and upper oroboreal zones. In the whole area this species seems to avoid paludified habitats.

R. pedatus J. E. Sm. – Hemp Creek: r. Azure Lake: (9) Blue River: (13, 15, 16), KUJALA 1945, (13, 14). – Murtle Lake: 17, (18–27), fq. – Stevens Lakes: (29), r.

Very common and often abundant in old coniferous forests, particularly in fresh *Tsuga* forests of the middle oroboreal zone. It seems to prefer strongly humid regions, being therefore rare in the dry valley of Hemp Creek.

R. pubescens Raf. – Hemp Creek: (3), sc. Murtle River: 5, scattered in old fresh coniferous forests near river banks.

Blue River: (13, 16), KUJALA 1945. – Murtle Lake: 25, very sparse along spring-fed brook.

R. viburnifolius (Greene) Rydb. – Murtle Lake: 21, r.

In a boulder bed on lake shore a low, glandular *Rubus* was detected very densely beset with prickles broadened at the base, having only a few white flowers and with leaves becoming subglabrous and light green beneath. It would seem to be the same type that RYDBERG (1913) called *R. viburnifolius* (Greene) Rydb., which HITCHCOCK et al. (1961), among others, included in *R. idaeus* L. var. *peramoenus* (Greene) Fern.

This plant is certainly native, occurring in association with *Corydalis aurea*.

Sibbaldia procumbens L. – Stevens Lakes: (28), sparse in dry meadows near lake shore. – Battle Mtn. I: (32), 34, (35), f fq. Fish Lake Hill II: 36, common in dry meadows, – Battle Mtn. II: (36, 37), scattered in dry rocky meadows.

Sorbus scopulina Greene, s. lat. – Blue River: (13, 15, 16), KUJALA 1945.

S. sitchensis Roemer var. *sitchensis* – Hemp Creek: (2, 3), f r. Blue River: (13), KUJALA 1945. – Murtle Lake: (17), 18, (22), 25, sc. – Stevens Lakes: (28), r.

Scattered in dry to fresh, second-growth or older forests.

Spiraea douglasii Hook. var. *menziesii* (Hook.) Presl – Hemp Creek: 2, common in moist pastures, in wet, alluvial meadows and in swamp forests, often forming pure thickets. Blue River: (13, 15), KUJALA 1945. – Murtle Lake: (18, 19, 24, 25, 27), as large pure thickets on lake shores and on river banks and scattered in mesotrophic fens. – Stevens Lakes: (30), sparse in alluvial meadows on lake shore.

S. betulifolia Pall. var. *lucida* (Dougl.) C. L. Hitchc. (*S. lucida* Dougl.) – Hemp Creek: 2, (3), sc. Murtle River: (4). Blue River: (13, 15, 16), KUJALA 1945, (13). – Murtle Lake: (18, 25, 26), sc.

Common but not abundant in dry second-growth *Populus tremuloides* forests, scattered in dry to fresh coniferous forests; also in pastures of the Hemp Creek village.

Leguminosae

Lathyrus ochroleucus Hook. – Hemp Creek: 3, Blue River: (16), KUJALA 1945.

In warm, dry to fresh second-growth coniferous forests; abundant especially in dry clearings and on roadsides.

Lupinus latifolius Agardh var. *subalpinus* (Piper & Robins.) C. P. Smith – Stevens Lakes: (28), sparsely in dry meadows. – Battle Mtn. I: 32, (33, 34), fq, Fish Lake Hill II: 36, fq, abundant in fresh meadows at margins of forests and in openings of fresh forests.

Determined according to HITCHCOCK et al. (1961).

**Medicago lupulina* L. var. *glanduligera* Ahlfv. (det. J. JALAS) – Hemp Creek: 2, on dry roadside, occasional. Mes-siter: 12, in railyard.

Only this variety has been found in Canada according to BOIVIN (1960; s.n. var. *glandulosa*).

**Melilotus albus* Desr. – Hemp Creek: 2, sparsely on roadside, adventive.

**Oxytropis campestris* (L.) DC. var. *gracilis* (A. Nels.) Barneby – Blue River: 15, A. Cajander and V. Kujala.

**Trifolium agrarium* L. – Hemp Creek: 2, fairly sparse in horse pasture, adventive.

T. dubium Sibth. – Murtle River: 4, sparse on roadside, introduced.

T. hybridum L. – Hemp Creek: 2, sc. – Murtle Lake: 18, sc. In yards of farms and cabins, naturalized adventive.

**T. pratense* L. – Hemp Creek: 2, scattered in dry second-growth *Populus tremuloides* forests near road. Adventive, naturalized.

T. repens L. – Hemp Creek: 2, (3), f fq. Murtle River: (6). – Murtle Lake: (28), r.

In dry second-growth *Populus tremuloides* and *Salix scouleriana* forests, also far from settlements, in yards of farms and cabins. Adventive, naturalized.

Vicia americana Muhl. var. *truncata* (Nutt.) Brewer – Hemp Creek: 2, sparse in grazed alluvial meadow, introduced. Blue River: (16), KUJALA 1945.

Geraniaceae

**Geranium bicknellii* Britt. – Hemp Creek: 2, fairly common on dry roadside and in dry second-growth *Populus tremuloides* forests near road. Naturalized adventive.

Euphorbiaceae

**Euphorbia glyptosperma* Engelm. – Clearwater: 11, in railyard, adventive.

Callitrichaceae

Callitriche verna L. – Stevens Lakes: 28, sparsely on muddy alluvial lake shore.

According to FASSETT's (1951) map, very few stations are known from B. C.

Empetraceae

Empetrum nigrum L., s. lat. – Blue River: 16, A. Cajander and V. Kujala, also KUJALA 1945. – Stevens Lakes: 30, scattered in open burn at margin of poor fen. – Battle Mtn. II: 37, locally abundant on wet rock by spring-fed brook at tree-line.

The two latter specimens have several flowers, mostly female, only a few being hermaphrodite. The collection from Stevens Lakes has no berries, while the other has some. In northwestern Europe *E. hermaphroditum* is nearly always rich in berries; its leaves are also relatively shorter than in the present specimens, which resemble the European *E. nigrum* s. str.. In the opinion of LÖVE and LÖVE (1959) and LÖVE (1960), *E. nigrum* s. str. does not occur in North America. According to the monograph by VASILYEV (1961), there is a widespread *Empetrum* type in western North America, which is characterized by staminal filaments 3–3.5 times as long as the respective bracts and by the irregular occurrence of unisexual and bisexual flowers. He called this type *E. subholarticum* V. Vassil., which is hardly a species but may represent a recognizable geographical race.

Celastraceae

Pachystima myrsinites (Pursh) Raf. – Hemp Creek: (1), 2, (3), fq. Murtle River: (4, 5). Blue River: (13), KUJALA 1945, (13, 14). – Murtle Lake: 18, (24, 25, 26), fq.

Abundant in dry warm second-growth forests and also in fresh coniferous forests.

In Murtle Lake, east side of Diamond Lake, in a dry coniferous forest two types of this species grow together.

One, with narrow and densely serrate leaves, seems to be common in the area, the other, with oval leaves, was seen only in that one place.

Aceraceae

Acer glabrum Torr. var. *douglasii* (Hook.) Dippel – Hemp Creek: 2, (3), f fq. Murtle River: (4). Blue River: (13, 16), KUJALA 1945. – Murtle Lake: (17), r.

A small tree in fresh and seasonally wet old *Thuja* forests, a bush in second-growth *Populus tremuloides* forests.

[*A. negundo* L. var. *negundo* – Hemp Creek: 2, one planted tree in a farm yard.]

Balsaminaceae

**Impatiens noli-tangere* L., s. lat. – Hemp Creek: 2, abundant in clearing of *Alnus* swamp near road, perhaps indigenous. Blue River: (13), KUJALA (1945; «*I. occidentalis*»).

Rhamnaceae

Ceanothus sanguineus Pursh – Blue River: 16, A. Cajander and V. Kujala. Reported also by HARTMAN (1957) from Wells Gray Park.

C. velutinus Dougl. – Reported by HARTMAN (1957).

Violaceae

**Viola adunca* J. E. Sm. – Hemp Creek: 2, abundant in dry second-growth *Populus tremuloides* forests. Blue River: (13, 16), KUJALA 1945. – Stevens Lakes: (28), sparse in dry meadow.

The collection from Hemp Creek belongs to var. *adunca*, KUJALA (op.cit.) mentioned var. *glabra* Brain. from Valemount.

V. epipsila Ledeb. ssp. *repens* (Turcz.) W. Bckr. – Murtle Lake: 17, sparse in rich swamp forests.

V. glabella Nutt. – Murtle Lake: 17, abundant in a rich swamp forest.

**V. rugulosa* Greene – Hemp Creek: 2, sparse in dry second-growth *Populus tremuloides* forest and in thickets along brook. Blue River: (13, 16), KUJALA 1945 (including «*V. canadensis*»).

V. nephrophylla Greene var. *nephrophylla* – Hemp Creek: 3, sparse on margin of a eutrophic fen.

**V. orbiculata* Geyer – Blue River: (13), KUJALA 1945.

V. renifolia Gray – Hemp Creek: 2, abundant in dry second-growth *Populus tremuloides* forests. Blue River: (13), KUJALA 1945. – Battle Mtn. I: (32), sparse in fresh forests. Fish Lake Hill II: 36, very sparse in dry meadows.

The specimens from Hemp Creek seem to fit with var. *renifolia*, but those from Fish Lake Hill belong to var. *brai-nerdii* (Greene) Fern. (cf. FERNALD 1912).

**V. selkirkii* Pursh – Blue River: (13), KUJALA 1945.

Elaeagnaceae

Shepherdia canadensis (L.) Nutt. – Hemp Creek: 2, fq. Murtle River: (4). Blue River: (13, 16). KUJALA 1945. – Murtle Lake: (25), r.

In dry second-growth *Populus tremuloides* and *Pinus contorta* forests. Favours calcareous soil and apparently therefore occurs abundantly only in Hemp Creek Valley.

Onagraceae

Circaea alpina L. cf. var. *pacifica* (Asch. & Magnus) M. E. Jones – Hemp Creek: (3), sparse in moist coniferous forests. Blue River: (13), KUJALA 1945. – Murtle Lake: 18, sparsely in mesotrophic swamps along brook.

The collection from Murtle Lake has mostly subcordate and sparsely denticulate leaves resembling var. *pacifica* (Asch. & Magnus) M. E. Jones.

Epilobium cf. *adenocaulon* Hausskn. (partly det. I. HIRTONEN) – Hemp Creek: 2, common on roadsides and in yards of farms. Spread by human activities, probably not native. Blue River: (13), KUJALA 1945. – Murtle Lake: 18, sparse in mesotrophic fens, in wet swamps and along brooks, native.

E. anagallidifolium Lam. – Battle Mtn. I: 32, (34, 35), f fq. Fish Lake Hill II: 36, f fq. – Battle Mtn. II: 37, sc.

In periodically wet seepage meadows and along spring-fed brooks.

E. angustifolium L. – Hemp Creek: 2, fq. Blue River: (13, 15, 16). KUJALA 1945. – Murtle Lake: f r. – Stevens Lakes: r. – Battle Mtn. I: (34), r.

In second-growth dry to fresh forests, on roadsides, in pastures. In many habitats spread by human activities.

E. ciliatum Raf. – Murtle River: 4, one individual on river bank near road.

E. cf. clavatum Trel. – Battle Mtn. I: 34, in moist meadows along brook, sparsely.

E. hornemannii Reichenb. – Murtle Lake: 18, r. – Stevens Lakes: r. – Battle Mtn. I: (32), 33, (34, 35), fq. Fish Lake Hill II: 36, fq. – Battle Mtn. II: 37, sc.

In springs, along spring-fed brooks, in meso- and eutrophic fens.

E. latifolium L. – Azure Lake: 10, sparse on wet cliff by waterfall.

E. leptocarpum Hausskn. var. *macounii* Trel. – Azure Lake: 10, in wet rocky meadow by waterfall.

E. oregonense Hausskn. – Murtle Lake: 18, sparse in a mesotrophic fen.

E. palustre L. var. *lapponicum* Wahlenb. – Murtle Lake: 18, 19, sparse in meso-eutrophic fens.

**E. paniculatum* Nutt. – Hemp Creek: 2, abundant on dry roadsides, in dry meadows and in other dry warm habitats. Naturalized adventive.

Oenothera biennis L., s. lat. – Messiter: 12, sparse in railway, adventive.

This specimen has no hairs with reddish pustular bases and therefore it could be called *O. rydbergii* House (cf. HIRTSCHOCK et al. 1961).

Hippuridaceae

Hippuris montana Ledeb. – Stevens Lakes: (28), r. – Fish Lake Hill II: 36, r. Local along brooks.

A very rare species (RAUP 1947), perhaps overlooked on account of its small size.

Araliaceae

Aralia nudicaulis L. – Hemp Creek: 2, (3), Murtle River: (4), fairly abundant in fresh to dry, second-growth to old

forests. Blue River: (13, 15, 16), KUJALA 1945. – Murtle Lake: 18, very sparsely in dry coniferous forests near lake shore.

Oplopanax horridum (Sm.) Miq. – Hemp Creek: (3), sparsely in fresh coniferous forests. Blue River: (13, 16), KUJALA 1945. Murtle River: (7). – Murtle Lake: 17, (18, 21–24, 26), common and often abundant in fresh and especially in moist old coniferous forests.

Umbelliferae

Cicuta douglasii (DC.) Coult. & Rose – Hemp Creek: 2, scattered in alluvial *Alnus* swamps. – Murtle Lake: 18, in mesotrophic fens, sparse.

Heracleum lanatum Michx. – Hemp Creek: 2, f r. Blue River: (16), KUJALA 1945. – Murtle Lake: (17), r. – Stevens Lakes: (30), r.

In alluvial swamp forests.

Osmorhiza chilensis Hook. & Arn. – Hemp Creek: 3, f r. – Murtle Lake: (17), r.

Scattered in fresh to moist rich *Thuja* forests.

**O. depauperata* Philippi – Blue River: (13), KUJALA 1945 (under *O. obtusata*).

O. purpurea (Coult. & Rose) Suksd. – Stevens Lakes: (28), r. – Battle Mtn. I: (32, 33), f r. Fish Lake Hill II: 36, f r.

In fresh coniferous forests.

Cornaceae

Cornus canadensis L. – Hemp Creek: (1), 2, (3), fq. Murtle River: (4, 5, 7). Azure Lake: (9, 10). Blue River: (13, 15, 16), KUJALA 1945, (13, 14). – Murtle Lake: (17–20, 22–27), fq. – Stevens Lakes: r.

Very common and abundant in dry to fresh coniferous forests and in second-growth *Populus tremuloides* forests up to the middle oroboreal zone, sparse in fresh forests in the upper oroboreal zone.

C. stolonifera Michx., s. lat. – Hemp Creek: 2, (3), scattered in fresh forests, in alluvial swamps and along brooks. Blue River: (13), KUJALA 1945 (under **C. pubescens**), 16, A. Cajander and V. Kujala. – Murtle Lake: 18, sparse on alluvial lake shores with willows.

The specimen from Hemp Creek has appressed pubescence and styles about 2.5 mm long and so, according to the treatment by RICKETT (1944), it may be a hybrid between the eastern *C. stolonifera* and the western *C. occidentalis*.

Pyrolaceae

Chimaphila umbellata (L.) Bart. ssp. *occidentalis* (Rydb.) Hull. – Hemp Creek: (2, 3), Murtle River: 4, abundant in dry second-growth *Pinus contorta* forests, scattered in dry second-growth *Populus tremuloides* forests. Blue River: (13, 15, 16), KUJALA 1945, (13, 14). – Murtle Lake: 25, 26, sparse on dry warm southern slope in coniferous forests. Also reported by SZCZAWINSKI (1962) from Wells Gray Park.

Moneses uniflora (L.) A. Gray – Hemp Creek: (3), r. Blue River: (13), KUJALA 1945. – Murtle Lake: (19, 20, 22), f r. – According to SZCZAWINSKI (1962), collected from the park.

In old fresh coniferous forests.

Orthilia secunda (L.) House (*Ramischia s.*) – Hemp Creek: 2, 3, f fq. Murtle River (4), 5. Azure Lake: (9). Blue River: (13, 15, 16), KUJALA 1945. – Murtle Lake: 18, (22–26), f fq. – Stevens Lakes: (29), r. – Battle Mtn. I: (32, 34), r. According to SZCZAWINSKI (1962), collected from the park.

A common species in dry and fresh coniferous forests, sparse in orohemiarctic meadow forests.

The specimens fit better with var. *secunda* than with var. *obtusata*.

Pyrola asarifolia Michx. var. *asarifolia* – Murtle River: 6, r. Blue River: (13, 16), KUJALA 1945. – Murtle Lake: 25, r. According to SZCZAWINSKI (1962), collected from the park.

Locally abundant in swamp forests and in fresh alluvial coniferous forests.

var. *purpurea* (Bunge) Fern. – Hemp Creek: (3), r. Murtle River: 4, Blue River: (15, 16), KUJALA 1945. – Murtle Lake: (25), r.

Sparse in fresh *Thuja* and fresh *Pinus contorta* forests.

P. chlorantha Sw. (*P. virens* Schweigg.) – Hemp Creek: 3, r. Blue River: (13, 15, 16) KUJALA 1945. – Murtle Lake: (25, 26), f r. According to SZCZAWINSKI (1962), collected from the park.

Sparse in old, dry to fresh coniferous forests.

P. minor L. – Murtle Lake: 25, locally abundant on sandy lake shore under willows. – Stevens Lakes: r.

Monotropaceae

Monotropa hypopitys L. var. *americana* (DC.) Domin – An «Indian-pipe» occurs in Wells Gray Park according to R. Ritcey (verbal comm.). Blue River: (13, 16), KUJALA 1945.

**Pterospora andromedea* Nutt. – Blue River: 16, A. Cajander and V. Kujala.

Ericaceae

Andromeda polifolia L. – Reported by HARTMAN (1957).

Arctostaphylos uva-ursi (L.) Spreng. var. *coactilis* Fern. & Macbr. – Hemp Creek: 2, scattered on rock outcrops in second-growth *Populus tremuloides* forests. Blue River: (16), KUJALA 1945. According to SZCZAWINSKI (1962), collected from the park.

Cassiope mertensiana (Bong.) D. Don var. *mertensiana* – Battle Mtn. I: (32–35), f fq. Fish Lake Hill II: 36, f fq. According to SZCZAWINSKI (1962), collected from the park.

Common in dry meadows at margins of forests and on hummocks at margins of fens.

C. tetragona (L.) D. Don ssp. *saximontana* (Small) Porsild – Battle Mtn. II: 38, scattered in rocky oroarctic meadows.

Gaultheria hispidula (L.) Bigel. – Hemp Creek: (3), r. Blue River: (13, 15, 16), KUJALA 1945. – Murtle Lake: 18, 19, (27), f r. According to SZCZAWINSKI (1962), collected from the park.

Sparse on oligotrophic hummocks in eutrophic fens and in swamps.

G. humifusa (Graham) Rydb. – Battle Mtn. I: (34), 35, sc. Fish Lake Hill II: 36, sc. – Battle Mtn. II: (37, 38), f r.

In dry meadows and dry heaths. These are apparently the northernmost known localities of this species in B. C. (cf. SZCZAWINSKI 1962, p. 65).

Kalmia polifolia Wang var. *microphylla* (Hook.) Rehd. – Battle Mtn. II: (32), 34, (35), common on thin hummocks at margins of fens and in mesic meadows.

var. *polifolia* – Hemp Creek: (3), r. – Murtle Lake: 18, (19), f r. – Stevens Lakes: (28), fq.

Sparse in oligotrophic hummocks of eutrophic and mesotrophic fens.

According to SZCZAWINSKI (1962), *K. polifolia* has been collected from Wells Gray Park.

Ledum glandulosum Nutt. – Collected from the park, according to SZCZAWINSKI (1962).

L. groenlandicum Oeder – Hemp Creek: 2, sparse in dry second-growth *Populus tremuloides* forest. Blue River: 16, A. Cajander and V. Kujala. (13, 15, 16), KUJALA 1945. – Murtle Lake: 18, fairly abundant in mesotrophic fens. Not seen in the upper oroboreal and orohemiarctic zones.

Menziesia ferruginea Sm. – Hemp Creek: 3, r. Blue River: (13, 15, 16), KUJALA 1945. – Murtle Lake: 17, (18, 19, 22–26), fq. – Stevens Lakes: (28, 29), fq. According to SZCZAWINSKI (1962), collected from the park.

Sparse in fresh, old *Thuja* forests in the lower oroboreal zone, very abundant in fresh coniferous forests in the middle and upper oroboreal zones.

The specimens collected from Hemp Creek seem to be close to var. *glabella* (Gray) Peck, which is known in the Rocky Mts. area. Those from Murtle Lake fit better with var. *ferruginea*, which is a coastal type (SZCZAWINSKI 1962).

Phylloce empetriformis (Sm.) D. Don – Murtle River: (7), very sparsely in a burned forest. – Murtle Lake: r. – Stevens Lakes: (30), sparse at margins of poor fens. – Battle Mtn. I: 34, (35), fq. Fish Lake Hill II: 36, fq, in marginal heaths of forests and fens and in dry meadows. – Battle Mtn. II: (37, 38), fairly abundant in rocky meadows.

According to SZCZAWINSKI (1962), collected from the park.

P. glanduliflora (Hook.) Coville – Battle Mtn. II: 37, in rocky oroarctic meadows.

Rhododendron albiflorum Hook. – Azure Lake: (9), very sparse and local in rocky forests on lake shore. – Murtle Lake: (17), 18, (23, 26), sc. – Stevens Lakes: (28–30), fq. Fish Lake Hill I: 31, fq. – Battle Mtn. I: (33), r. Collected from the park, according to SZCZAWINSKI (1962).

In fresh coniferous forests from the middle to the upper oroboreal zone. The upper limit of this species, where it forms a continuous thicket difficult to penetrate, is very sharp and seems to be the same as the limit between the upper oroboreal and the orohemiarctic zone on Battle Mtn. and Fish Lake Hill.

Vaccinium caespitosum Michx. – Blue River: (13, 16), KUJALA 1945. – Murtle Lake: 25, 27, f r. – Stevens Lakes: (30), f fq. – Battle Mtn. I: (32–35), fq. According to SZCZAWINSKI (1962), collected from the park.

On dry sandy lake shores and river banks, in dry *Pinus contorta* forests and in dry orohemiarctic meadows.

V. membranaceum Dougl. – Hemp Creek: (3), f fq. Murtle River: 4, (5). Azure Lake: (9, 10). Blue River: (13, 15, 16), KUJALA 1945, (13, 14). – Murtle Lake: (17), 18, (19–22, 24–27), fq. – Stevens Lakes: (28–30), f fq. Fish Lake Hill I: (31). – Battle Mtn. I: (32, 33), sc. Fish Lake Hill II: (36).

Common and abundant in fresh coniferous forests; sparse in very shady localities.

**V. myrtilloides* Michx. – Blue River: 15, 16, A. Cajander and V. Kujala. (13, 15, 16), KUJALA 1945. 14, abundant in old dry and shady *Tsuga* forests.

V. oxycoccos L. – Murtle River: (7). – Murtle Lake: 18, (19), f r. – Stevens Lakes: (30), r.

Scattered in all kinds of fens.

The collection is closest to var. *intermedium* A. Gray, its pedicels are pubescent, leaves broadest near the base.

V. ovalifolium J. E. Sm. – Hemp Creek: r. Murtle River: (6). Azure Lake: (9, 10). Blue River: (13, 15), KUJALA 1945,

(13, 14). – Murtle Lake: (18–24), fq. – Stevens Lakes: (30), fq. – Battle Mtn. I: (32, 33), fq.

In dry to fresh coniferous forests. Very rare in the dry Hemp Creek valley, like the other species common on the Coast and in the Interior Wet Belt.

**V. vitis-idaea* L. ssp. *minus* (Lodd.) Hult. – Blue River: 15, 16, A. Cajander and V. Kujala, also KUJALA 1945.

Primulaceae

Trientalis europaea L. ssp. *arctica* (Fisch.) Hult. – Murtle Lake: 18, f r. – Stevens Lakes: 28, r. Scattered in mesotrophic and eutrophic fens.

Gentianaceae

Gentiana glauca Pall. – Battle Mtn. I: (32), 34, (35), scattered in moist *Carex nigricans* meadows.

Menyanthes trifoliata L. cf. var. *minor* Raf. – Murtle Lake: 25, common in a mesotrophic fen. – Stevens Lakes: (30), sparse in a fen pool.

Apocynaceae

**Apocynum androsaemifolium* L. var. *androsaemifolium* – Hemp Creek: 2, fairly abundant in dry warm second-growth *Populus tremuloides* forests and on dry roadsides, probably prefers calcareous ground and is also spread by human activities. Blue River: (16), KUJALA 1945.

Polemoniaceae

**Collomia linearis* Nutt. – Blue River: 16, A. Cajander and V. Kujala.

**Microsteris gracilis* (Hook.) Greene var. *humilior* (Hook.) Cronq. – Hemp Creek: 2, adventive in bare gravel in the yard of the Ranger Sta.

Labiatae

**Galeopsis bifida* Boenn. (*G. tetrahit* L. var. *bifida* (Boenn.) Lej. & Court.) – Hemp Creek: 2, as a weed in the yard of an abandoned farm, adventive.

Lycopus uniflorus Michx. – Murtle Lake: 18, sparse in a moist coniferous forest.

**Mentha spicata* L. – Hemp Creek: 2, sparse in the yard of an abandoned farm, probably originally planted.

**M. arvensis* L. var. *glabrata* (Benth.) Fern. – Hemp Creek: 2, abundant in alluvial pastures and in swamp forests along brook near road, perhaps adventive.

The determination and nomenclature is according to HITCHCOCK et al. (1959).

Prunella vulgaris L. ssp. *lanceolata* (Barton) Hult. – Hemp Creek: 2, scattered in moist pastures and on moist roadside. – Murtle Lake: (18), in cabin yard. – Stevens Lakes: (30), sparse on stony lake shore near cabin (native?).

**Scutellaria galericulata* L. (incl. *S. epilobiiifolia* A. Hamilton). – Hemp Creek: 2, sparse in rich alluvial forest along a brook, in moist pastures and in grazed alluvial meadows.

Scrophulariaceae

Castilleja miniata Dougl. (conf. J. A. CALDER) – Hemp Creek: (1), 2, common in dry second-growth *Populus tremuloides* forests.

C. occidentalis Torr. (det. J. A. CALDER) – Battle Mtn. I: (33, 35). – Battle Mtn. II: 37. Abundant in meadows at timberline.

The colour of inflorescence varies from yellow to purple and red.

C. rhexifolia Rydb. (conf. J. A. CALDER) – Murtle Lake: 18, (19, 24), scattered in eutrophic fens. – Battle Mtn. I: 32, (33 – 35). Fish Lake Hill II: (36). Common in orohemiarctic fresh meadows.

**Linaria vulgaris* L. – Hemp Creek: (2), on roadside, adventive.

Melampyrum lineare Desr. var. *lineare* – Murtle River: 4, abundant in 60-year-old, warm and dry *Pinus contorta* forests. Blue River: (13, 15, 16), KUJALA 1945, (13).

Mimulus guttatus DC. – Hemp Creek: 2, scattered in grazed alluvial meadows, along brooks and on wet trails; spread by human activities. – Murtle Lake: 18, r. – Stevens Lakes: (28), r, in meso-eutrophic fens, native.

M. lewisii Pursh – Battle Mtn. I: 35, locally abundant along a spring-fed brook.

M. moschatus Dougl. – Murtle River: 4, locally abundant in moist roadside ditch, adventive.

Pedicularis bracteosa Benth. – Murtle Lake: 24, scattered in a mesotrophic fen. – Battle Mtn. I: 32. (33 – 34), fq, Fish Lake Hill II: 36, fq, common and often abundant in fresh to moist meadows, especially in *Valeriana sitchensis* meadows, and in fresh forests.

P. groenlandica Retz. – Reported by EDWARDS and RITCEY 1960.

**Penstemon procerus* Dougl. – Blue River: 16, A. Cajander and V. Kujala.

Penstemon sp. – Reported by HARTMAN (1957).

**Verbascum thapsus* L. – Hemp Creek: 2, on dry roadside and on an abandoned road, probably naturalized. (Very common in burned areas along the Wells Gray Park road about 10 miles N of Clearwater).

Veronica americana (Raf.) Schwein. – Hemp Creek: 2, r. – Murtle Lake: r. – Stevens Lakes: (30), r. – Battle Mtn. I: (34), r.

In alluvial *Alnus* swamps and along brooks. Indigenous, but seems to be spread by human activities.

V. serpyllifolia L. var. *humifusa* (Dicks.) Vahl – Battle Mtn. (32), sparse in moist meadow along a brook.

V. wormskjoldii Roem. & Schult. – Murtle Lake: 18, sparse in eutrophic fens. – Battle Mtn. I: (32 – 34), 35, fq, Fish Lake Hill II: 36, fq, common in fresh meadows. – Battle Mtn. II: 37, sparsely along brook.

The specimens from Murtle Lake seem to fit FERNALD's (1939) description of *Veronica alpina* var. *geminiflora*. The others cannot be determined according to FERNALD's paper. On Battle Mtn. there was seen a small patch of a form with white flowers and another with red flowers.

Lentibulariaceae

Utricularia intermedia Hayne – Murtle Lake: 24, sparse in wet hollows of mesotrophic fens, flowering at the end of June.

Plantaginaceae

Plantago major L. – Hemp Creek: 2, on moist trails, on roadsides and in moist pastures. – Murtle Lake: (26), in the yard of the patrolman's cabin. Introduced.

Rubiaceae

Galium boreale L. ssp. *septentrionale* (Roem. & Schult.) Iltis – Blue River: (16), KUJALA 1945. Reported also by HARTMAN (1957).

G. trifidum L. var. *pacificum* Wieg. – Hemp Creek: 2, abundant on wet roadside near road. – Murtle Lake: (17), sparsely along a brook.

var. *trifidum* – Stevens Lakes: r. – Battle Mtn. I: r. Sparsely along brooks and in moist meadows.

G. triflorum Michx. – Hemp Creek: 2, (3), f fq. Murtle River: 4, f fq. Blue River: (13), KUJALA 1945. – Murtle Lake: (24), f r.

In alluvial *Alnus* swamps, in fresh to moist coniferous forests, in dry second-growth *Populus tremuloides* forests and on dry to wet roadsides; spread somewhat by human activities.

Caprifoliaceae

Linnaea borealis L. ssp. *americana* (Forbes) Hult. – Hemp Creek: (1), 2, (3), fq. Murtle River: (4, 5), Azure Lake: (9, 10). Messiter: (12). Blue River: (13, 15, 16), KUJALA 1945, (13, 14). – Murtle Lake: (18, 20, 21, 25 – 27), fq.

Common in dry to fresh and open to shady forests up to the middle oroboreal zone. Not seen in the upper oroboreal zone.

Lonicera involucrata (Richards.) Banks var. *involucrata* – Hemp Creek: 2, (3), f fq. Murtle River: (4). Blue River: 16, A. Cajander and V. Kujala, (13, 15, 16), KUJALA 1945. – Murtle Lake: (18, 19, 24, 25), fq. – Stevens Lakes: r.

Common in dry to fresh forests of second-growth or older; in shady habitats usually small and sterile.

Sambucus racemosa L., s. lat. – Hemp Creek: 2, f r. Blue River: (13), KUJALA 1945. – Murtle Lake: f r. – Stevens Lakes: r.

Rare along brooks and in alluvial swamps.

Symphoricarpos albus (L.) Blake – Hemp Creek: 2, 3, uncommon in dry second-growth *Populus tremuloides* forests, common in fresh coniferous forests and in alluvial *Alnus* swamps. Blue River: (13), KUJALA 1945.

The specimens are probably var. *laevigatus* (Fern.) Blake.

**Viburnum edule* (Michx.) Raf. – Blue River: (13, 16), KUJALA 1945.

V. trilobum Marsh. – Hemp Creek: 2, (3), f r. Blue River: (16), KUJALA 1945. – Murtle Lake: (17, 18, 20, 21, 25), sc.

In fresh and rich forests and along brooks.

Adoxaceae

**Adoxa moschatellina* L. – Blue River: (13), KUJALA 1945.

Valerianaceae

Valeriana sitchensis Bong. – Murtle Lake: 18, (24), fairly abundant in swamp forests. – Stevens Lakes: (28 – 30), abundant in fresh coniferous forests. – Battle Mtn. I: (32 –

35), Fish Lake Hill II: (36), dominant in a fresh orohemiarctic meadow type and scattered in fresh forests.

Campanulaceae

Campanula lasiocarpa Cham. – Battle Mtn. II: 38, scattered in rocky meadows.

**C. rotundifolia* L. – Messiter: (12), on cliff by waterfalls, native. Blue River: 16, A. Cajander and V. Kujala, also KUJALA 1945.

Compositae

Achillea lanulosa Nutt. var. *alpicola* Rydb. – Battle Mtn. I: 32, fairly sparsely in a moist meadow.

*var. *lanulosa* – Hemp Creek: 2, sparsely in horse pasture, introduced. Blue River: 16, A. Cajander and V. Kujala, also KUJALA 1945.

Adenocaulon bicolor Hook. – Hemp Creek: 3, sparsely in moist, rich *Thuja* forest.

Agoseris aurantiaca (Hook.) Greene – Murtle River: 6, one individual on trail in second-growth *Populus tremuloides* forest. – Stevens Lakes: r. – Battle Mtn. I: 32, (33–35), fq. Fish Lake Hill I: 36, fq.

Chiefly in moist orohemiarctic meadows. The colour of the corollas varies from bluish violet to brownish orange.

Anaphalis margaritacea (L.) Benth. & Hook. – Hemp Creek: (1), 2, fq. – Murtle Lake: r. – Battle Mtn. I: r.

Very common and abundant in dry warm second-growth *Populus tremuloides* forests in the lower oroboreal zone. Very rare in the other zones, but it was found, for instance, to be abundant in orohemiarctic burned forest on the southern slope of Battle Mtn. (alt. ca. 4 500 feet).

Antennaria alpina group – Battle Mtn. II: 37, in dry meadows, sparse.

This collection does not seem to fit with any *Antennaria* species described by PORSILD (1950) or by RYDBERG (1922). It has short stolons, the leaves are densely greyish tomentose on both surfaces, the flowering stems are about 10 cm tall, purplish, floccose, with 5–7 well-developed leaves. The involucre is about 5 mm high, the achenes glabrous, and the pappus dirty white.

A. cf. stolonifera A. E. Porsild – Battle Mtn. I: 34, in strings and hummocks of poor fens, scattered.

**A. howellii* Greene – Hemp Creek: 2, common in dry second-growth *Populus tremuloides* forests. Blue River: (16), KUJALA 1945.

A. lanata (Hook.) Greene – Stevens Lakes: (28), r. – Battle Mtn. I: 32, (33–35), fq. Fish Lake Hill II: 36, fq.

Common and abundant in dry orohemiarctic meadows, giving them a greyish colour.

CHREK and POUZAR (1961) have demonstrated that the name *lanata* belongs to the European taxon called *A. carpatia*, which is clearly distinct from the *A. lanata* of the North American floras.

A. umbrinella Rydb. – Battle Mtn. I: 34, in moist meadows, sparse.

A. racemosa Hook. – Murtle River: 4, 5, locally in a rock outcrop in second-growth *Populus tremuloides* forest and on dry roadside.

A. rosea Greene – Hemp Creek: 2, r. Murtle River: 4, r. Sparse in dry second-growth *Populus tremuloides* forests and on dry roadside. Native, spread by human activities.

Arnica chamissonis Less. ssp. *chamissonis* \geq ssp. *foliosa* (Nutt.) Maguire – Clearwater Lake: 8, abundant in a man-made meadow.

A. cordifolia Hook. var. *cordifolia* – Murtle River: 6, r. Blue River: (16), KUJALA 1945. – Murtle Lake: (18), r. Sparse in swamp and swamps forests.

A. diversifolia Greene – Battle Mtn. II: 37, sparse in moist meadows along brook.

A. latifolia Bong. var. *latifolia* – Murtle Lake: 18, sparse in swamps along brook. – Stevens Lakes: (28–30), Fish Lake Hill I: (31), abundant in fresh coniferous forests. – Battle Mtn. I: (32), 33, (34), Fish Lake Hill II: (36), one of the most common herbs in shady orohemiarctic forests, sparsely in meadows and only at margins of forests.

A. mollis Hook. – Murtle Lake: 18, sparse in mesotrophic fens but fairly abundant in eutrophic fens. – Battle Mtn. I: (32, 33), 34, (35), common and often abundant in moist to wet meadows along brooks.

A. rydbergii Greene – Battle Mtn. II: 37, in a meadow along brook.

Artemisia arctica Less. – Battle Mtn. I: (33), 34, (35), common in dry meadows, – Battle Mtn. II: (37), rare in rocky meadows.

According to HULTÉN's map (1954), this species is fairly common in mountains in B. C.

**Aster ciliolatus* Lindl. – Hemp Creek: 2, common in dry second-growth *Populus tremuloides* forests and on dry roadside. Native, spread by human activities.

A. conspicuus Lindl. – Hemp Creek: 3, sparse in dry second-growth coniferous forest. Blue River: 16, A. Cajander and V. Kujala.

**A. engelmannii* (Eat.) A. Gray – Blue River: (13, 16), KUJALA 1945.

A. foliaceus Lindl. var. *foliaceus* – Murtle Lake: 19, fairly abundant in a mesotrophic fen.

A. junciformis Rydb. – Hemp Creek: 3, abundant in a eutrophic fen.

A. modestus Lindl. – Hemp Creek: 2, sc. Murtle River: 4, r. Scattered in alluvial meadows, on abandoned road in shady rich forest and on moist roadside. Perhaps indigenous but spread by human activities.

Chrysanthemum leucanthemum L. – Murtle River: 4, sparsely on roadside, occasional adventive.

**Cirsium arvense* (L.) Scop. var. *maritimum* Fr. – Hemp Creek: 2, fairly abundant in the yard of the Ranger Sta.

**C. vulgare* (Savi) Airy-Shaw – Hemp Creek: (2), scattered in pastures and on roadsides,

Crepis tectorum L. – Murtle River: 4, occasional adventive on roadside.

**Erigeron acris* L., s.lat. – Hemp Creek: 2, abundant on dry roadside, probably adventive.

E. canadensis L. (*Conyza canadensis* (L.) Cronq.) – Hemp Creek: 2, sparsely in pastures and on roadside, adventive.

E. humilis Graham – Battle Mtn. II: 38, sparsely in boulder bed.

E. peregrinus (Pursh) Greene ssp. *callianthemus* (Greene) Cronq. var. *callianthemus* – Murtle Lake: 18, (24), r, sparse in a mesotrophic fen and one individual in a cabin yard. – Stevens Lakes: (29), f r, Fish Lake Hill I: (31), fr, scattered in mesotrophic fens and forest openings. – Battle Mtn. I: (32–35), f q, Fish Lake Hill II: 36, f q, common and abundant in mesic to moist meadows.

E. philadelphicus L. – Hemp Creek: 2, scattered in dry second-growth *Populus tremuloides* forests and on moist roadside ditch like an adventive plant. – Murtle Lake: 21, sparse in a boulder bed near lake shore with *Rubus viburnifolius* and *Corydalis aurea*, apparently indigenous.

**Gnaphalium viscosum* H. B. K. – Hemp Creek: 2, common in second-growth *Populus tremuloides* forests.

Hieracium albiflorum Hook. – Hemp Creek: 2, fq. Blue River: (13, 16), KUJALA 1945. – Murtle Lake: f r.

Common in dry second-growth *Populus tremuloides* forests and on dry roadside.

**H. canadense* Michx. – Hemp Creek: 2, sparse on dry roadside, adventive.

H. gracile Hook. – Stevens Lakes: (28), r. – Battle Mtn. I: 32, (33 – 35), fq. Fish Lake Hill II: 36, fq.

In dry meadows and forests.

**Lactuca biennis* (Moench) Fern. – Hemp Creek: 2, fairly abundant along moist brook near road. Clearwater: 11, common.

**Matricaria matricarioides* (Less.) Porter – Hemp Creek: 2, abundant in the yard of the Ranger Sta., adventive.

**Petasites hyperboreus* Rydb. – Hemp Creek: 2, sparse in alluvial *Alnus* swamp on roadside.

P. palmatus (Ait.) A. Gray – Murtle River: 5, in fresh coniferous forests on river bank.

**P. sagittatus* (Pursh) A. Gray – Blue River: (16), KUJALA 1945.

**Senecio canus* Hook. – Blue River: 16, A. Cajander & V. Kujala.

S. integerrimus Nutt. var. *exaltatus* (Nutt.) Cronq. – Battle Mtn. I: (32), 34, (35), Sparse in fresh *Valeriana sitchensis* meadows.

S. pauciflorus Pursh – Battle Mtn. II: 32, scattered along moist alluvial brook.

**S. pseud aureus* Rydb. – Hemp Creek: 2, common on dry roadside and scattered in fresh second-growth *Populus tremuloides* forests and in alluvial willow thickets, perhaps adventive.

S. triangularis Hook. – Blue River: (13), KUJALA 1945. – Murtle Lake: 18, (24), r, sparse in eutrophic fens. – Stevens Lakes: (28, 30), scattered in mesotrophic fens and along brooks. – Battle Mtn. II: (32, 34, 35), fq, abundant in moist to fresh meadows.

**Solidago canadensis* L. – Hemp Creek: 2, in horse pasture, adventive. The collections include both var. *subserrata* (DC.) Cronq. and var. *salebrosa* (Piper) Jones.

S. multiradiata Ait. var. *scopulorum* A. Gray – Battle Mtn. II: 38, sparse in rocky meadows.

Taraxacum lyratum (Ledeb.) DC. – Battle Mtn. II: 38, scattered on mineral soil.

T. scanicum Dahlst. (det. H. SÄLTIN) – Hemp Creek: 2, in yard of farm, adventive.

Taraxacum spp. – Hemp Creek: 2, f r, in yards of farms, adventive. – Murtle Lake: r, adventive. – Stevens Lakes: (30), on lake shore, apparently native.

Two specimens approach *T. croceiflorum* Dahlst. (det. H. SÄLTIN).

**Tragopogon pratense* L. – Hemp Creek: (2), on roadside, casual adventive.

VI. Summary

This paper lists about 550 species, subspecies or varieties known to occur in or in the vicinity of Wells Gray Provincial Park, British Columbia. One of them, *Carex praeceptorium*, is now reported from Canada for the first time. New published records for B.C. are evidently *Carex*

heleonastes, *C. trisperma* and *Juncus stygius*. *Anemone richardsonii*, *Cryptogramma crispa* var. *sitchense*, *Carex tenuiflora* and *Hierochloë alpina* probably have their southernmost and *Carex cephalantha*, *C. illota* and *Gaultheria humifusa* their northernmost known localities in this area.

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<i>Asplenium</i>	144	<i>Galium</i>	160	<i>Orizopsis</i>	147	<i>Subularia</i>	154
<i>Aster</i>	161	<i>Gaultheria</i>	158	<i>Osmorhiza</i>	158	<i>Symphoricarpos</i>	160
<i>Athyrium</i>	144	<i>Gentiana</i>	159	<i>Oxyccoccus</i>	159	<i>Taraxacum</i>	162
<i>Betula</i>	152	<i>Geocaulon</i>	152	<i>Oxyria</i>	152	<i>Taxus</i>	145
<i>Botrychium</i>	144	<i>Geranium</i>	156	<i>Oxytropis</i>	156	<i>Tellima</i>	155
<i>Bromus</i>	146	<i>Geum</i>	155	<i>Pachystima</i>	156	<i>Thalictrum</i>	153
<i>Calamagrostis</i>	146	<i>Glyceria</i>	147	<i>Parnassia</i>	154	<i>Thelypteris</i>	144
<i>Callitriche</i>	156	<i>Gnaphalium</i>	162	<i>Pedicularis</i>	160	<i>Thuja</i>	145
<i>Calltha</i>	153	<i>Goodyera</i>	151	<i>Penstemon</i>	160	<i>Tiarella</i>	155
<i>Calyso</i>	151	<i>Gymnocarpium</i>	144	<i>Petalites</i>	162	<i>Tofieldia</i>	150
<i>Campanula</i>	161	<i>Habenaria</i>	151	<i>Phalaris</i>	147	<i>Tragopogon</i>	162
<i>Capsella</i>	153	<i>Heracleum</i>	158	<i>Phleum</i>	147	<i>Trientalis</i>	159
<i>Cardamine</i>	154	<i>Heuchera</i>	154	<i>Phyllodoce</i>	159	<i>Trifolium</i>	156
<i>Carex</i>	148	<i>Hieracium</i>	162	<i>Picea</i>	145	<i>Triglochin</i>	146
<i>Cassiope</i>	158	<i>Hierochloë</i>	147	<i>Pinus</i>	145	<i>Trisetum</i>	147
<i>Castilleja</i>	160	<i>Hippuris</i>	157	<i>Plantago</i>	160	<i>Trollius</i>	153
<i>Ceanothus</i>	157	<i>Holcus</i>	147	<i>Poa</i>	147	<i>Tsuga</i>	146
<i>Cerastium</i>	152	<i>Hordeum</i>	147	<i>Polygonum</i>	152	<i>Turritis</i>	154
<i>Chenopodium</i>	152	<i>Juncus</i>	149	<i>Populus</i>	151	<i>Typha</i>	146
<i>Chimaphila</i>	158	<i>Juniperus</i>	145	<i>Portulaca</i>	152	<i>Urtica</i>	152
<i>Chrysanthemum</i>	161	<i>Impatiens</i>	157	<i>Potentilla</i>	155	<i>Utricularia</i>	160
<i>Chrysosplenium</i>	154	<i>Isoetes</i>	145	<i>Prunella</i>	159	<i>Vaccinium</i>	159
<i>Cicuta</i>	158	<i>Kalmia</i>	158	<i>Prunus</i>	155	<i>Vahlodea</i>	147
<i>Cinna</i>	146	<i>Lactuca</i>	162	<i>Pseudotsuga</i>	145	<i>Valeriana</i>	160
<i>Circaea</i>	157	<i>Lathyrus</i>	156	<i>Pteridium</i>	144	<i>Veratrum</i>	150
<i>Cirsium</i>	161	<i>Ledum</i>	159	<i>Pterospora</i>	158	<i>Verbascum</i>	160
<i>Claytonia</i>	152	<i>Leptarrhena</i>	154	<i>Pyrola</i>	158	<i>Veronica</i>	160
<i>Clintonia</i>	150	<i>Lilium</i>	150	<i>Ramischia</i>	158	<i>Viburnum</i>	160
<i>Collomia</i>	159	<i>Linaria</i>	160	<i>Ranunculus</i>	153	<i>Vicia</i>	156
<i>Coptis</i>	153	<i>Linnaea</i>	160	<i>Rhododendron</i>	159	<i>Viola</i>	157
<i>Corallorhiza</i>	151	<i>Listera</i>	151	<i>Ribes</i>	154	<i>Woodsia</i>	144
<i>Cornus</i>	158	<i>Lonicera</i>	160				

Received 1. XI. 1964

Printed 10. IX. 1965