PROVINCE OF BRITISH COLUMBIA

REPORT

OF THE

PROVINCIAL MUSEUM

OF

NATURAL HISTORY

FOR THE YEAR 1933

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
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1934.

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VICTORIA, B. C.

To His Honour J. W. FORDHAM JOHNSON,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned respectfully submits herewith the Annual Report of the Provincial Museum of Natural History for the year 1933.

G. M. WEIR,
Provincial Secretary.

Provincial Secretary's Office,
Victoria, B.C., March 27th, 1934.

PROVINCIAL MUSEUM OF NATURAL HISTORY,
VICTORIA, B.C., March 27th, 1934.

The Honourable Dr. G. M. Weir,
Provincial Secretary, Victoria, B.C.

SIR,—I have the honour, as Director of the Provincial Museum of Natural History, to lay before you the Report for the year ended December 31st, 1933, covering the activities of the Museum.

I have the honour to be,
Sir,
Your obedient servant,

FRANCIS KERMODE,
Director.

DEPARTMENT *of the* PROVINCIAL SECRETARY.

The Honourable Dr. G. M. WEIR, *Minister.*

P. DE NOE WALKER, *Deputy Minister.*

PROVINCIAL MUSEUM OF NATURAL HISTORY.

Staff:

FRANCIS KERMODE, *Director.*

NANCY STARK, *Recorder.* MAUD P. HARTREE, *Stenographer.*

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Plates I. to VI.

PLATE I.

NORMAL SCHOOL STUDENTS HAVING BOTANICAL INSTRUCTION.

NORMAL SCHOOL STUDENTS STUDYING MAMMAL COLLECTIONS.

REPORT *of the*
PROVINCIAL MUSEUM OF NATURAL HISTORY
FOR THE YEAR 1933.

By Francis Kermode, *Director*.

OBJECTS.

(*a.*) To secure and preserve specimens illustrating the natural history of the Province.

(*b.*) To collect anthropological material relating to the aboriginal races of the Province.

(*c.*) To obtain information respecting the natural sciences, relating particularly to the natural history of the Province, and diffuse knowledge regarding the same.

ADMISSION.

The Provincial Museum is open to the public, free. November 1st to April 30th, week-days, 9 a.m. to 5 p.m.; Saturdays, 9 a.m. to 1 p.m. May 1st to October 31st, week-days, 9 a.m. to 5 p.m.; Sunday afternoons, 1 to 5 p.m.

The Museum is closed on New Year's Day, Good Friday, Remembrance Day, and Christmas Day.

VISITORS.

The following figures show the difference between those who registered and those who were checked by the staff. While only 19,706 people registered, the total of the check was 45,457.

	Registered.	Checked.
January	444	1,092
February	612	1,852
March	585	1,657
April	1,220	4,197
May	1,301	3,201
June	2,027	4,432
July	4,450	9,568
August	4,777	9,874
September	2,111	4,678
October	1,142	2,506
November	556	1,335
December	481	1,065
Totals	19,706	45,457

ACTIVITIES.

In the summer of 1933 the Fifth Pacific Science Congress held their preliminary meeting in Victoria from June 1st to 4th before proceeding to Vancouver for their general session. While in Victoria many of the noted scientists from various parts of the world—namely, England, Australia, New Zealand, United States, Netherlands, France, China, Japan, Philippine Islands, Hawaii, and eastern points of Canada—visited the Museum and were greatly impressed with our exceptionally fine display of Natural History and Ethnological Collections of the Province. The Director attended the meeting on behalf of the Provincial Museum and also represented the Biological Society of Washington, D.C.

The general opinion was that this meeting was the most successful one ever held by the Pacific Science Congress, and a full report of the proceedings is in preparation for publication by Dr. Tory, President of the Association.

During September the Director attended a meeting in Ottawa of the Advisory Board of the Canadian Committee on Museums of the Carnegie Corporation of New York. Matters were discussed in regard to devising means for the furtherance of Museum work and for the assistance to Museums throughout the Dominion. A sub-committee was elected to attend to Museum matters, on which the Director was asked to assist.

While in the East it afforded your Director an excellent opportunity of renewing old acquaintances in connection with the Museums and of visiting the following institutions: McGill

University Museums in Montreal; National Museum, Ottawa; Royal Ontario Museum, Toronto; State Museum of Natural History, New York; U.S. National Museum, Smithsonian Institution, Washington, D.C.; and the Field Museum, Chicago. The Directors and staff of these great Museums very kindly offered any assistance possible to our Museum at Victoria.

This year the Provincial Museum collections have been supplemented by a number of additions to the Flora, Fauna, and Ethnology of this Province, which will be found on pages 8, 9, 10, and 11.

One of the most outstanding donations of the year was a specimen of sage-grouse taken on the old Dewdney Trail about 1864 by the late Hon. C. E. Pooley, presented by the Hon. R. H. Pooley, K.C., ex-Attorney-General. We were most fortunate in receiving this bird as it has always been listed as rare in British Columbia.

Throughout the year the staff collected plants for the seasonal wild-flower exhibit, which continually proves to be of great interest and help to the many visitors. (*See* Plate II.)

The work of renewing botanical specimens in the exhibition cases was started, and it is hoped this will be completed during the coming year, as this exhibit has been of great assistance not only to the public-school children, but also to Normal School students. (*See* Plates III. and IV.)

Special mention is due to both Miss Bertrand and Mr. Lohbrunner. The former having collected and donated forty plants from the Peace River District and the latter twenty-six from Mount Arrowsmith; these plants are a very valuable acquisition to our Herbarium.

We were very grateful to receive a collection of entomological specimens, including ninety-eight Lepidoptera and thirteen miscellaneous, presented by Mr. A. N. Gartrell, of Summerland, also a scorpion collected by Mr. A. N. Gartrell, presented by Mr. D. P. Simpson.

Early in the year Dr. Clemens and Mr. G. V. Wilby, of the Pacific Biological Station, Departure Bay, V.I., visited the Museum in order to secure records of our fishes for publication. Later we were most fortunate to receive from Mr. G. V. Wilby twenty-one species of fish lacking in our exhibit cases. We are most grateful to Mr. G. V. Wilby for this exceptionally fine collection.

Another donation worthy of mention was the forty-four mollusca species collected by Mr. W. Spreadborough on Vancouver Island, donated by Mr. F. Beech.

In this report a most interesting article will be found by Roy Graham, B.A.Sc., M.A.Sc., Ph.D., on the "Notes on the Flora of the Peace River"; also a "List of Hepatics of Pacific Coast and Adjoining Territory," by A. H. Brinkman, of Alberta. An interesting account is also given on "Entomology" by J. F. Gates Clarke. The Department is very pleased to have articles written by persons interested in the several branches of science in which the Department is unable to have specialists on their regular staff at the present time. The Director wishes to thank the above contributors for their very excellent reports. Any additions to the "List of Hepatics," by A. H. Brinkman, will be published from time to time in the Annual Reports.

Before closing the Director would like to bring to the notice of the public that he is continually being confronted by persons wishing to place loan collections in the Museum. It is against the principle of this Department to accept loan collections except where there is a possibility of them being donated later. Furthermore, in the event that a collection is not Provincial, the Department is unable to accept, as it is restricted by the "Provincial Museum Act," listed under "Objects" on page 7.

ACCESSIONS.

The following additions have been received during the past year and cordial thanks are extended to the donors:—

Anthropology and Archæology.

Salish (Coast).

Skull. Jones Island (A. Gillespie).
Skull. Oak Bay, V.I. (Mrs. Radford).
Skull, part of. Parksville, V.I. (Col. N. Bourke).
Adze, rough stone. Fanny Bay, Comox District, V.I. (T. W. S. Parsons).
? Toggle, bone. Tsable River (T. W. S. Parsons).
Arrow-head. Swan Lake, V.I. (George Sheridan).
Spear-point. Gordon Head, V.I. (A. Bursgerd).

PLATE II.

SEASONAL WILD-FLOWER EXHIBIT, PROVINCIAL MUSEUM.

PLATE III.

CHILDREN STUDYING NATIVE WILD FLOWERS IN HERBARIUM, PROVINCIAL MUSEUM.

PLATE IV.

EXHIBITION OF NATIVE WILD FLOWERS IN HERBARIUM, PROVINCIAL MUSEUM.

Bone knife. Cadboro Bay, V.I. (T. W. S. Parsons).
Spear-head. Cumberland, V.I. (Frank Mobley).
Bead. Cumberland, V.I. (Frank Mobley).

Salish (Interior).

Arrow-point. Lytton (A. Dryden, per T. W. S. Parsons).
Pipe. Stein Creek (A. Dryden, per T. W. S. Parsons).
? Charm. Lytton (A. Dryden, per T. W. S. Parsons).

Kootenaian.

Horn skin-scraper. Kootenay District (R. Pritchard).
Berry-crusher. Queens Bay, Kootenay Lake (Miss A. Paffard).
Hammer, stone. Found by Major R. B. Prest on west side of Columbia Lake (presented by Constable Pritchard, per T. W. S. Parsons).

Nootkan.

Stone dagger. Alberni District (W. Goodall).

PALÆONTOLOGY AND GEOLOGY.

Fossil shells (11). Chemainus River, V.I. (A. C. Dryden).
Fossil oyster-shells (4). Saltspring Island (R. Owens).
Fossil oyster-shells (8). Ganges (A. B. Elliott).
Fossil leaf. Ganges (A. B. Elliott).
Fossil shell. Cowichan Lake, V.I. (? finder).
Concretion. East Saanich Reserve, V.I. (R. Owens).
Concretions (6). Armstrong (E. T. Abbott).

BOTANY.

A number of botanical specimens were presented to the Museum during the year, the more valuable being mounted for the Herbarium. The following list gives the localities and names of the donors: Armstrong, W. J. Graham; Bould Point, V.I., N. Stark; Bridge Lake, A. E. Morgan; Cadboro Bay, V.I., N. Stark; Chatham Island, H. Toms; Duncan, V.I., Mrs. J. A. Patterson; Elk Lake, V.I., J. Bridgman; Estevan, V.I., N. J. Smith; Gordon Head, V.I., F. Kermode; Highland District, V.I., E. Cooke; Malahat, V.I., N. Stark; Mount Douglas, V.I., N. Stark; Mount Arrowsmith, Mr. Lohbrunner; Mount Newton, V.I., M. P. Hartree; Mount Tolmie, F. Kermode; Peace River District, Miss Bertrand; Sandy Beach, V.I., Rev. C. J. Young; Saanich Observatory, V.I., N. Stark; Sooke, A. Campbell, F. Kermode; Shawnigan Lake, V.I., N. Stark; Thetis Lake, V.I., N. Stark; Tugwell Creek, D. Bullen; Uplands, V.I., Rev. C. J. Young; Victoria, Rev. R. Connell, M.L.A., Mrs. J. Andrew, Mr. Bramble, Rev. C. J. Young, E. Cooke, G. Keefe, M. P. Hartree, Mr. Lang, F. Kermode; Wellington, V.I., Mr. Carmichael; Whaletown, J. Pool.

Mosses and Hepatics.

Vancouver Island (Mrs. H. Mackenzie).
Eastern States (Miss C. C. Haynes, per Mrs. H. Mackenzie).

REPTILIA.

Rattlesnakes (2). Collected by the late Lloyd Fisher, Arizona; presented by Miss A. M. Pooley.
Poisonous Garter Snake. Collected by the late Lloyd Fisher, Arizona; presented by Miss A. M. Pooley.
Blue-tailed Lizard (*Eumesces skiltonianus* B. & G.). Sirdar (Andy Lovestrom).
Salamander, young of Pacific Swift. Errington, V.I. (H. Rawlins).

ENTOMOLOGY.

Lepidoptera.

Langford, V.I., P. W. Martin; Royal Oak, V.I., Mr. Thorpe; Nelson, D. Spurway; Saanich, V.I., H. Ralph, H. Frost; Victoria, V.I., F. Jones, E. Cooke, J. H. Penketh, D. B. F. Bullen, R. Hodgkinson; also ninety-eight specimens from Summerland, A. N. Gartrell.

Hemiptera.

Victoria, V.I., A. Gold.

Hymenoptera.

Victoria, V.I., E. Cooke.

Coleoptera.

Victoria, V.I., B. Brooks, F. Sehl, H. Fields, A. Gold; Cowichan Lake, V.I., E. Garman.

Homoptera.

Victoria, V.I., Mr. White.

Neuroptera.

Victoria, V.I., K. Ross.

Arachnida.

Summerland. Collected by A. N. Gartrell; presented by D. P. Simpson.

Orthoptera.

Saltspring Island, Gordon Ruckle; Victoria, V.I., J. Taylor.

Anthropoda.

Victoria, V.I., J. Askey.

Miscellaneous.

Parasite. Parksville, V.I. (W. Downes).
Thirteen miscellaneous specimens. Summerland (A. N. Gartrell).
Tarantula. Collected by late Lloyd Fisher, Arizona; presented by Miss A. M. Pooley.
Tarantula houses (2). Collected by late Lloyd Fisher, Arizona; presented by Miss A. M. Pooley.

MARINE.

Noduled Crab (*Lopholithodes mandtii*). Ucluelet (George B. Hillier).
Mollusca, 44 species. Collected by W. Spreadborough on Vancouver Island; donated by F. Beech.
Section of fir pile, bored by boring mollusk (*Bankia setacea* (Tyron)). Fulford Harbour (Major Swan, Public Works Department).
Pearls; found in mussels. Egg Island (John Moran).
Serpula tubes. Tod Inlet, V.I. (Major Garrard).
Land-snail (? *Helix Townsendiana* Lea). Vancouver (H. B. Leech).
Turtle Crab (*Cryptolithodes sitchensis*). Hardy Bay (Rev. C. J. Young).
Polyp. Saanich Inlet, V.I. (Mr. Parker).
Squid (*Loligo opalescens*). Ganges, Saltspring Island (Miss D. Taylor).
Seaweed. Victoria (C. N. Sowerby).
Mollusca. Sooke, V.I. (P. W. Martin).

ICHTHYOLOGY.

List of fishes donated by G. V. Wilby, Pacific Biological Station:—
Anchovy (*Engraulis mordax* Girard). Cardale Point, Porlier Pass.
Tubesnout (2) (*Aulorhynchus flavidus* Gill.). Cardale Point, Porlier Pass.
Speckled Sand Dab (immature) (*Citharichthys stigmæus* Jordan & Gilbert).
Rough Sole (*Lyopsetta exilis* (Jordan & Gilbert)). English Bay.
Hippoglossoides elassodon (Jordan & Gilbert). English Bay.
Stickleback (8) (*Gasterosteus aculeatus* Linnæus). Qualicum Lake.
Steller's Greenling (immature) (*Hexagrammos stelleri* Tilesius).
Buffalo Sculpin (immature) (*Aspicottus bison* (Girard). Departure Bay, V.I.
Nichol's Goby (*Rhinogobiops nicholsii* (Bean)). Departure Bay, V.I.
Sand Lance (2) (immature) (*Ammodytes personatus* Girard). Cardale Point, Porlier Pass.
Penpoint Blenny (*Apodichthys flavidus* Girard). Departure Bay, V.I.
Clingfish (*Caularchus mœandricus* (Girard)). Departure Bay, V.I.

Ornithology.

Sage Cock. (*Centrocercus urophasianus* (Bonap.)). Taken by late Hon. C. E. Pooley on Dewdney Trail about 1864. Presented by Hon. R. H. Pooley, ex-Attorney-General.
Pigeon Hawk (*Falco columbarius suckleyi* Ridgway). Gordon Head, V.I. (E. G. Kermode).
European Red-head Pochard (*Nyroca ferina* (Linnæus)). Beacon Hill Park, V.I. (Mr. Astley).
Californian Murre (*Uria troille californica* (H. Bryant)). Victoria (Rev. C. J. Young).
Western Red-tailed Hawk (*Buteo borealis calurus* Cassin). Wilkinson Road, V.I. (Mr. Harper).
Whistling Swans (2), young, mutilated specimens (*Olor columbianus* (Ord.)). Shot near Qualicum (confiscated by Game Department), Nanaimo, V.I.
Pigeon Hawk (*Falco columbarius suckleyi* Ridgway). Victoria (Mr. Gunn).

Oology.

? Towhee nest. Shawnigan District, V.I. (J. E. Deloume).
Goldfinch nest. Saanich, V.I. (John Lucas).
Vireo's nest. Victoria (S. Fairhurst).
Puffin eggs (2). Donated by Mr. C. Hickman, Victoria.
Gull's eggs (5). Donated by Mr. C. Hickman, Victoria.
Guillemot egg. Donated by Mr. C. Hickman, Victoria.

Mammalogy.

Part of Whale vertebræ. Victoria (K. Watson).
Vancouver Island Wapiti head. Killed at Comox. Purchased from Mrs. V. Sweeney.
Skull, young Black-tailed Deer. Quatsino (Rev. C. J. Young).
Skull, Coyote. Sanca Creek, Kootenay Lake (G. Stace Smith).
Rib of Whale. Carmanah Point (Captain Seymour Briggs).
Young Moose head, with malformed antlers. Shot near Finlay Forks. Presented by V. L. Williams, Provincial Game Warden, Prince George.
Vertebræ of Whale. Sooke (Mrs. Ernest Lane).

PUBLICATIONS RECEIVED FROM OTHER INSTITUTIONS.

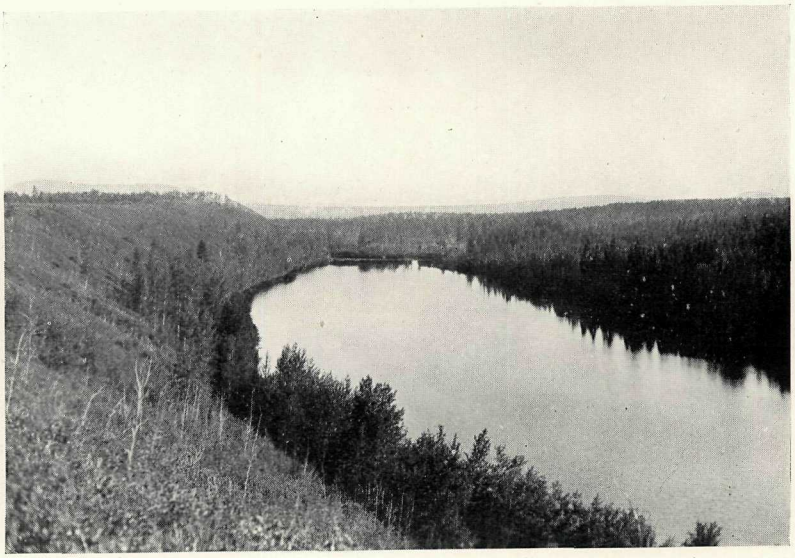
Agricultural Experiment Station, Fargo, North Dakota	2
American Association of Museums, Washington, D.C.	15
American Museum of Natural History, New York	1
American Ornithologists' Union, Lancaster, Pa.	4
Art Historical & Scientific Society, Vancouver, B.C.	8
Australian Museum, Sydney, Australia	3
Bernice P. Bishop Museum, Honolulu	2
Biological Board of Canada	14
Biological Society of Washington	2
Boston Society of Natural History	3
Bristol Museum & Art Gallery, England	1
British Museums Association, South Kensington, England	18
British Museum of Natural History	1
Brooklyn Children's Museum, Brooklyn, N.Y.	5
Cambridge University Library	1
Cardiff Naturalists' Society	2
Carnegie Museum, Pittsburgh, Pa.	1
Charleston Museum, Charleston, S.C.	2
Chicago Academy of Sciences	4
Colorado Museum of Natural History, Denver, Colo.	7
Commercial & Industrial Museum of Montreal	1
Condor, Cooper Ornithological Club	6
Carried forward	103

PUBLICATIONS RECEIVED FROM OTHER INSTITUTIONS—*Continued.*

Brought forward	103
Cornell University, Ithaca, N.Y.	11
Dalhousie University, Halifax, N.S.	1
Division of Fish & Game of California	2
Dominion Government Publications	17
Field Museum of Natural History	4
Geological Society of America, New York	1
Illinois Natural History Survey	1
Indiana University, Bloomington, Ind.	1
Insular Experimental Station, Rio Piedras, P.R.	10
Leicester Museum & Art Gallery, England	6
Library of Congress, Washington, D.C.	1
Lloyd Library, Cincinnati	1
McGill University, Montreal, Canada	1
Manchester Museum, England	1
Musee D'Ethnographie du Trocadero, Paris, France	1
Museum of Fine Arts, Boston, Mass.	3
National Museum of Ireland	2
National Museum of Philippine Islands	2
National Museum of Wales	3
New York Zoological Society	6
Nova Scotian Institute of Science	1
Observatorio Astronomico Nacional de Tacubaya	1
Ohio Agricultural Experiment Station, Wooster	6
Ottawa Field Naturalist, Ottawa, Canada	4
Oxford University Press	8
Peabody Museum, Harvard University	1
Peabody Museum, Yale University	3
Philadelphia Academy of Natural Sciences	1
Philadelphia Museums	1
Public Museum of Milwaukee	7
Rochester Academy of Science	1
Royal Geographical Society of Australia	1
Royal Society of Canada, Ottawa	3
San Diego Society of Natural History	13
Santa Barbara Museum of Natural History	4
Scientific Museums, England	5
Scripp's Institute of Oceanography, La Jolla	5
Similkeen Historical Association	1
Smithsonian Institution, U.S. National Museum	35
State College of Washington	4
Staten Island Institute of Arts & Science	7
Tolson Memorial Museum, England	2
University of California, Berkeley, California	25
University of Colorado, Boulder, Colorado	2
University of Illinois, Urbana, Illinois	3
University of Montreal, Montreal, Quebec	2
University of Nebraska, Lincoln, U.S.A.	1
University of Toronto	7
University of Washington, Seattle	8
Vancouver Art Gallery, Vancouver, B.C.	4
Wagner Free Institute of Science, Philadelphia	3
Washington Academy of Sciences	1
Zoological Society of Philadelphia	2
Total	350

PLATE V.

HUDSON HOPE, B.C., IN THE VALLEY OF THE PEACE RIVER.



JACKFISH LAKE, AMONG GLACIAL MORAINES.

PLATE VI.

MOBERLY LAKE, FROM EAST END.

THE AUTHOR ON HIS HORSE IN A NATURAL MEADOW OF COW-PARSNIP, FIREWEED, GRASSES, ETC.

NOTES ON THE FLORA OF THE PEACE RIVER.*

By Roy Graham, B.A.Sc., M.A.Sc., Ph.D.

Introduction.

During the summer of 1930, the author, while engaged as assistant to Dr. M. Y. Williams on a geological party for the Pacific Great Eastern Resources Survey, made collections of plants from the vicinity of Peace River. A small collection was made from an island in the Peace River at Finlay Forks; another from the valley of Lost Cabin Creek in the Rockies, about 3 miles to the east of Finlay Forks; and a third (the main collection) from the Dominion Block lands south of Peace River and including also a narrow strip along the north bank of the Peace from Hudson Hope to the Alberta boundary.

The author is very much indebted to Professor John Davidson, of the University of British Columbia, for help received in the identification of the collections and in the preparation of this report.

Finlay Forks.

On June 22nd a small collection of plants was made from a low-lying island in the river at Finlay Forks. This is in the Rocky Mountain Trench, west of the Rockies. With the exception of a small clearing about the Provincial Forester's cabin, the island is wooded with a mixed growth of Spruce (*Picea*), Cottonwood (*Populus*), and Birch (*Betula*). Underbrush consists of Red-osier Dogwood (*Cornus stolonifera*), High-bush Cranberry (*Viburnum pauciflorum*), Alder (*Alnus sitchensis*), and some Devil's Club (*Fatsia horrida*). The west side of the island is subject to flooding by the river at high water. This part is covered with a dense thicket of Alder (*Alnus sitchensis*), Red-osier Dogwood (*Cornus stolonifera*), and some Willow (*Salix*). The flora is largely mesophytic, as may be seen from the following list:—

Phegopteris Dryopteris (L.) Fee. Oak Fern.
Equisetum palustre L. Marsh Horsetail.
Equisetum arvense L. Field Horsetail.
Picea canadensis (Mill) B.S.P. White Spruce.
Poa pratensis L. June Grass.
Smilacina racemosa Desf. Spikenard.
Populus sp. (catkins required). Cottonwood.
Mitella nuda L. Mitrewort.
Rubus strigosus Michx. Raspberry.
Rubus triflorus Michx. Three-flowered Raspberry.
Aralia nudicaulis L. Wild Sarsaparilla.
Cornus canadensis L. Bunchberry.
Pyrola asarifolia Michx. Pyrola.
Mertensia ciliata Don. Lungwort.
Galium boreale L. Northern Bedstraw.
Viburnum pauciflorum Raf. High-bush Cranberry.
Linnæa borealis L. var. *americana*. Twinflower.
Lonicera involucrata Banks. Black Twinberry.

Lost Cabin Creek.

On June 23rd a trip was made up Lost Cabin Creek for a distance of about 3½ miles. This creek occupies a narrow valley in the Rocky Mountains. For about three-quarters of a mile above its mouth there is a flat clothed with a mixed growth of Spruce (*Picea*) and Cottonwood (*Populus*), with underbrush of Red-osier Dogwood (*Cornus stolonifera*). Above the flat the creek runs in a very narrow valley which for short stretches is canyon-like. The slopes are covered with a growth of Alder, Poplar, and Spruce over a burn fifteen or twenty years old. Travelling is almost impossible because of the fallen logs and the dense thickets of Alder, Red-osier Dogwood, and Devil's Club. Young Spruce and Poplar (*Populus tremuloides*) are beginning to make stands.

The following plants were collected in a few stands of Spruce which had been missed by the fire: *Lycopodium obscurum* L., *Lycopodium annotinum* L., and *Lycopodium complanatum* L. Elevations ranged between 2,000 and 3,000 feet.

* Published by permission of the Provincial Government. Illustrations by M. Y. Williams, B.Sc., Ph.D.

Southern Half of Dominion Block.

From June 28th to the end of August collections were made in the course of surveying the southern part of the Dominion Block. The route followed by the survey was roughly as follows: From Hudson Hope by boat down the Peace to the Alberta boundary and back to Hudson Hope; then by pack-train southward to the west end of Moberly Lake, and on to East Pine via Jackfish Lake; from East Pine by pack-train up the Pine River to Peavine Flats (about 7 miles west of the Block boundary) and back to East Pine; from there northward and eastward to Sunset Prairie, and then southward and eastward through Kiskatinaw (Arras), finishing up the season at Dawson Creek. By that time it was the 8th of September, and as the flowers, with the exception of a few Compositæ, had passed, no collections were made from the prairies about Dawson Creek and Pouce Coupe.

The following is a list of the plants collected from the area traversed, arranged according to families:—

Ophioglossaceæ.

Botrychium Lunaria (L.) Sw. Moonwort.

Polypodiaceæ.

Phegopteris alpestris (Hoppe.) Mett. Fern.
Phegopteris Dryopteris (L.) Fee. Oak Fern.
Woodsia oregana D. C. Eaton. Fern.

Equisetaceæ.

Equisetum arvense L. Field Horsetail.
Equisetum palustre L. Marsh Horsetail.
Equisetum hyemale ? L. Scouring Rush.

Lycopodiaceæ.

Lycopodium obscurum L. Ground Pine.
Lycopodium clavatum L. Common Club Moss.
Lycopodium annotinum L. Club Moss.
Lycopodium complanatum L. Ground Cedar.

Pinaceæ.

Pinus contorta Dougl. var. *Murrayana.* Lodgepole Pine.
Larix sp.? (cones required). Larch.
Picea Engelmanni Parry. Engelmann's Spruce.
Picea canadensis (Mill) B.S.P. White Spruce.
Abies sp.? (cones required). Fir.
Juniperus communis L. Common Juniper.
Juniperus scopulorum Sarg. Rocky Mountain Juniper.

Gramineæ.

Alopecurus geniculatus L.
Agrostis alba L. Bent Grass.
Calamagrostis canadensis (Michx.) Beauv. Reed Bent Grass.
Calamagrostis Langsdorfii (Link) Trin. Reed Bent Grass.
Beckmannia erucæformis (L.) Host.
Kœleria cristata (L) Pers. Shining Spike Grass.
Poa pratensis L. June Grass (introduced).
Bromus Pumpellianus Scrib. Brome (introduced).
Bromus inermis Leyss. Hungarian Brome (introduced).
Agropyron repens (L.) Beauv. Couch Grass.
Agropyron tenerum Vasey. Bunch Grass.
Hordeum jubatum L. Squirrel Tail (introduced).
Elymus innovatus Beal. Lyme Grass.
Elymus glaucus Buck. Lyme Grass.

Cyperaceæ.

Carex festiva Dewey. Sedge.
Carex misandra R.Br. Sedge.
Carex retrorsa Schwein. Sedge.
Carex rostrata Stokes. Sedge.

Juncaceæ.

Juncus nodosus L. Rush.
Juncus oreganus Wats. Rush.
Luzula parviflora Desv. Wood Rush.

Liliaceæ.

Veratrum viride Ait. False Hellebore.
Allium Schœnoprasum L. Wild Chives.
Smilacina racemosa Desf. Spikenard.
Smilacina stellata (L.) Desf. Starry Spikenard.
Smilacina trifolia (L.) Desf. Three-leaved Spikenard.
Maianthemum bifolium. Mayflower, or Wild Lily of the Valley.
Disporum sp. ? (flowers required). Fairy Bells.
Streptopus amplexifolius DC. Twisted Stalk.

Iridaceæ.

Sisyrinchium idahœnse Bickn. Blue-eyed Grass.

Orchidaceæ.

Cypripedium sp. ? (flowers required). Lady's Slipper.
Habenaria bracteata R.Br. Rein Orchid.
Habenaria orbiculata Torr. Rein Orchid.
Spiranthes Romanzoffiana Cham. Ladies' Tresses.
Listera cordata R.Br. Twayblade.
Goodyera Menziesii Lindl. Rattlesnake Orchid.
Corallorhiza Mertensiana Bong. Coral Root.

Salicaceæ.

Populus tremulodies Michx. Quaking Aspen.
Populus cf. P. trichocarpa or *P. balsamifera* (fruit required). Black Cottonwood.
Salix sp. ? Willow (at least seven species, but catkins are required for specific determination).

Betulaceæ.

Corylus rostrata Ait. Hazel.
Betula occidentalis Hook. Birch.
Betula fontinalis Sarg. Birch.
Betula glandulosa Michx. Dwarf Birch.
Alnus sitchensis (Regel.) Sarg. Green Alder.

Urticaceæ.

Urtica Lyallii Wats. Stinging Nettle.

Santalaceæ.

Comandra livida Richards. Bastard Toadflax.
Comandra pallida A. DC. Bastard Toadflax.

Polygonaceæ.

Rumex hydrolapthum ? Dock (possibly introduced).
Polygonum Convolvulus L. Bindweed (introduced).
Polygonum amphibium L. Knotweed.

Chenopodiaceæ.

Chenopodium capitatum B. & H. Strawberry Blite.

Caryophyllaceæ.

Stellaria umbellata Turcz. Stitchwort.
Stellaria longipes Goldie. Firm Stitchwort.
Stellaria longifolia Muhl. Long-leaved Stitchwort.
Stellaria crispa C. & S. Crisp Stitchwort.
Cerastium vulgatum L. Mouse-ear Chickweed.

Nymphæaceæ.

Nuphar polysepalum (Engelm.) Greene. Yellow Water Lily.

Ranunculaceæ.

Actæa arguta Nutt. Baneberry.
Actæa eburnea Rydb. Baneberry.
Aquilegia sp. ? (flowers required). Columbine.
Delphinium Brownii Rydb. Larkspur.
Aconitum columbianum Nutt. Monkshood.
Anemone patens var. *Nuttalliana* Gray. Pasque Flower.
Anemone multifida Poir. Cut-leaved Anemone.
Clematis columbiana Hornem. Clematis.
Ranunculus Macounii ? Britt. Buttercup.
Ranunculus Purshii ? Richards. Buttercup.
Thalictrum occidentale Gray. Meadow Rue.

Fumariaceæ.

Corydalis sempervirens Pers. Pale Corydalis.
Corydalis aurea Willd. Golden Corydalis.

Cruciferæ.

Lepidium medium Greene. Peppergrass.
Radicula palustris (L.) Mœnch. Water Cress.
Cardamine oligosperma Nutt. Bitter Cress.
Capsella Bursa-pastoris (L.) Medic. Shepherd's Purse.
Neslia paniculata (L.) Desv. Ball Mustard.
Draba nemorsa (L.) Draba.
Draba cana Rydb. Draba.
Draba aurea Vahl. Draba.
Arabis sp. ? (insufficient material). Rock Cress.
Erysimum cheiranthoides (L.) Treacle Mustard.

Crassulaceæ.

Sedum sp. ? (poor material). Stonecrop.

Saxifragaceæ.

Saxifraga tricuspidata Rottb. Saxifrage.
Tiarella unifoliata Hook. Foam Flower.
Heuchera cylindrica Dougl. Alum Root.
Tellima grandiflora Dougl. Fringe Cup.
Mitella nuda (L.) Mitrewort.
Chrysosplenium tetrandrum ? Fries.
Parnassia parviflora DC. Grass of Parnassus.
Ribes oxyacanthoides L. Smooth Gooseberry.
Ribes lacustre Poir. Swamp Gooseberry.
Ribes glandulosum Grauer. Skunk Currant.

Rosaceæ.

Spiræa lucida Dougl. Spiræa.
Aruncus sylvester Kost. Goat's Beard.
Pyrus sitchensis (Roem.) Piper. Mountain Ash.

Amelanchier alnifolia Nutt. Juneberry.
Rubus parviflorus Nutt. Thimbleberry.
Rubus triflorus Rich. Three-flowered Raspberry.
Rubus pedatus Smith. Dewberry.
Rubus arcticus L. Arctic Dewberry.
Rubus arcticus L. var. *grandiflorus*. Arctic Dewberry.
Rubus strigosus Michx. Raspberry.
Fragaria glauca (Wats.) Rydb. Strawberry.
Potentilla palustris (L.) Scop. Marsh Cinquefoil.
Potentilla Anserina L. Silverweed.
Potentilla corymbosa Rydb. Cinquefoil.
Potentilla monspeliensis L. Cinquefoil.
Potentilla dissecta Pursh. Cinquefoil.
Potentilla Nuttallii Lehm. Cinquefoil.
Potentilla pennsylvanica L. Cinquefoil.
Potentilla pennsylvanica L. var. *strigosa* Pursh. Cinquefoil.
Geum macrophyllum Willd. Large-leaved Yellow Avens.
Geum rivale L. Purple Avens.
Geum triflorum Pursh. Three-flowered Avens.
Dryas Drummondii Rich. Alpine Avens.
Rosa Woodsii Lindl. Rose.
Prunus demissa Nutt. Choke Cherry.

Leguminosæ.

Melilotus officinalis Lam. Yellow Melilot.
Melilotus alba Desr. Sweet Clover.
Trifolium hybridum. Alsike Clover (introduced).
Astragalus frigidus Wats. var. *americanus*. Astragalus.
Astragalus tenellus Pursh. Astragalus.
(Several other species of *Astragalus*, but flower and fruit of same plant are required for specific determination.)
Oxytropis monticola Gray.
Oxytropis Lambertii Pursh. Loco-weed.
Hedysarum boreale Nutt. Loments.
Vicia americana Muhl. American Vetch.
Lathyrus ochroleucus Hook. Yellow Peavine.

Geraniaceæ.

Geranium Richardsonii F. & M. Richardson's Geranium.
Geranium Bicknellii Brit. Bicknell's Geranium.

Empetraceæ.

Empetrum nigrum L. Crowberry.

Aceraceæ.

Acer glabrum Torr. Mountain Maple.

Balsaminaceæ.

Impatiens biflora Watt. Jewelweed.

Violaceæ.

Viola canadensis L. White Violet.

Cactaceæ.

Opuntia polycantha Haw. var. *borealis*. Cactus.

Elæagnaceæ.

Shepherdia canadensis Nutt. Sopolallie.
Elæagnus argentea Pursh. Silverberry or Buffalo-berry.

Onagraceæ.

Epilobium angustifolium L. Fireweed.
Epilobium latifolium L. Mountain Fireweed.
Epilobium adenocaulon Haus. Willow Herb.

Halorrhagidaceæ.

Myriophyllum spicatum L. Water Milfoil.

Hippuridaceæ.

Hippuris vulgaris L. Mare's Tail.

Araliaceæ.

Fatsia horrida (Sm.) B. & H. Devil's Club.
Aralia nudicaulis L. Wild Sarsaparilla.

Umbelliferæ.

Osmorrhiza nuda Torr. Sweet Cicely.
Oeanthe sarmentosa Presl. Water Dropwort.
Heracleum lanatum Mich. Cow Parsnip.
Thaspium aureum Nutt.

Cornaceæ.

Cornus canadensis L. Bunchberry.
Cornus stolonifera Michx. Red-osier Dogwood.

Pyrolaceæ.

Pyrola uniflora L. Single Delight.
Pyrola secunda L. Pyrola.
Pyrola chlorantha Swartz. Pyrola.
Pyrola asarifolia Michx. Pyrola.

Ericaceæ.

Ledum grœnlandicum Oeder. Labrador Tea.
Rhododendron albiflorum Hook. White Rhododendron.
Arctostaphylos Uva-ursi Spreng. Bearberry.
Vaccinium oreophilum Rydb. Blueberry.
Vaccinium canadense Kulm. Canada Blueberry.
Vaccinium cæspitosum Mich. Dwarf Bilberry.
Vaccinium Vitis-Idœa L. Rock Cranberry.

Primulaceæ.

Primula americana Rydb. American Primrose.
Androsace sp. ? (insufficient material).

Gentianaceæ.

Gentiana acuta Michx. Northern Gentian.

Apocynaceæ.

Apocynum androsœmifolium L. Dogbane.

Polemoniaceæ.

Collomia linearis Gray.

Hydrophyllaceæ.

Phacelia sp. ? (insufficient material). Phacelia.

Boraginaceæ.

Lappula occidentalis (Wats.) Rydb. Stickseed.
Mertensia ciliata Don. Lungwort.

Labiatæ.

Scutellaria galericulata L. Skull-cap.

Dracocephalum parviflorum Nutt. Dragon Head.
Stachys palustris L. Woundwort.
Monarda mollis L. Horsemint.
Mentha canadensis Kulm. Canada Mint.

Scrophulariaceæ.

Pens'emon confertus Dougl. var. *cærula-purpureus.* Beard-tongue.
Penstemon glaucus ? Beard-tongue.
Mimulus Langsdorfii Donn. Monkey Flower.
Veronica americana Schwein. Brooklime.
Veronica Anagallis-aquatica L. Water Speedwell.
Castilleja pallida Kunth. Paint Brush.
Castilleja miniata Dougl. Paint Brush.
Rhinanthus Crista-galli L. Yellow Rattle.

Lentibulariaceæ.

Pinguicula vulgaris L. Butterwort.
Utricularia vulgaris L. Bladderwort.

Plantaginaceæ.

Plantago major L. Common Plantain.

Rubiaceæ.

Galium boreale L. Northern Bedstraw.

Caprifoliaceæ.

Sambucus melanocarpa ? Elder.
Viburnum pauciflorum Raf. High-bush Cranberry.
Symphoricarpos racemosus Michx. Snowberry.
Linnæa borealis L. var. *americana* (Forbes) Rehder. Twin Flower.
Lonicera involucrata Banks. Black Twinberry.
Lonicera ciliosa Poir. Orange Honeysuckle.

Valerianaceæ.

Valeriana sp. ? (poor material). Valerian.

Campanulaceæ.

Campanula rotundifolia L. Harebell.

Compositæ.

Solidago multiradiata Ait. Goldenrod.
Solidago canadensis L. Goldenrod.
Solidago elongata Nutt. Goldenrod.
Aster conspicuus Lindl. Aster.
Aster modestus Lindl. Aster.
Aster multiflorus Ait. Aster.
Aster Richardsonii Spreng. Aster.
Aster foliaceus Lindl. Aster.
Aster occidentalis Nutt. Aster.
Erigeron Philadelphicus ? Common Fleabane.
Erigeron glabellus Nutt. Fleabane.
Antennaria parvifolia Nutt. Mountain Everlasting.
Antennaria rosea Greene. Rosy Everlasting.
Antennaria anaphalloides Rydb. Everlasting.
Achillea millefolium L. Yarrow.
Achillea multiflora Hook. Yarrow.
Matricaria discoidea DC. Pineapple-weed.

Artemisia canadensis Michx. Wormwood.
Artemisia frigida Willd. Sagebrush.
Petasites palmatus Gray. Butterbur.
Petasites sagittata Gray. Butterbur.
Arnica (insufficient material). Arnica.
Senecio Balsamitæ Muhl. Groundsel.
Lactuca pulchella (Pursh.) DC. Blue Lettuce.
Troximon glaucum (Pursh.) Greene. False Dandelion.
Crepis virens L. Hawk's Beard.
Hieracium umbellatum L. Hawkweed.

The area falls within the Canadian biological zone, with the exception of the tops of the higher hills, as Wartenbe (Table) Mountain, which passes into the Hudsonian range. Taken as a whole, the flora is transitional between semi-arid and humid, or mesophytic. Sufficient moisture and a sufficiently long growing season for agriculture is indicated.

Forests.

The area under consideration is largely forested, but in the eastern part of the Block there are extensive areas of park land, as about Pouce Coupe, Sunset Prairie, and Fort St. John. The principal trees are Spruce (*Picea canadensis* and *P. Engelmanii*), Aspen or White Poplar (*Populus tremuloides*), and Lodgepole Pine (*Pinus contorta* var. *Murrayana*), which is locally called Jack Pine. Of secondary importance are Birch (*Betula occidentalis* and *B. fontinalis*) and Cottonwood, a species of *Populus*, which in the absence of fruits could not be determined positively as *P. trichocarpa* or *P. balsaminfera*.

Distribution.

Spruce (*Picea*). In the western hilly part of the area this is the dominant tree and constitutes the bulk of the timber. It is most common in moist habitats. The land is probably too difficult to clear for agricultural purposes.

Aspen (*Populus tremuloides*). This is the dominant tree of the benches of the Peace and Pine Rivers; on the floor of the larger valleys, as that occupied by Moberly Lake and Centurion Creek, where the trees grow up to 1 foot in diameter; and in the park lands, where Aspens constitute the bulk of the woods. The land is usually suitable for agricultural purposes and clearing is not difficult.

Lodgepole Pine (*Pinus contorta* var. *Murrayana*). This tree is a pioneer on dry, rocky, or gravelly soil, and areas covered with Pine are of little value for agriculture.

Birch (*Betula occidentalis* and *B. fontinalis*). Birch is associated mainly with stands of Spruce, especially on the forest fringe.

Cottonwood (*Populus*). Usually grows in moist habitats along the banks of creeks.

Underbrush and Shrubs.

On the whole, the woods are open, there being very little underbrush. The High-bush Cranberry (*Viburnum pauciflorum*) is abundant throughout moist woods, but it does not form thickets in this region.

Alder (*Alnus sitchensis*), whose seeds are dispersed by the wind, grows on open areas, as on the dry sandstone ridges about Moberly Lake and everywhere on burned-over areas. It makes dense thickets from 3 to 20 feet in height. It is also abundant along creek-banks. Willow, whose seeds also are dispersed by the wind, grows on some semi-open river-flats and along river-banks. *Spiræa ludica*, a dwarf shrub, is abundant, especially in dry situations.

There are many berry-fruited shrubs whose seeds are dispersed by birds: Red-osier Dogwood (*Cornus stolonifera*) makes thickets in moist places along the banks of creeks. Sopolallie (*Shepherdia canadensis*) grows in the open or beneath light woods, especially Pine. Choke Cherry (*Prunus demissa*), Juneberry (*Amelanchier alnifolia*), locally called Saskatoon, and Silverberry (*Elæagnus argentea*) form patches of low scrub in dry open situations, as on dry meadows and south-facing slopes.

Of the lower shrubs, the Rose (*Rosa Woodsii*), Snowberry (*Symphoricarpus racemosus*), and various species of Currants (*Ribes*) are the most common. At the foot of slides of clay shale east of Cache Creek, extensive Brier patches were formed of *Rosa Woodsii*.

Steep South-facing Slopes.

These include the north banks of the Peace and Pine Rivers and the south-facing slopes of the hills about Moberly Lake. These slopes face the sun at angles of 10° to 30° from the horizontal, and are therefore subject to extreme evaporation. The vegetation is characteristic of dry-belt or semi-arid habitats. Bunch Grass, Sagebrush (*Artemisia frigida*), with some Wormwood (*Artemisia canadensis*), Everlasting (*Antennaria*), Bearberry (*Arctostaphylos Uva-ursi*), Loments (*Hedysarum boreale*), *Anemone patens* var. *Nuttalliana, Anemone multifida, Oxytropis monticola*, and several species of *Astragalus* comprise the bulk of the flora. Other plants are Avens (*Geum trifolium*), Loco-weed (*Oxytropis Lambertii*), Beard-tongue (*Pentstemon*), Chives (*Allium Schœnoprasum*), and Horsemint (*Monarda mollis*), all more or less xerophytic. *Prunus demissa, Amelanchier alnifolia*, and *Elæagnus argentea* occur in patches. Near the base of the slope, where seepage is received from above, are patches of Aspen (*Populus tremuloides*).

Arid conditions are most marked in the northern and eastern parts of the area, as along the Peace eastward from Taylor Flats, where Cactus (*Opuntia polyacantha* var. *borealis*) occurs. In the south-western part of the area, arid conditions are much less pronounced. For example, no Cactus was noticed along the Pine River, and at Peavine Flats (on the Pine River 7 miles west of the Block boundary), the burnt-off south slopes were covered with Alder (*Alnus sitchensis*). Formerly the slopes had been wooded, which is not the case with the south slopes in other parts of the area.

North Slopes.

North slopes, on account of less evaporation, have a greater effective rainfall and therefore support a forest of Spruce, with some Poplar and Birch. In addition to underbrush, sub-alpine shade-loving plants, such as various species of Currants (*Ribes*), Bunchberry (*Cornus canadensis*), Pyrolas and Dewberry (*Rubus pedatus* and *R. arcticus*), grow in abundance. These indicate a short growing season due to snow lying longer on northern slopes.

Flora of the Peace River Flats.

On the river flats are meadows with scattered groves of Poplar, and also open woodlands of Poplar and Willow in which is abundant pasturage of Grass, Vetch (*Vicia americana*), Yellow Peavine (*Lathyrus ochroleucus*) and *Astragalus frigidus* var. *americanus*. Vegetation is transitional between semi-arid and humid, with some patches of humid associations, probably due to seepage from the hills behind, or to heavier subsoil.

Herbage of the meadows consists of Grass with Peavine, Vetch, Wild Strawberry (*Fragaria*), Bedstraw (*Galium boreale*), *Anemone multifida*, and Paint Brush (*Castilleja*). On gravelly soil are Bearberry (*Arctostaphylos Uva-ursi*) and Rock Cranberry (*Vaccinium Vitis-Idæa*). There are also many shrubs, such as Dwarf Willows (*Salix*), Choke Cherry (*Prunus demissa*), Sopolallie (*Shepherdia canadensis*), Juneberry (*Amelanchier alnifolia*).

Flora of the Plateaux.

The area between Hudson Hope and Moberly Lake is largely a poorly drained upland, supporting a forest of Spruce and Poplar, with numerous small bogs or muskegs of Sphagnum, supporting Labrador Tea (*Ledum*) and some stunted Spruce. About the headwaters of Maurice Creek are luxuriant grass meadows fringed with Willows. Avens (*Geum rivale* and *G. macrophyllum*) and White Geranium (*Geranium Richardsonii*) are very abundant.

Moberly Lake.—At the west end of the lake the Moberly River has built up a delta. In the marshy habitat along the water's edge, Horsetail (*Equisetum*) grows in great profusion, interspersed with clumps of Willow. Back from the lake, where the land is better drained, there are luxuriant meadows of Grasses, Vetch (*Vicia americana*), Peavine (*Lathyrus ochroleucus*), Larkspur (*Delphinium Brownii*), and Cow Parsnip (*Heracleum lanatum*), with groves of Aspen and Spruce and patches of Willow.

On the north side of the lake are open Poplar woodlands with pasturage beneath, and some moist meadows of the same general character as those at the west end of the lake. The slopes of the hills face south and have the characteristic dry-belt vegetation. The tops of the ridges are broad and dry, being underlain by sandstone. These had formerly been clad with Pine, but forest fires have altered this and burned-over areas are now occupied by Alder thickets and

some young Pine. *Spiræa, Arnica, Hieracium,* and *Antennaria* are characteristic herbaceous plants. However, on most of these ridges are depressions containing water, thus showing the water-table to be high. Surrounding these ponds are moisture-loving plants such as Sedges (*Carex*).

At the east end of the lake is an area of moraines. The vegetation forms a semi-arid park land with patches of Poplar and Willow and dry meadows in which Paint Brush (*Castilleja*), Harebell (*Campanula rotundifolia*), and Strawberry (*Fragaria*) are abundant. On the slopes of the morainal ridges are *Antennaria, Artemisia, Oxytropis Lambertii, Hedysarum boreale,* and *Allium.*

On the south side of the lake the Spruce forest extends down to the lake-shore.

In the vicinity of Jackfish Lake there are extensive meadows of varying types. Characteristic plants of the drier meadows are Paint Brush (*Castilleja*), Yarrow (*Achillea millefolium*), and Bluebell (*Campanula rotundifolia*). The moister meadows support entirely different associations of plants. Grass, Fireweed (*Epilobium angustifolium*), Cow Parsnip (*Heracleum lanatum*), Larkspur (*Delphinium Brownii*), and Erigeron form a luxuriant growth from 3 to 5 feet in height. These meadows have been cut for hay by the Calliou family. (*See* Plate II., Fig. 2.)

Little Prairie is an area of park country in the valley of Centurion Creek. *Geum macrophyllum, Galium boreale, Campanula rotundifolia, Delphinium Brownii,* and *Solidago* are abundant in the meadows.

The Pine Valley is lightly wooded with Poplar up to 1 foot in diameter, and some Spruce. There are also some fine hay meadows and much country supporting a dense growth of herbage between clumps of Willow and Poplar scrub. The following plants are abundant: *Fragaria, Rubus strigosus, Heracleum lanatum, Castilleja, Epilobium angustifolium, Urtica Lyalli,* and *Achillea millefolium.*

The following observations were made along the trail from Peavine Flats (on the Pine River, 7 miles west of the Dominion Block boundary) to Hudson Hope.

For 1,200 feet above the river the north bank of the Pine Valley is steep. The slope is covered with Willow (*Salix*), Alder (*Alnus sitchensis*), and Aspen (*Populus tremuloides*), with some Red-osier Dogwood (*Cornus stolonifera*), Maple (*Acer glabrum*), and Pine (*Pinus contorta*). Among the smaller plants are the following: *Spiræa lucida, Aster, Castilleja,* and *Antennaria,* indicating semi-arid conditions.

At 1,200 feet above the flats the slope flattens off. Vegetation is of the humid type. The country is a several-year-old burn and has grown up to vegetation 6 feet high. The following plants are very abundant: Fireweed (*Epilobium angustifolium*), Cow Parsnip (*Heracleum lanatum*), Larkspur (*Delphinium Brownii*), *Viola canadense, Senecio Balsamitæ, Aster, Actæa arguta, Actæa eburnea,* Stinging Nettle (*Urtica Lyallii*), and Black Twinberry (*Lonicera involucrata*).

Across the summit of the divide are dense woods of Spruce and Birch. Shade-loving plants are abundant, amongst which are Horsetail (*Equisetum*), Club-moss (*Lycopodium*), Foam Flower (*Tiarella unifoliata*), Bunchberry (*Cornus canadensis*), Twinflower (*Linnæa borealis*), *Phegopteris Dryopteris, Pyrola uniflora,* and *Rubus pedatus.*

This locality is in the foot-hills region, which probably receives more rainfall, thus accounting for the more humid type of vegetation. During the summer's work the following plants were noted only from various localities in the foot-hill's region, west of a line joining Table Mountain and the east end of Moberly Lake:—

Veratrum viride. False Hellebore.
Disporum sp. ? (flowers required). Fairy Bells.
Streptopus amplexifolius. Twisted Stalk.
Aconitum columbianum. Monkshood.
Tellima grandiflora. Fringe Cup.
Aruncus sylvester. Goat's Beard.
Acer glabrum. Mountain Maple.
Fatsia horrida. Devil's Club.
Sambucus melanocarpa ? Elder.

Dr. Williams reports a luxuriant growth of Monkshood (*Aconitum*) and Larkspur (*Delphinium*) in the valley of Hulcross Creek, north of Peavine Flats.

The road between Centurion Creek and East Pine crosses morainal uplands. These uplands are dry and are covered with sparse woods of Spruce, Pine, and Poplar. *Castilleja*, *Campanula rotundifolia*, and *Achillea millefolium* are abundant. Blueberry (*Vaccinium canadensis*) and Bearberry (*Arctostaphylos Uva-ursi*), accompanied by some *Commandra livida* (a partial parasite), form extensive patches.

Sundance Lake, a small lake at the bottom of a large kettle-hole, is fringed with marsh and aquatic plants such as coarse Sedges (*Carex rostrata* and *C. retrorsa*), Knotweed (*Polygonum amphibium*), Bladderwort (*Utricularia vulgaris*), and Yellow Pond Lily (*Nuphar polysepalum*).

East of East Pine Post-office the uplands support a growth of Spruce, Poplar, and Pine, some of which has been burnt off by forest fires. There are also numerous shallow sloughs or marshy meadows which support a luxuriant growth of coarse Sedges such as *Carex rostrata* and *Carex retrorsa*, which are of very low value for either fodder or hay. Marsh Cinquefoil (*Potentilla palustre*) is sometimes found. At the edges of these sloughs are a Dwarf Willow (*Salix*) and Dwarf Birch (*Betula glandulosa*).

Sunset Prairie and Kiskatinaw.—The country here is typically park land, consisting of meadow and light poplar woodland. It is excellent agricultural land. Clearing is easy, much of the Poplar being under 2 or 3 inches in diameter.

Some marshy areas exist, especially at the headwaters of Sunset Creek. These support a growth of scrub Willow (*Salix*) and Birch (*Betula glandulosa*). These trees indicate poor drainage. Land supporting a growth of these shrubs is of little use for agriculture, unless it can be drained economically in order to allow the surplus water to run off in the spring.

Near Kiskatinaw (Arras) are some small areas of bog, carpeted with Sphagnum and Labrador Tea (*Ledum*), and supporting a few stunted Spruce (*Picea*). This land is useless for agriculture unless it could be drained.

Pasturage and Fodder Plants.

In moist meadows the Grasses *Calmagrostis canadensis* and *C. Langsdorfii* attain a height of 3 to 5 feet and form excellent hay. In the drier meadows *Agrostis alba*, *Agropyron*, and *Elymus* are abundant. The dry hillsides support Bunch Grass (*Agropyron tenerum*) and shining Spike Grass (*Kœleria cristata*). Introduced fodder grasses are *Poa pratensis*, *Bromus Pumpellianus*, and *Bromus inermis*.

Leguminous fodder is very abundant. Vetch (*Vicia americana*) and Yellow Peavine (*Lathyrus ochroleucus*) thrive in the moist river-flats and in light Poplar woodlands. Milk Vetch (*Astragalus frigidus* var. *americanus*) is abundant in light woodlands.

Other plants occasionally eaten by stock are: Fireweed (*Epilobium angustifolium*) and Cow Parsnip (*Heracleum lanatum*). There are also several species of coarse Sedge (*Carex*) which grow in marshy sloughs. They are sometimes cut for winter feed. Sedges, however, are extremely poor as fodder plants as the nutritive value is low.

Poisonous Plants.

There are several plants in the district which are poisonous to stock. Poisoning occurs when stock are turned out too early in the spring, before the pasturage is up, or when they are turned into a region where there is an insufficient supply of fodder plants, as on an overgrazed range.

Of the poisonous plants, Larkspur (*Delphinium Brownii*) is the commonest and is very abundant in some meadows. Horses are affected. Loco-weed (*Oxytropis Lambertii*) grows on dry meadows and south-facing slopes. It was observed at Fort St. John, Moberly Lake, Jackfish Lake, and along the valley of the Pine. It affects horses, which get a craving for it. The symptoms of poisoning are that the horse on coming to a slight furrow in a meadow, or a stick lying on the ground, will take a huge leap to clear it. Affected horses must be taken off the range and put where they cannot get the Loco-weed. The plant quickly proves fatal if such steps are not taken. Another poisonous plant is False Hellebore (*Veratrum Viride*), which, however, was recorded only in the south-western corner of the area.

Small Fruits.

The Raspberry (*Rubus strigosus*) is the most important small fruit and in some places is very abundant, as at the mouth of the Pine, on the Pine at the mouth of Stewart Creek, and

on the west slope of Table Mountain. Blueberries (*Vaccinium canadensis*) and Rock Cranberries (*Vaccinium Vitis-Idæa*) are more restricted, but are locally abundant beneath Pine; Juneberry (*Amelanchier alnifolia*), locally called Saskatoon, and Choke Cherry (*Prunus demissa*) are abundant in dry open situations. High-bush Cranberry (*Viburnum pauciflorum*), Strawberries (*Fragaria*), and Black Currants (*Ribes*) are fruits of lesser importance. Red Currants and Gooseberries were also observed, but were of no importance, though Mr. Bocock states that there was an abundance of Red Currants at the headwaters of Coldstream Creek in the area just south of the Block.

Conclusion.

Although the collection is far from being complete, it is representative of the area. The collection includes about 250 species, representing 159 genera and 56 families.

The flora of the area as a whole is transitional between the semi-arid and humid types. The distribution of the plants is governed chiefly by the amount of available moisture. On the whole, the area is increasingly humid towards the south-west; i.e., nearer the foot-hills. Other factors controlling humidity are the slope of the land, kind of subsoil, seepage, and drainage. A south-facing slope is subject to greater evaporation than a north slope and is therefore drier. Light subsoil tends more to aridity than heavy subsoil. Seepage, of course, adds directly to the water content of the soil. Lack of sufficient drainage gives rise to marsh and bog habitats.

As stated before, the collection indicates sufficient rainfall and a sufficiently long growing season for agriculture, if the soil is favourable. Many areas unsuitable for agriculture afford pasturage for stock.

LIST OF HEPATICS OF PACIFIC COAST AND ADJOINING TERRITORY.

By A. H. Brinkman.

	1.	*Sphærocarpus texanus* Aust. C. O. W.
	2.	*Sphærocarpus hians* Haynes. W. I.
	3.	*Sphærocarpus cristatus* M. A. Howe. C.
	4.	*Sphærocarpus Drewei* Wigglesworth. C.
	5.	*Geothallus tuberosus* Campbell. C.
*V.	6.	*Riccia fluitans* L. C. O. Co. W. B.C.
V.	7.	*Riccia crystallina* L. C. O. Co. Wy. A.
	8.	*Riccia Frostii* Aust. C. O. Co. W. I. M.
	9.	*Riccia Austinii* Steph. C.
	10.	*Riccia sorocarpa* Bisch. C. W.
	11.	*Riccia glauca* L. C. O.
	11a.	*Riccia* var. *subinermis* (Lindb.) Warnst. C. O.
	12.	*Riccia Campbelliana* M. A. Howe. C.
	13.	*Riccia nigrella* DC. C.
R.	14.	*Riccia Beyrichiana* Hampe. C. Co. I. B.C. A.
	15.	*Riccia californica* Aust. C. O.
	16.	*Riccia trichocarpa* M. A. Howe. C. O.
S.	17.	*Ricciocarpus natans* (L.) Corda. C. O. B.C.
R.	18.	*Targionia hypophylla* L. C. O. W. B.C.
C.	19.	*Clevea hyalina* (Sommerf.) Lindb. C. O. Co. W. I. B.C. A.
	20.	*Sauteria alpina* Nees. B.C. A. Al.
	21.	*Peltolepis grandis* Lindb. B.C.
	22.	*Grimaldia fragrans* (Balb.) Corda. Co. Al.
	23.	*Grimaldia californica* (Gottsche) Underw. C.
R.	24.	*Grimaldia pilosa* (Hornem.) Lindb. B.C. A. Al.
	25.	*Cryptomitrium tenerum* (Hook.) Aust. C. W.
S.	26.	*Reboulia hemisphærica* (L.) Raddi. C. O. Co. W. Wy. B.C. A.
C.	27.	*Asterella Ludwigii* (Schwaegr.) Underw. C. O. Co. W. M. B.C. A.
	28.	*Asterella Palmeri* (Aust.) Underw. C.
R.	29.	*Asterella saccata* (Wahl.) Evans. W. I. M. B.C. Y.
	30.	*Asterella californica* (Hampe) Underw. C. O.
S.	31.	*Asterella Lindenbergiana* (Corda) Lindb. W. M. Wy. B.C. A. Al.
	32.	*Asterella Bolanderi* (Austin) Underw. C.

33. *Lunularia cruciata* (L.) Dum. C. O. W. I.
U. 34. *Conocephalum conicum* (L.) Dum. C. O. Co. W. I. M. Wy. B.C. A. Al.
U. 35. *Bucegia romanica* Radian. B.C. A.
P. 36. *Preissia quadrata* (Scop.) Nees. Co. W. I. M. Wy. B.C. A. Y. Al.
P. 37. *Marchantia polymorpha* L. C. O. Co. W. I. M. Wy. B.C. A. Y. Al.
V. 37A. *Marchantia* var. *alpestris* Nees. B.C.
P. 38. *Riccardia pinguis* (L.) S. F. Gray. C. O. W. B.C. A. Y.
U. 39. *Riccardia multifida* (L.) S. F. Gray. C. O. W. I. B.C. Al.
R. 39A. *Riccardia* var. *ambrosioides* (Nees). O. B.C.
R. 40. *Riccardia sinuata* (Dicks.) Trevis. C. O. W. B.C.
V. 40A. *Riccardia* var. *major* (Nees) Clark. C. A. Al.
P. 41. *Riccardia latifrons* Lindb. C. O. W. I. M. Wy. B.C. A. Al.
S. 42. *Riccardia palmata* (Hedw.) Carruth. C. O. W. I. B.C. Al.
R. 43. *Metzgeria furcata pacifica* Brinkman. B.C.
44. *Metzgeria fruticulosa* (Dicks.) Evans. O. W.
U. 45. *Metzgeria conjugata* Lindb. O. W. B.C. Al.
46. *Metzgeria hamata* Lindb. Al.
U. 47. *Metzgeria pubescens* (Schrank.) Raddi. W. M. B.C. Al.
V. 48. *Pallavicinia hibernica* (Hook.) S. F. Gray. B.C.
U. 49. *Pallavicinia Flotowiana* (Nees) Lindb. W. B.C. A. Al.
V.(P.) 50. *Pallavicinia Blyttii* (Morck) Lindb. W. B.C.
*V. 51. *Fossombronia longiseta* Austin. C. O. B.C.
52. *Fossombronia hispidissima* Steph. C.
V. 53. *Fossombronia foveolata* Lindb. B.C.
(= *Dumortieri* (Hub. et Genth.) Lindb. W.)
S. 54. *Pellia epiphylla* (L.) Corda. C. W. B.C. A. Al.
C. 55. *Pellia Neesiana* (Gottsche) Limpr. C. O. W. I. M. B.C. A. Al.
C. 56. *Pellia Fabroniana* Raddi. W. M. Wy. B.C. A. Al.
S. 57. *Blasia pusilla* L. C. O. W. I. B.C. Al.
U. 58. *Gymnomitrium concinnatum* (Lightf.) Corda. W. B.C. A.
R. 58A. *Gymnomitrium* var. *intermedium* Limpr. B.C.
F. 59. *Gymnomitrium obtusum* (Lindb.) Pears. O. W. M. B.C. Al.
60. *Gymnomitrium corallioides* Nees. Y. Al.
61. *Gymnomitrium crenulatum* Gottsche. Al.
F. 62. *Gymnomitrium varians* (Lindb.) Schffn. B.C. A.
U. 63. *Marsupella sparsifolia* (Lindb.) Dum. B.C. A.
U. 64. *Marsupella Sullivantii* (De Not.) Evans. C. W. B.C.
R. 65. *Marsupella ustulata* (Huben.) Spruce. O. Wy. B.C.
R. 66. *Marsupella sphacelata* (Gieseke) Dum. M. B.C. A. Al.
67. *Marsupella Bolanderi* (Aust.) Underw. C. O.
V. 68. *Marsupella Pearsoni* Schffn. B.C.
C. 69. *Marsupella emarginata* (Ehrh.) Dum. C. O. Co. W. M. B.C. A. Al.
70. *Nardia compressa* (Hook.) S. F. Gray. Al.
R. 71. *Nardia scalaris* (Schrad.) S. F. Gray. O. W. B.C. Y. Al.
V. 71A. *Nardia* var. *procerior* Schffn. B.C.
C. 72. *Nardia Geoscyphus* (De Not.) Lindb. C. W. B.C. A. Al.
R. 73. *Nardia Breidleri* (Limpr.) Lindb. W. M. B.C. A.
R. 74. *Nardia obovata* (Nees) Carr. W. M. B.C. A.
V. 75. *Nardia hyalina* (Lyell.) Carr. C. B.C.
76. *Nardia obscura* Evans. O.
S. 77. *Nardia rubra* (Gottsche) Evans. C. O. W. I. M. B.C. A.
C. 78. *Jungermannia sphærocarpa* Hook. C. Co. W. Wy. B.C. A. Al.
C. 79. *Jungermannia cordifolia* Hook. C. O. Co. W. M. Wy. B.C. A. Al.
S. 80. *Jungermannia Pendletonii* (Pears.) Evans. C. B.C.
81. *Jungermannia cæspiticia* Lindenb. Al.
82. *Jungermannia Allenii* Clark. W.
83. *Jungermannia Danicola* Gottsche. C.

84. *Jungermannia Bolanderi* Gottsche. C.
S. 85. *Jungermannia riparia* Tayl. C. W. M. B.C. A.
S. 85A. *Jungermannia* var. *rivularis* Bern. B.C.
86. *Jungermannia pumila* With. C. Co.
C. 87. *Jungermannia atrovirens* Dum. W. I. M. B.C. A. Al.
S. 88. *Jungermannia Schiffneri* (Loitles.) Evans. B.C. A.
F. 89. *Jungermannia lanceolata* L. C. W. I. M. B.C. Al.
U. 90. *Arnellia fennica* (Gottsche) Lindb. B.C. A. Y.
P. 91. *Jamesoniella autumnalis* (DC.) Steph. W. I. M. B.C. A.
92. *Mesoptychia Sahlbergii* (Lindb. & Arnell) Evans. Y.
93. *Anastrophyllum Reichardtii* (Gottsche) Steph. Al.
R. 94. *Gyrothyra Underwoodiana* M. A. Howe. C. O. W. B.C. Al.
U. 95. *Lophozia inflata* (Huds.) M. A. Howe. C. O. W. Wy. B.C. A. Y. Al.
F. 96. *Lophozia badensis* (Gottsche) Schffn. W. M. B.C. A.
C. 97. *Lophozia Muelleri* (Nees) Dum. Co. B.C. A.
F. 98. *Lophozia Hornschuchiana* (Nees) Schff. C. O. Co. B.C. A.
(as *bantriensis* (Hook.) Steph.) W.
P. 99. *Lophozia heterocolpa* (Thed.) M. A. Howe. C. W. I. M. B.C. A. Y. Al.
F. 100. *Lophozia Kaurini* (Limpr.) Steph. W. B.C. A. Y. Al.
C. 101. *Lophozia Rutheana* (Limpr.) M. A. Howe. B.C. A. Y.
V. 102. *Lophozia grandiretis* (Lindb.) Schffn. A.
C. 103. *Lophozia longidens* (Lindb.) Macoun. I. B.C. A.
P. 104. *Lophozia ventricosa* (Dicks.) Dum. C. O. Co. W. I. M. Wy. B.C. A. Y. Al.
P. 105. *Lophozia porphyroleuca* (Nees) Schffn. O. Co. W. I. M. Wy. B.C. A. Y. Al.
C. 106. *Lophozia longiflora* (Nees) Schffn. B.C. A.
C. 107. *Lophozia guttulata* (Lindb. & Arn.) Evans. B.C. A.
C. 108. *Lophozia alpestris* (Schleich.) Evans. C. W. Wy. B.C. A. Al.
109. *Lophozia Wenzelii* (Nees) Steph. Y.
C. 110. *Lophozia confertifolia* Schffn. Co. B.C. A.
V. 111. *Lophozia bicrenata* (Schmid.) Dum. B.C.
F. 112. *Lophozia excisa* (Dicks.) Dum. C. Wy. B.C. A.
P. 113. *Lophozia incisa* (Schrad.) Dum. C. O. Co. W. I. M. Wy. B.C. A. Y. Al.
P. 114. *Lophozia quinkuedentata* (Huds.) Cogn. B.C. A. Y. Al.
P. 115. *Lophozia lycopodioides* (Wallr.) Cogn. Co. W. M. Wy. B.C. A. Al.
P. 116. *Lophozia Hatcheri* (Evans) Steph. C. O. Co. W. M. Wy. B.C. A.
P. 117. *Lophozia Floerkii* (Web. & Mohr.) Schffn. Co. W. M. B.C. A. Y. Al.
F. 118. *Lophozia Binsteadii* (Kaal.) Evans. B.C. A. Y. Al.
S. 119. *Lophozia attenuata* (Mart.) Dum. W. M. Wy. B.C. Al.
P. 120. *Laphozia barbata* (Schmid.) Dum. Co. W. M. B.C. A. Y.
F. 121. *Lophozia quadriloba* (Lindb.) Evans. B.C. A. Al.
P. 122. *Lophozia Kunzeana* (Hub.) Evans. Co. B.C. A. Y.
V. 123. *Lophozia obtusa* (Lindb.) Evans. O. W. I. Wy. B.C. Al.
*V. 124. *Sphenolobus saxicola* (Schrad.) Steph. B.C. Y.
C. 125. *Sphenolobus minutus* (Crantz.) Steph. W. B.C. A. Y. Al.
R. 125A. *Sphenolobus* var. *cuspidatus* Kaal. B.C.
R. 126. *Sphenolobus ovatus* (Dicks.) Schffn. C. O. W. B.C. Al.
(= *Diplophyllum ovatum* (Dicks.) Steph.)
C. 127. *Sphenolobus Hellerianus* (Nees) Steph. B.C. A.
P. 128. *Sphenolobus scitulus* (Taylor) Steph. B.C. A.
S. 129. *Sphenolobus Michauxii* (Web.) Steph. I. Wy. B.C. A. Y.
P. 130. *Sphenolobus politus* (Nees) Steph. B.C. A.
R. 131. *Sphenolobus exsectus* (Schmid.) Steph. B.C. Al.
P. 132. *Sphenolobus exsectæformis* (Breidl.) Steph. Co. B.C. A.
133. *Anastrepta orcadensis* (Hook.) Schffn. Al.
P. 134. *Plagiochila asplenoides* (L.) Dum. C. O. Co. W. I. B.C. A. Al.
135. *Plagiochila alaskana* Evans. Al.
136. *Plagiochila Fryei* Evans. Al.

V. 137. *Pedinophyllum interruptum* (Nees) Pears. A.
C. 138. *Mylia anomala* (Hook.) S. F. Gray. W. B.C. A. Y. Al.
S. 139. *Mylia Taylori* (Hook.) S. F. Gray. B.C. A. Al.
U. 140. *Lophocolea cuspidata* (Nees) Limpr. C. O. W. I. M. B.C. Al.
R. 141. *Lophocolea bidentata* (L.) Dum. W. I. B.C. A.
U. 142. *Lophocolea heterophylla* (Schrad.) Dum. C. O. W. I. M. Wy. B.C.
F. 143. *Lophocolea minor* Nees. I. M. B.C. A. Y.
F. 144. *Chiloscyphus polyanthos* (L.) Corda. C. O. W. I. M. Wy. B.C. A.
U. 145. *Chiloscyphus rivularis* (Schrad.) Loesk. C. O. Co. W. I. M. Wy. B.C. A.
U. 146. *Chiloscyphus pallescens* (Ehrh.) Dum. C. O. W. I. B.C. A. Al.
R. 147. *Chiloscyphus fragilis* (Roth.) Schffn. C. W. M. Wy. B.C. A.
F. 148. *Harpanthus Flotowianus* Nees. W. M. B.C. A. Al.
U. 149. *Harpanthus scutatus* (Web. & Mohr.) Spruce. B.C.
S. 150. *Geocalyx graveolens* (Schrad.) Nees. C. O. W. I. B.C. A. Al.
P. 151. *Cephalozia bicuspidata* (L.) Dum. C. O. Co. W. I. M. Wy. B.C. A. Y. Al.
151A. *Cephalozia* var. *Lammersiana* (Hub.) Breid. O. B.C.
P. 152. *Cephalozia pleniceps* (Aust.) Lindb. C. O. W. M. B.C. A. Y. Al.
V. 152A. *Cephalozia* var. *macrantha* (Kaal. & Nichols). (Boundary of) B.C. A.
R. 153. *Cephalozia connivens* (Dicks.) Lindb. B.C. A.
P. 154. *Cephalozia media* Lindb. C. O. W. I. M. Wy. B.C. A. Y. Al.
155. *Cephalozia affinis* Lindb. C.
*S. 156. *Cephalozia serriflora* Lindb. B.C.
(as *catenulata* (Hub.) Spruce.)
V. 157. *Cephalozia leucantha* Spruce. W. B.C. Y. Al.
*V. 158. *Cephalozia fluitans* (Nees) Spruce. B.C.
R. 159. *Cephalozia Macounii* Aust. B.C.
S. 160. *Cephaloziella byssacea* (Roth.) Warnst. C. O. W. Wy. B.C. Al.
(= *Starkii* Schffn.)
V. 160A. *Cephaloziella* var. *asperifolia* (Jens.) Macv. C. O. W. B.C.
(= *C. papillosa* (Douin) Schffn.)
S. 161. *Cephaloziella bifida* (Schreb.) Schffn. B.C. A.
(= *C. rubella* Limpr.)
S. 162. *Cephaloziella Hampeana* (Nees) Schffn. C. O. Co. W. Wy. B.C. A.
V. 163. *Cephaloziella myriantha* (Lindb.) Schffn. A.
164. *Cephaloziella Limprichtii* Warnst. C. W.
(? = *gracillima*, Douin.)
R. 165. *Cephaloziella elachista* (Jack) Schffn. B.C. A.
166. *Cephaloziella alpina* Douin. I.
167. *Cephaloziella patulifolia* (Steph.) Douin. C.
168. *Prinolobus Turneri* (Hook.) Schffn. C. O. W.
V. 169. *Prinolobus striatulus* (Jens.) Schffn. B.C. Al.
V. 170. *Prinolobus Brinkmanii* (Douin). B.C.
*V. 170B. *Prinolobus dentatus* (Raddi) Schffn. B.C.
R. 171. *Hygrobiella laxifolia* (Hook.) Spruce. O. W. I. M. B.C. A.
U. 172. *Pleuroclada albescens* (Hook.) Spruce. W. M. B.C. A. Al.
173. *Odontoschisma Macounii* (Aust.) Underw. Y.
V. 174. *Odontoschisma denudatum* (Mart.) Dum. B.C.
V.(P.) 175. *Odontoschisma Gibbsiæ* Evans. B.C.
S. 176. *Calypogeia trichomanis* (L.) Corda. C. O. W. I. Wy. B.C. A. Y. Al.
V. 177. *Calypogeia fissa* (L.) Raddi. O. W. B.C.
U. 178. *Calypogeia Neesiana* (Carest. & Massal) Massal. B.C. A. Al.
U. 179. *Calypogeia sphagnicola* (Arnell. & Perss.) Warnst & Loeske. B.C. A.
R. 180. *Calypogeia suecica* (Arn. & Perss.) K. Mull. W. B.C.
R. 181. *Bazzania tricrenata* (Wahl.) Pears. W. I. B.C. Al.
U. 181B. *Bazzania triangularis* (Schleich.) Lindb. B.C.
182. *Bazzania trilobata* (L.) S. F. Gray. Al.
183. *Bazzania ambigua* (Lindenb.) Trevis. O. W.

184. *Bazzania Pearsoni* (Steph.) Pears. Al.
P. 185. *Lepidozia reptans* (L.) Dum. C. O. W. I. M. B.C. A. Al.
186. *Lepidozia sandvicensis* Lindenb. Al.
V.(P.) 187. *Lepidozia filamentosa* (Lehm. & Lindenb.) Lindenb. B.C. Al.
P. 188. *Blepharastoma trichophyllum* (L.) Dum. C. O. Co. W. I. M. Wy. B.C. A. Y. Al.
V.(P.) 189. *Blepharastoma arachnoideum* M. A. Howe. C. O. W. M. B.C.
*V. 190. *Temnoma setiforme* (Ehrh.) M. A. Howe.
(= *Chandonanthus setiformis* (Ehrh.) Lindb.) B.C. Y. Al.
R. 191. *Anthelia julacea* (L.) Dum. O. W. M. B.C. Al.
P. 192. *Anthelia Juratzkana* (Limpr.) Trevis. C. W. B.C. Al.
R. 193. *Herberta Hutchinsiæ* (Gottsche) Evans. W. B.C. Al.
F. 194. *Ptilidium ciliare* (L.) Nees. B.C. A. Y. Al.
P. 195. *Ptilidium pulcherrimum* (Web.) Hampe. W. I. M. B.C. A. Al.
C. 196. *Ptilidium californicum* (Aust.) Underw. & Cooke. C. O. W. I. M. B.C. Al.
F. 197. *Diplophyllum albicans* (L.) Dum. O. W. B.C. Y. Al.
F. 198. *Diplophyllum taxifolium* (Wahl.) Dum. O. W. I. B.C. A. Y. Al.
R. 199. *Diplophyllum obtusifolium* (Hook.) Dum. C. O. W. B.C.
*V. 200. *Diplophyllum plicatum* Lindb. B.C. Al.
*V. 200B. *Diplophyllum argenteum* (Tayl.) Spruce. B.C. Al.
201. *Diplophyllum imbricatum* (M. A. Howe) K. Mull. Al.
V. 202. *Diplophyllum gymnostophilum* Kaal. B.C.
P. 203. *Scapania subalpina* (Nees) Dum. C. Co. W. B.C. A.
S. 204. *Scapania cuspiduligera* (Nees) K. Mull. C. Co. B.C. A.
(= Bartlingii (Hampe.) Dum.)
R. 205. *Scapania aspera* Bernet. B.C.
R. 206. *Scapania nemorosa* (L.) Dum. W. I. M. Wy. B.C. A. Al.
R. 207. *Scapania americana* K. Mull. C. O. W. B.C.
208. *Scapania granulifera* Evans. C.
C. 209. *Scapania Bolanderi* Aust. C. O. W. B.C. Al.
S. 210. *Scapania dentata* Dum. O. Co. W. I. M. Wy. B.C. A.
*R. 211. *Scapania Oakesii* Aust. C. O. W. I. Wy. B.C.
V. 212. *Scapania intermedia* (Husnot.) Pears. B.C.
V.(P.) 213. *Scapania Evansii* Bryhn. W. I. M. B.C.
C. 214. *Scapania undulata* (L.) Dum. C. O. Co. W. I. M. Wy. B.C. A. Y. Al.
215. *Scapania heterophylla* M. A. Howe. C.
U. 216. *Scapania uliginosa* (Swartz.) Dum. Co. W. B.C. Al.
S. 217. *Scapania obliqua* (Arnell.) Schffn. B.C.
S. 218. *Scapania paludosa* K. Mull. B.C. A.
S. 218A. *Scapania* var. *vogesiaca* K. Mull. B.C. A.
218B. *Scapania* var. *papillosa* Clark. W.
219. *Scapania cordifolia* K. Mull. O. W. M. Al.
F. 220. *Scapania irrigua* (Nees) Dum. O. Wy. B.C. A. Al.
221. *Scapania paludicola* Loeske & K. Mull. Al.
C. 222. *Scapania curta* (Mart.) Dum. C. O. Co. W. I. Wy. B.C. A. Y. Al.
223. *Scapania rosacea* (Corda) Dum. Al.
S. 224. *Scapania glaucocephala* (Tayl.) Aust. B.C. A.
V. 225. *Scapania apiculata* Spruce. B.C.
U. 226. *Scapania umbrosa* (Schrad.) Dum. C. O. W. M. B.C. Al.
227. *Scapania perlaxa* Warnst. C.
C. 228. *Radula complanta* (L.) Dum. C. O. Co. W. I. M. B.C. A.
F. 229. *Radula Bolanderi* Gottsche. C. O. W. B.C. Al.
R. 230. *Radula obconica* Sulliv. B.C.
R. 231. *Radula polyclada* Evans. W. B.C. Al.
232. *Pleurozia purpurea* (Lightf.) Lindb. Al.
233. *Porella Bolanderi* Aust. C. O.
P. 234. *Porella Cordeana* (Huben.) Evans. C. O. Co. W. I. M. B.C. A. Al.
C. 235. *Porella navicularis* (Lehm. & Lindenb.) Lindb. C. O. W. I. M. B.C. A. Al.

R. 236. *Porella platyphylla* (L.) Lindb. O. I. B.C. Al.
R. 237. *Porella platylhylloidea* (Schwein.) Lindb. B.C.
F. 238. *Porella Rœlli* Steph. C. O. W. I. M. B.C. Al.
239. *Lejeunia cavifolia* (Ehrh.) Lindb. O.
*V. 240. *Cololejeunia Macounii* (Spruce) Evans. B.C.
F. 241. *Frullania Bolanderi* Aust. C. O. W. B.C.
242. *Frullania Catalinæ* Evans. C.
*R. 243. *Frullania Franciscana* M. A. Howe. C. O. W. B.C. Al.
*U. 244. *Frullania californica* (Aust.) Evans. C. O. W. B.C.
F. 245. *Frullania nisquallensis* Sulliv. C. O. W. B.C. Al.
246. *Frullania chilcootensis* Steph. Al.
R. 247. *Frullania eboracensis* Gottsche. B.C.
248. *Anthoceros phymatodes* M. A. Howe. C. O.
249. *Anthoceros Pearsoni* M. A. Howe. C. O. W.
250. *Anthoceros carolianus occidentalis* M. A. Howe. C. O.
*U. 251. *Anthoceros fusiformis* Aust. C. O. W. I. B.C.
U. 251A. *Anthoceros* var. *stomatifer* (Aust.) M. A. Howe. O. W. B.C.
252. *Anthoceros punctatus* L. O. W.
253. *Anthoceros Hallii* Aust. O. W.
254. *Anthoceros lævis* L. O. Co.

(Signs: V. 1 record; very rare. R. 2–3 records; rare. S. 4–6 records; scarce. U. 7–10 records; uncommon. F. 11–16 records; frequent. C. 17–25 records; common. P. without brackets. Above 26 records; plentiful.)

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* Old record (before 1900), not re-examined or duplicated, but listed in Macoun's Catalogue, Part 7. (P.) Listed in Postelsia, 1906, by Dr. A. W. Evans; not recorded elsewhere.

Dr. A. W. Evans has kindly supplied some notes, which he has given me permission to use.

170B. *Prinolobus dentatus* (Raddi) Schffn. Douin considers this a European species, so till the specimen is re-examined the record is doubtful.

181B. *Bazzania triangularis* (Schleich) Lindb. This species has been treated in Rhodora, May and June, 1923, by Dr. Evans, and the bulk of the records placed under *B. tricrenatas* with some placed under *B. denudata* (Torr.) Trevis (= *B. ambigua* (Lindenb.) Trevis). Probably all of the British Columbia records come under *B. tricrenata* (Wahl.) Pears, but until re-examination this question must remain unsettled.

200B. *Diplophyllum argenteum* (Tayl.) Spruce. The type material has recently been examined by Dr. Evans, who reduces it to synonymy under *Douinia ovata* (Dicks.) Buch., which is named in this list as *Sphenolobus ovatus* (Dicks.) Schffn. (Syn. *Diplophyllum ovatum* (Dicks.) Steph.), so that this record disappears from the list. The species included under *Prinolobus* may have to be replaced under three different genera, *Prinolobus*, *Cephaloziella*, and *Evansia*, but this cannot be done till Douin's monograph is available, and meanwhile, as placed, they can hardly mislead. Genus *Scapania* is now under examination, and some emendations will be found necessary. Thus, *S. nemorosa* may prove not to be Western in its distribution, its records being replaced by *S. americana* K. Mull. Others also are not too well understood at present and may have to be omitted. Under re-examination, the records of *Porella platyphylla* and *P. platyphylloidea* may disappear, at least in part, though Pearson's statement (on the B.C. record) that "these specimens agree in every particular with original ones from Schweinetz" seems definite.

Synonymy has been avoided as far as possible, but some synonyms have been unavoidable, and under *Cephaloziella byssacea* var. *asperifolia* two more synonyms should perhaps be used, *C. starkii* (Funck.) Schffn. var. *scabra* (Howe) Clark and *Cephalozia divaricata scabra* M. A. Howe.

The letters used are for States and Provinces, and are as follows:—

C. California, 112 species, 3 varieties.
Co. Colorado, 41 species.
I. Idaho, 55 species.
Wy. Wyoming, 38 species.
Y. Yukon, 39 species.
O. Oregon, 96 species, 5 varieties.
W. Washington, 130 species, 1 variety.
M. Montana, 60 species.
B.C. British Columbia, 186 species, 10 vars.
Al. Alaska, 109 species.
A. Alberta, 105 species, 4 varieties.

Of the British Columbian records, two, 181B and 200B, may be discarded, and 170B requires re-examination.

Four States are not included. Arizona and New Mexico have a flora so much Mexican in character that the short lists are not included, for it hardly seems they come within the original scope of this list—namely, Pacific Coast and Rocky Mountain District Hepatic Flora.

There is a short list of Nebraskan Hepaticæ (Bryologist, 1924, pp. 49–52, Dr. A. W. Evans), and as it includes some species new to the list, and some quite rare, the list is given briefly, without authorities.

Riccia Beyrichiana (?), *R. Austini* (?), *R. hirta* (?), all doubtful; *Riccia Fluitans, Frostii, McAllisteri, Ricciocarpus natans, Reboulia hemisphærica, Grimaldia fragrans, Conocephalum conicum, Marchantia polymorpha, Pallavicinia Flotowiana, Chiloscyphus pallescens, Porella platyphylla, Frullania eboracensis, Notothylas orbicularis, Anthoceros crispulus, lævis, punctatus.* That leaves *Riccia McAllisteri* M. A. Howe, *Notothylas oribcularis* (Schwein.) Sulliv., and *Anthoceros crispulus* (Mont.) Douin as additions to the territory originally proposed. The article, though short, is very interesting. No list of Utah Hepaticæ is known to the writer.

Hepatics of the Pacific Coast and Adjoining Regions.

The original intention of this paper was to supply an up-to-date list of the Hepatics of British Columbia and Alberta, with records of stations, and also the relation of species to habitats. But a combination of circumstances prevented the carrying-out of the original idea, and suggested the widening of the paper to include the area mentioned above.

Dr. Conklin very kindly supplied a very long list of the Hepaticæ of British Columbia and Alberta represented in the herbarium of the Sullivant Moss Society.

Part 7 of Macoun's catalogue of plants of Canada, with its lengthy list of records, along with Pearson's List of Canadian Hepaticæ, was also used; the writer's list of gatherings from 1908 to 1913 and 1928–29 was also used, a list only made possible through the help of Dr. A. W. Evans, Dr. G. H. Conklin, and Miss C. C. Haynes, through whose hands, often all three, frequently the latter two, all records passed.

Miss Greenwood had made a collection in the vicinity of Glacier and Field, B.C.; Dr. W. R. Taylor had made other collections farther West; and a quite extensive collection had been made by Mrs. F. MacFadden, mostly amongst the mountains of British Columbia and Alberta, and the records now ran into thousands. Some recent additions by Dr. E. H. Moss have added to the list and our knowledge of distribution.

To add to the difficulty, a partial examination of material in the Ottawa Herbarium showed that some of the records were unreliable (and for permission to study this material I have to thank Dr. M. O. Malte for his kind co-operation and help), so that simply copying from Macoun's catalogue would have been misleading.

These difficulties made an alteration in the original plan necessary, and the plan followed in the following list is to indicate frequencies by letters, as follows: One record, V, very rare; 2–3 records, R, rare; 4–6 records, S, scarce; 7–10 records, U, unusual; 11–16 records, F, frequent; 17–25 records, C, common; 26 and above, P, plentiful or very common.

Unfortunately this does not permit of geographical distribution being shown, and some species are quite frequent in the coastal districts, and absent elsewhere; others extend as far as the Selkirks, but not beyond; some farther East to the Rockies, but not beyond on to the plains, and some species are strictly alpine or sub-alpine.

Still, it was felt that the frequency list would give some help as to what to expect, or at least as to what had already been found. A fuller treatment with all records would require a book, and much more time than is available to the writer. I regret, however, that it was not possible to indicate relation of species to habitats, a most useful and interesting study, for which a large quantity of material is available, but not the time.

So far the records were only of British Columbia and Alberta, but since the publication of the last lists (Canadian Field Naturalist, 1923, Nos. 5 and 6) an important publication had appeared, "The Liverworts of the North West," by Clarke & Frye, University of Washington, which bridged the gap hitherto existing between the published lists of California, and of the Yukon and Alaska, and it was now possible to consider the making of a list of the Pacific Coast region West of and including the Rockies, except that the following States are not yet represented: Nevada, New Mexico, Utah, Arizona; but partial lists already exist from some of

these States, so that a future list may hope to include them, and thus make it representative of the area of Rocky Mountains and West to the Coast; the present list, however, is not attempting such an extension.

It is felt that the British Columbia and Alberta records are very considerably reliable, as so very much has been collected since 1900, and has passed through hands that hardly admit of much error; but to give a more accurate idea of the standing of the plant species, an asterisk (*) has been placed against those species that have not been collected since 1900, and which have not been examined by the writer, or others; and another group of records that are not included in the above-mentioned collections or herbaria is that worked over by Dr. Evans, and recorded in Postelsia, 1906, and these have been marked with (P.).

The examination of the Ottawa material has added to the esteem already felt for that outstanding field naturalist, John Macoun, for a number of recent (since 1900) additions have been found among the material examined, but not, or incorrectly, named; not only so, but fresh additions to North America are turning up, and some material not yet described, to the writer's knowledge. Of especial value has been the publications of Dr. Evans; one can hardly imagine Hepatology in North America without him, and his writings and outstanding knowledge have been frequently and extensively used.

As before stated, the publication of Clark & Frye's book closed the gap hitherto existing, and, with the present publication of the British Columbia and Alberta list, a series of publications exist giving most of the records included in above lists. Starting from the earliest publications, we have "The Hepaticæ and Anthocerotes of California," Dr. M. A. Howe, Memoirs Torr. Bot. Club, Vol. 7, 1899, with a very full treatment of the species known up to then as occurring in California, and notes of further extensions; this was supplemented with "Notes on the Hepaticæ of California," Dr. A. W. Evans, Proc. of California Academy Sciences, Nov., 1923, bringing the list up to date. "Notes on the Hepaticæ collected in Alaska," Dr. A. W. Evans, Proc. Washington Academy Sciences, Oct., 1900, was the next publication, in date, giving the Alaskan species up to date; this was followed in 1915 by "Report on the Hepaticæ of Alaska," Dr. A. W. Evans, Bull. Torr. Bot. Club, 41, 1915, bringing the knowledge of Alaskan species up to date. A list of the Hepaticæ of Yukon (coll. R. S. Williams), by Dr. M. A. Howe, Bull. New York Bot. Garden, Vol. 2, 1901, gave the list up to that date; this was followed in 1903 by "Yukon Hepaticæ," Dr. A. W. Evans, Ottawa Naturalist, April, 1903, bringing the knowledge up to date and including the Macoun collections.

This left a large territory covered by Clark & Frye, "Liverworts of the North West," University of Washington, 1928, who brought together all the known records, giving a list of literature with sources of records. This has been kindly supplemented by a corrected list given to the writer by the authors, bringing their list up to date.

In 1923 was published Part 1, N.A. Flora, Hepaticæ, giving distribution of the *Sphærocarpales–Marchantiales* up to 1923, Jan. These are the main sources of the list, but the following list has been referred to also:—

Notes on New England Hepaticæ, Nos. 1 to 17, Nov., 1902, to June, 1923, Rhodora.

Notes on N. American Hepaticæ, Bryologist, Nos. 1 to 9, March, 1910, to March, 1922. Both the series by Dr. A. W. Evans.

Odontoschisma Macounii and its North American Allies, Dr. A. W. Evans, Bot. Gaz., 36, Nov., 1903.

Notes on the genus Herberta, Dr. A. W. Evans, Bull. Torr. Club, 44, April, 1917.

The N. American species of Asterella, Dr. A. W. Evans, Contributions from the U.S. Nat. Herb., Vol. 20, Pt. 8, 1920.

Three species of Scapania from Western N. America, Dr. A. W. Evans, Bull. Torr. Bot. Club, 57, Sept., 1930.

The N. American species of Porella, Dr. M. A. Howe, Bull. Torr. Bot. Club, Vol. 24, Nov., 1897.

The Anthocerotaceæ of N. America, Dr. M. A. Howe, Bull. Torr. Bot. Club, Vol. 25, Jan., 1898.

A revision of the species of Radula of U.S.A. and Canada, H. Castle, Bull. Torr. Bot. Club, 52, Nov., 1925.

Hepaticæ and Antherocotes of Western Oregon, Dr. E. Sanborn, University of Oregon, Oct., 1929, Biological series.

Report on the Hepaticæ of Nebraska, Bryologist, 1924, pp. 49–52, Dr. A. W. Evans.

These, I believe, contain all the records necessary, though various other papers have been referred to.

The writer is responsible for his own district, that of British Columbia and Alberta, and must take the blame for any mistakes made in that portion. Dr. Frye and Dr. Clark have kindly brought their district up to date. Mrs. Sutcliffe has added some valuable records for California; Dr. E. Sanborn has supplied an interesting list of additions for Oregon; Dr. E. H. Moss, some recent and new additions to the flora of Alberta; while Dr. Evans has kindly contributed a further list of additions and some valuable critical notes, and to Dr. M. A. Howe I owe thanks for loan of some critical species and help with literature and critical notes.

To the generous assistance of Dr. A. W. Evans the writer owes much; both Miss C. C. Haynes and Dr. G. H. Conklin gave freely of their time and other assistance; their patience in naming the fearfully mixed alpine collections must be understood from actual experience to be realized.

While the list, 254 species, at first looks large, yet comparison with Macvicar's Handbook, Ed. 1, with its list of 274 species from that small district, will show how very far from large it really is. How small it is in comparison to the territory covered in this list the following figures will show:—

British Isles, latitude 50 to 60, area 120,000 square miles; Pacific territory, area much over 10 times as great, latitude 33 to 70 (or more), in widest part, over 1,000 miles. But even greater are the differences in climate and range of habits. Britain, highest point, 4,370 feet; Pacific territory, up to 15,000 feet, with numerous mountain ranges, and whole large areas higher than 4,370 feet. Britain, climate mildly oceanic; Pacific territory, warm Pacific to frigid; continental, from arid and desert to densely covered with rank vegetation, from high alpine to warm wet coastal.

This perhaps will give some idea of how little this territory has been worked botanically, little more than partly worked in a few widely separated territories in the line of Hepatics, and practically unworked over very much the largest part of the territory.

We may then confidently expect not only numerous additions to the list of species already known in Europe, but also of species not known to Europe and peculiar to America.

In making a North and South comparison of the list, perhaps the first point that strikes one is the comparative plenty of Thalloid Hepatics in California, compared to the more Northern regions.

California, 29 and 4 *Anthocerotes* out of 115 records.

Oregon, 17 *Thalloids* and 1 *Anthocerotes* out of 101 records.

Washington, 16 *Thalloids* and 5 *Anthocerotes* out of 131 records.

British Columbia, 17 *Thalloids* and 2 *Anthocerotes* out of 196 records.

Alaska, 7 *Thalloids*, no *Anthocerotes*, a steady diminishing northward.

A glance at the *Lophozia* and *Scapania* tribes shows how comparatively Northern these groups are, but perhaps the most striking contrast is in the Eastern and Western distribution of Hepatics in North America, a peculiarity already noticed with the grasses.

Look at the long list of *Lejeunias* in the exchange list; only two of those are on this list, the rest are Eastern and Southern, not Western.

Frullanias show 7 Western out of a list of 28. These are the most striking difference.

I think this paper and list, while, I hope, proving of some use to the students of the Western Hepaticæ, will give some idea of the largeness of the work yet remaining to be done in various directions in this very interesting field.

It will be noticed that some varieties are included; it is hoped this will be the beginning of an attempt to correlate the numerous named varieties of Europe with those of North America.

It is hoped that the arrangement of list will easily permit the tracing of the North and South distribution, and the East and West also, of both species and groups, and give a good working idea of what further may be expected to be found in the various districts, for even British Columbia with 186 species is having frequent additions made to its Hepatic flora, and some of the districts may expect to have their records of species at least doubled and, in some cases, quadrupled.

To those interested in Hepatics, but not knowing the literature to obtain, the writer would suggest that Macvicar's Handbook of British Hepatics is the best single work of reference,

especially for Canada, coupled, if at all possible, with Clark & Frye's book referred to above for the coastal regions and near-by States; for Oregon, Dr. Sanborn's Hepaticæ and Anthocerotes of Western Oregon best covers that State; while for California Dr. M. A. Howe's book is practically indispensable. If obtainable, the numerous papers of Dr. A. W. Evans must be obtained for further study; one can only regret he has not published a Handbook of American Hepatics, for Part 1 of the North American Hepatic Flora covers only a small portion of the whole flora and is not illustrated.

ENTOMOLOGY.

By J. F. Gates Clarke.

The following sixty-five insects have been described as new to science since the report for 1930 was published. It seems desirable to bring this list together so that those who are interested on the various orders may have these references readily available.

It is hoped that in the future, when the length of series permits, the various authors will deposit a paratype or an authentic specimen of newly described species in the collections of the Provincial Museum. With the very limited staff it is impossible to collect all these species, and yet it is one of the aims of the Museum to bring together, as nearly complete as possible, representations of the fauna and flora of the Province.

Ephemeroptera.

Ameletus vancouverensis McDonnough. Can. Ent., 65: 157, 1933. The holotype male is from Vancouver Island (J. D. Gregson).

Neuroptera.

Chrysopidæ.

Chrysopa oculata carei Smith. Described (Ann. Ent. Soc. Amer., 25: 588, 1932) from a series collected at various places in Canada. The British Columbia specimens are from Cranbrook (A. A. Dennys), Pouce Coupe, Rolla, and Creston.

Chrysopa downesi Smith. In the type series there are numerous specimens from the Province as follows: Kelowna (W. Downes), Vernon, Salmon Arm, Lillooet, Rock Creek, Victoria, and Keremeos.

Plecoptera.

Nemoura cataractæ Neave. Can. Ent., 65: 238, 1933. Holotype male from Cataract Brook, Lake O'Hara, collected by the author of the species.

Mecoptera.

Boreidæ.

Boreus reductus Carpenter. Can. Ent., 65: 94, 1933. Holotype male from Kaslo. Paratypes from Lillooet (W. H. A. Phair).

(Hemiptera) Heteroptera.

Phymatidæ.

Phymata metcalfi Evans. Described (Ann. Ent. Soc. Amer., 24: 723, 1931). Represented by a paratype from Lillooet.

Coleoptera.

Carabidæ.

Chlænius crestonensis Brown. Described (Can. Ent., 65: 43, 1933) from specimens from Creston (G. Stace Smith).

Dytiscidæ.

Hydroporus compertus Brown. Described (Can. Ent., 64: 4, 1932) from specimens collected at Copper Mountain, June 15th to July 23rd, 1930, by Mr. G. Stace Smith.

Hydroporus falsificus Brown. Can. Ent., 65: 44, 1933. The holotype was collected at Wynndel. Paratypes were collected at Erickson, Copper Mountain, and Creston. All were taken by Mr. G. Stace Smith.

Agabus audeni Wallis. Can. Ent., 65: 270, 1933. Described from the holotype male from Okanagan.

Agabus verisimilis Brown. Described (Can. Ent., 64: 4, 1932) from specimens collected at Creston, April 13th to 23rd, 1930, by Mr. G. Stace Smith.

Rhantus hoppingi Wallis. Can. Ent., 65: 272, 1933. The holotype is from Trinity Valley (J. R. L. Howell) and the allotype from Peachland (J. B. Wallis). There are also paratypes from Malakwa, Peachland, Creston, and Trinity Valley.

Rhantus zimmermanni Wallis. Can. Ent., 65: 274, 1933. The British Columbia specimens are represented by paratypes from Copper Mountain.

Hydrophilidæ.

Ochthebius insulanus Brown. Described (Can. Ent., 64: 116, 1932). The type series was collected at Victoria by Mr. H. F. Wickham.

Ochthebius mimicus Brown. Can. Ent., 65: 45, 1933. Described from specimens collected at Summerland by Mr. A. N. Gartrell.

Limnebius columbianus Brown. Described (Can. Ent., 64: 5, 1932). These specimens were collected at Similkameen River, Copper Mountain, August 24th to October 30th, 1930, and at Wolfe Creek, Copper Mountain, March 28th to July 20th, 1930, by Mr. G. Stace Smith.

Tropisternus columbianus Brown. Described (Can. Ent., 63: 117, 1931) from specimens collected at Malahat by Mr. W. H. A. Preece.

Silphidæ.

Hydnobius simulator Brown. Described (Can. Ent., 64: 6, 1932) from specimens collected by Mr. G. Stace Smith at Creston, November 11th to 19th, 1930.

Agathidium conjunctum Brown. Can. Ent., 65: 46, 1933. The holotype was collected at Langley by Mr. K. Graham.

Dryopidæ.

Helichus columbianus Brown. This species was described (Can. Ent., 63: 118, 1931) from specimens collected at Copper Mountain by Mr. G. Stace Smith and at Duncan by Mr. A. W. Hanham.

Helmidæ.

Helmis solutus Brown. Can. Ent., 65: 46, 1933. The holotype male and allotype female are from Wynndel. Both were collected by Mr. G. Stace Smith.

Elateridæ.

Ampedus varipilis columbianus Brown. Can. Ent., 65: 136, 1933. The holotype male is from Creston (G. Stace Smith), and paratypes are from Trinity Valley (J. R. Howell), Vancouver (H. B. Leech), Enderby and Hotel Lake, Pender Harbour (G. R. Hopping), Nelson (R. D. Bird), North Vancouver (A. Gibson), Vancouver Island (Taylor), Creston, and Copper Mountain (A. A. Dennys and G. Stace Smith).

Agriotes tardus Brown. Can. Ent., 65: 177, 1933. The allotype female is from Trinity Valley (J. R. Howell). There are also paratypes from McNab Creek, Howe Sound, Vancouver (H. B. Leech), and Red Pass (G. Stace Smith).

Agriotella Occidentalis Brown. Can. Ent., 65: 180, 1933. Described from a series of twenty-four specimens. The holotype male, allotype female, and six paratypes are from Copper Mountain (G. Stace Smith). There are also paratypes from Vancouver and Creston (G. Stace Smith), Vernon (R. Hopping), and Pender Harbour (R. T. Turner).

Agriotella columbiana Brown. Can. Ent., 65: 182, 1933. Holotype male from Genoa Bay, Duncan (W. Mathers).

Nitidulidæ.

Glischrochilus quadrisignatus canadensis Brown. Described (Can. Ent., 64: 259, 1932). The holotype male was collected at Vernon by Mr. K. B. Hopping. Paratypes were collected at Enderby and Agassiz.

Glischrochilus seepmanni Brown. Described (Can. Ent., 64: 259, 1932). Paratypes of this species were collected at Midday Valley and Merritt by Mr. K. F. Auden and at Vernon by Mr. R. Hopping.

Glischrochilus moratus Brown. Described (Can. Ent., 64: 261, 1932). There are paratypes of this species from Summerland, collected by Mr. A. N. Gartrell, and Copper Mountain and Creston, collected by Mr. G. Stace Smith.

Alleculidæ.

Hymenorus caurinus Fall. Described (Trans. Amer. Ent. Soc., 57: 185, 1931) from a single specimen collected at Peachland by Mr. J. B. Wallis.

Hymenorus sinuatus Fall. Described (Trans. Amer. Ent. Soc., 57: 187, 1931) from a single specimen collected at Peachland by Mr. J. B. Wallis.

Pseudocistela pacifica Hopping. Can. Ent., 65: 284, 1933. The British Columbia specimens are from Vernon (holotype male and allotype female, R. Hopping) and Salmon Arm.

Pseudocistela pectinata Hopping. Can. Ent., 65: 285, 1933. The type series is from Midday Valley, Merritt (W. G. Mathers, N. L. Cutler).

Tenebrionidæ.

Hypophlœus subpoacus Wallis. Can. Ent., 65: 247, 1933. Described from specimens collected at Lorna and Trinity Valley by Mr. E. A. Rendall and Mr. Ralph Hopping.

Hypophlœus occidentalis Wallis. Can. Ent., 65: 249, 1933. Described from specimens from Lorna, reared by Mr. Ralph Hopping.

Ægialiinæ.

Ægialia criddlei Brown. Described (Can. Ent., 63: 42, 1931). There are paratypes of this species from the Queen Charlotte Islands collected by Mr. J. H. Keen.

Scarabæidæ.

Dichelonyx columbiana Hopping. This species was described (Can. Ent., 63: 233, 1931) from a series of specimens collected at Vernon by Mr. R. Hopping.

Cerambycidæ.

Pidonia quadrata Hopping. Described (Can. Ent., 63: 233, 1931). The holotype of this species was collected at Wigwam Inn by Mr. R. G. Hopping. Paratypes were collected at various locations as follows: Lynn Valley, Vancouver (Mr. R. T. Turner), Clayoquot Sound (Dr. G. J. Spencer), and Vancouver (Mr. R. Hopping).

Pœcilobrium gibsoni Hopping. Described (Can. Ent., 63: 234, 1931) from specimens collected at Vernon by Mr. R. Hopping.

Chrysomelidæ.

Luperodes lecontei asclepiadis Schaeffer. This species was described (Can. Ent., 64: 238, 1932) from specimens from Copper Mountain collected by Mr. G. Stace Smith.

Curculionidæ.

Ceutorhynchus opertus Brown. Described (Can. Ent., 63: 119, 1931). The type series was collected at Oliver by Mr. C. B. Garrett.

Ipidæ.

Pityophthorus smithi Schedl. Described (Can. Ent., 63: 163, 1931) from specimens collected at Copper Mountain by Mr. G. Stace Smith.

LEPIDOPTERA.

RHOPALOCERA.

Nymphalidæ.

Argynnis whitehousei Gunder. Described (Can. Ent., 64: 279, 1932) from specimens collected at Jaffray (Mr. A. C. Whitehouse) and Cranbrook.

Argynnis rhodope tr. f. *Gregsoni* Gunder. Described (Can. Ent., 64: 281, 1932). The holotype was collected by Mr. J. D. Gregson on Mount Washington, Forbidden Plateau.

Argynnis bischoffii Edw. Gunder records this species from the Forbidden Plateau (Can. Ent., 64: 282, 1932), this being a new record for the Province.

Argynnis garretti Gunder. The type series of this species, described (Can. Ent., 64: 282, 1932), was collected at Cranbrook by Mr. C. B. Garrett.

HETEROCERA.

Gelechiidæ.

Aristotelia nigrobasiella Clarke. Described (Can. Ent., 64: 63, 1932) from specimens collected at Fraser Mills by Mr. L. E. Marmont, and Saanichton by Mr. J. G. Colville and the late Mr. E. H. Blackmore.

Gelechia abactella Clarke. Described (Can. Ent., 64: 68, 1932). The type series was collected at Kaslo by Mr. J. W. Cockle.

HYMENOPTERA.

Tenthredinidæ.

Tenthredella fraternalis Ross. Described (Ann. Ent. Soc. Amer., 24: 113, 1931). A paratype of this species was collected at Field.

Tenthredella stricklandi Ross. Described (Ann. Ent. Soc. Amer., 24: 117, 1931). There is one paratype of this species from the Selkirk Mountains collected by Mr. J. C. Bradley.

Macrophya oregona dukiæ Ross. Described (Ann. Ent. Soc. Amer., 24: 122, 1931). The holotype male and allotype female were collected at Vancouver by Mr. H. H. Ross.

Hemichroa washingtonia R. & M. Described (Proc. Ent. Soc. Wash., 24: 97, 1932) from specimens collected at Seattle, Washington. There are three specimens from White Rock (G. Beall), Rosedale (R. Glendenning), and Langley (Graham) which the authors associate with this species.

Vipionidæ.

Microbracon bembeciæ Walley. Described (Can. Ent., 64: 186, 1932) from a series of specimens from Agassiz, August 7th, 1922 (R. Glendenning), which were reared from *Bembecia marginata* Harris.

Ichneumonidæ.

Euceros angulicornis Walley. Described (Can. Ent., 64: 246, 1932) from specimens from British Columbia (Hanham) and Victoria (Rev. G. W. Taylor, collector).

Smicroplectrus disseptus Walley. Can. Ent., 65: 256, 1933. Holotype female, Agassiz (R. Glendenning); allotype male, North Bend (W. B. Anderson); and paratypes from Victoria (Rev. G. W. Taylor).

Arenetra occulata Walley. Described (Can. Ent., 63: 170, 1931). The holotype was collected at Victoria (R. G. ?).

The following species, with the exception of *O. auripes* Whittaker, which was collected at Chilliwack, were taken at Hollyburn by the author of the species:—

Mymaridæ.

Ooctonus fuscipes Whittaker. Described (Proc. Ent. Soc. Wash., 33: 189, 1931).
Ooctonus canadensis Whittaker. Described (Proc. Ent. Soc. Wash., 33: 191, 1931).
Ooctonus auripes Whittaker. Described (Proc. Ent. Soc. Wash., 33: 190, 1931).
Ooctonus occidentalis Whittaker. Described (Proc. Ent. Soc. Wash., 33: 191, 1931).

Diapriidæ.

Belyta sanguinea Whittaker. Described (Proc. Ent. Soc. Wash., 33: 177, 1931).
Belyta boreale Whittaker. Described (Proc. Ent. Soc. Wash., 33: 179, 1931).
Belyta anthracina Whittaker. Described (Proc. Ent. Soc. Wash., 33: 180, 1931).
Belyta excavata Whittaker. Described (Proc. Ent. Soc. Wash., 33: 180, 1931).

Andrenidæ.

Andrena Walleyi Cockerell. Described (Can. Ent., 64: 285, 1932) from specimens collected at Fairview by Mr. E. R. Buckell.

Apoidea.

Halictus athabascensis Sandhouse. Proc. Ent. Soc. Wash., 35: 78, 1933. Several paratypes of this species are from Hazelton (H. G. Dyar) and Kaslo (H. G. Dyar, R. P. Currie, and J. W. Cockle).

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