

PROVINCE OF BRITISH COLUMBIA

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REPORT

OF THE

PROVINCIAL MUSEUM

OF

NATURAL HISTORY

AND

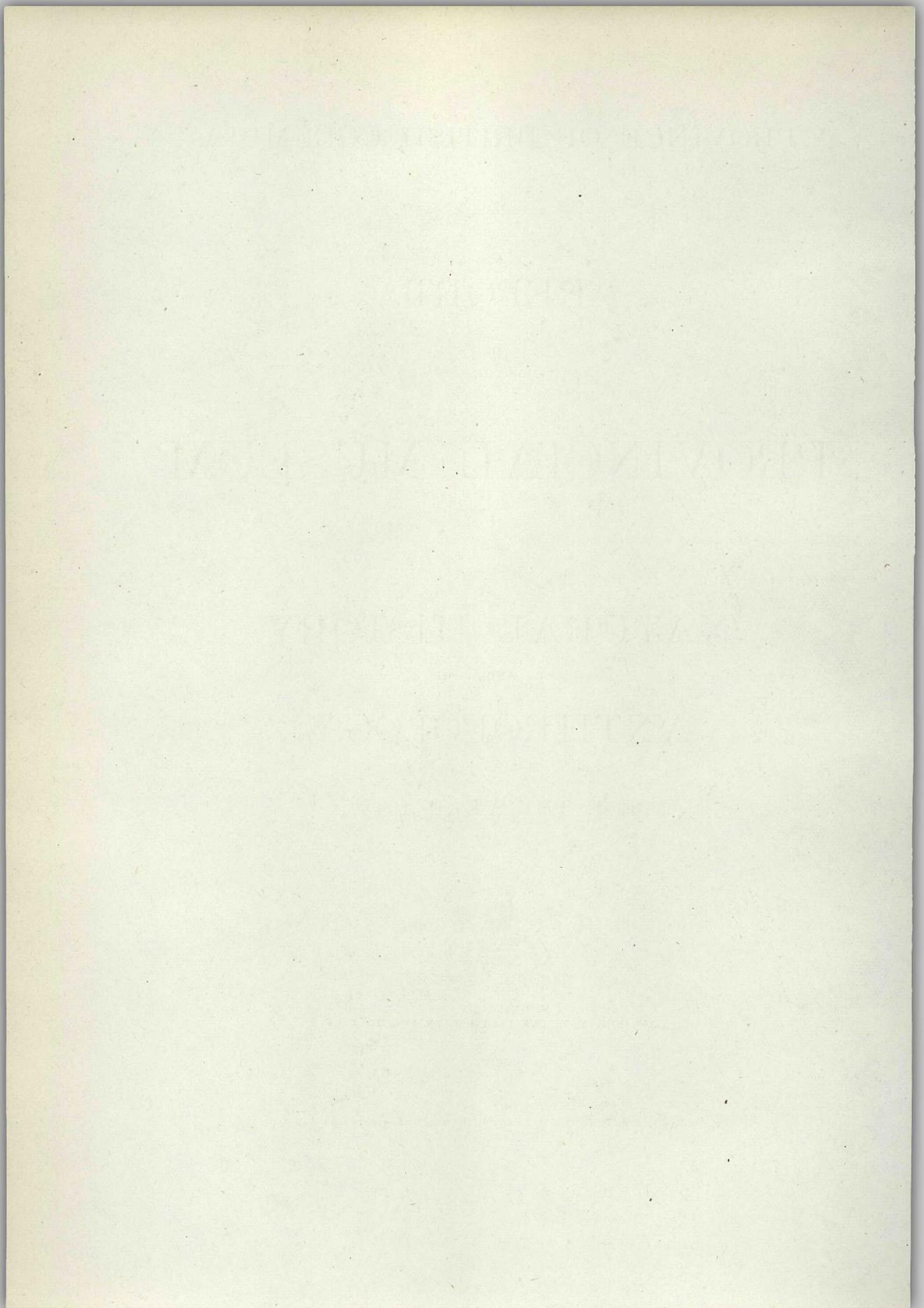
ANTHROPOLOGY

FOR THE YEAR 1943



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1944.



To His Honour W. C. WOODWARD,  
*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 and Anthropology for the year 1943.

H. G. T. PERRY,  
*Minister of Education.*

*Office of the Minister of Education,  
Victoria, B.C.*

PROVINCIAL MUSEUM OF NATURAL HISTORY  
AND ANTHROPOLOGY,

VICTORIA, B.C., April 15th, 1944.

*The Honourable H. G. T. Perry,*  
*Minister of Education, Victoria, B.C.*

SIR,—The undersigned respectfully submits herewith a report of the activities of the Provincial Museum of Natural History and Anthropology for the year 1943.

I have the honour to be,

Sir,

Your obedient servant,

G. CLIFFORD CARL,

*Director.*

## DEPARTMENT OF EDUCATION.

The Honourable H. G. T. PERRY, *Minister.*

Dr. S. J. WILLIS, *Superintendent.*

### PROVINCIAL MUSEUM OF NATURAL HISTORY AND ANTHROPOLOGY.

#### *Staff:*

G. CLIFFORD CARL, Ph.D., *Director.*

GEORGE A. HARDY, *Botanist.*

LILLIAN C. SWEENEY, *Assistant Preparator (Artist).*

MARGARET CRUMMY, B.A., *Clerk-Stenographer.*

E. A. COOKE, *Laboratory Assistant and Attendant (to February 15th).*

FRANK L. BEEBE, *Laboratory Assistant and Illustrator (from May 1st).*

H. H. PEGLER, *Attendant.*

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## PROVINCIAL MUSEUM OF NATURAL HISTORY AND ANTHROPOLOGY.

#### 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 to increase and diffuse knowledge regarding the same.

(Section 4, "Provincial Museum Act," R.S.B.C. 1936, c. 231.)

#### ADMISSION.

The Provincial Museum is open to the public, free, week-days, 9 a.m. to 5 p.m.; and on Sunday afternoons, 1 p.m. to 5 p.m.

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# REPORT of the PROVINCIAL MUSEUM

## FOR THE YEAR 1943.

### REPORT OF THE DIRECTOR.

Despite the war-time restrictions that have been placed on travelling the Provincial Museum has experienced a busy year, both from the standpoint of numbers of visitors and of educational activities. The following is a general account of the services rendered and of the progress of work in the various fields in which the Museum has been active during the year 1943.

#### EXHIBITION AND PREPARATION.

Among the new specimens placed on display during the year is an exhibit featuring different types of forest fungi commonly found in this Province. An enlarged model in cross-section illustrates the life-history of a bracket-fungus from the spore which enters the wood to the production of the familiar fruiting body. Other specimens show types of growth and method of annular increase in size.

Two water-colours by Major Allan Brooks have been hung in the bird section. The first, featuring black brant, was acquired by purchase; the second, showing various species of sea-birds in a scene typical of the Victoria district, was donated to the Museum by the artist. We wish to thank Major Brooks for the most generous gift of this painting which makes a most welcome addition to the bird exhibit.

Among the living exhibits the native wild flower display has continued to receive attention, especially from students interested in the botany of this Province. The living reptile display has been maintained by the addition of a blue racer and a gopher snake received from Mr. A. C. Mackie, of Vernon, and by a second specimen of blue racer from Mr. G. P. Holland, of Kamloops. A live scorpion, captured by Mr. L. E. Johnson, of Victoria, has also been a source of interest.

The miniature fish-hatchery has been kept in operation; the coho salmon eggs used in this display were supplied through the kindness of Mr. E. V. Epps, of the Cowichan Lake Hatchery.

Among the models of fishes prepared by Mrs. L. C. Sweeney during the year are the following: Blenny, ling-cod, coho salmon (blueback), chub, coarse-scaled and fine-scaled suckers, sculpin, mackerel shark, rainbow trout, crappie, sunfish, small-mouth black bass, shiner, and catfish. A series of ten mushroom groups was also constructed to be added to the display of common fungi already on exhibit. To be included in the series of enlarged models is a mosquito constructed approximately twenty times life size so that the details of structure are plainly visible.

#### LOAN EXHIBITS AND MUSEUM DISPLAYS.

A small collection of British Columbia Indian material was sent on loan to the Hudson's Bay Company, Winnipeg, to be exhibited in the Hudson's Bay Company Museum under the direction of Mr. Clifford P. Wilson.

Examples of arts and crafts of present-day Indians were sent through the Museum to the Annual Exhibition of the Royal Canadian Academy of Arts in the City of Quebec in October and to the Sixty-fourth Annual Exhibition held in Montreal in November. Specimens receiving special notice were two examples of finely woven baskets made by Mrs. Charlie Thomas and Mrs. Johnny Johnson, of Kakawis, B.C., the latter receiving an award for individual work. Prizes were also awarded to Christie Indian School (Kakawis) for first in Design; to Inkameep School (Oliver) and Christie Indian School

for Applied Work; and to St. Catherine's School (Duncan) for Honourable Mention. Madeline Charlie, of St. Catherine's School, also received an individual award for a knitted sweater. Entries also included examples of handicrafts from St. Michael's School (Alert Bay) and from other individuals. All exhibit material was sent under the auspices of the Society for the Furtherance of British Columbia Indian Arts and Crafts, Victoria.

During the period May 17th to May 31st, 1943, an exhibition of Indian children's handiwork was held in the Museum, sponsored by the Society for the Furtherance of British Columbia Indian Arts and Crafts. The material on display consisted of drawings and paintings illustrating Indian folk-lore, designs, beadwork, various types of woodwork and carving, examples of dressmaking, knitting, and other handicrafts. Schools represented in the display included the following: Christie Indian School (Kakawis), St. Catherine's School (Duncan), Songhees Indian Day School (Craigflower, Victoria), Kuper Island Indian Residential School, Campbell River Indian Day School, Crosby Girls' School (Port Simpson), St. Michael's School (Alert Bay), Penticton Indian Day School, Inkameep School (Oliver), Squamish Residential School (North Vancouver), and Kootenay Indian School (Cranbrook). The exhibition was formally opened by Mrs. W. C. Nichol, who was introduced by Major L. Bullock-Webster, President of the Society.

Early in the year a collection of original bird paintings by Major Allan Brooks was placed on display and attracted considerable attention. The pictures featured wood-duck, hooded merganser, pheasant, snipe, brant, mallard, and other sea-birds in oils and in water-colours.

#### FIELD-WORK.

The principal collecting trip made during the year was to the Forbidden Plateau area during the latter part of August. The details of this expedition are included in the account found elsewhere in this report.

Other short trips were made to Active Pass, to Saltspring Island, to Goldstream, and other near-by areas for the purpose of collecting fresh exhibition material and scientific specimens. Mrs. Sweeney made a collection of representative plants and obtained specimens of marine life while visiting Cortes Island in July.

#### PUBLICATIONS.

During the year the following articles and other publications have originated from the Museum:—

- "Some Accounts of the Flora and Fauna of the Driftwood Valley Region of North Central British Columbia." John F. and Theodora C. Stanwell-Fletcher. Occasional Paper No. 4, Provincial Museum, May, 1943.
- "The Amphibians of British Columbia." G. Clifford Carl. Handbook No. 2, British Columbia Provincial Museum, June, 1943.
- "Northward Extensions of the Range of *Ascaphus*." John W. Slipp and G. Clifford Carl. Copeia, No. 2, June, 1943.
- "Frogs Herald the Approach of Spring." G. Clifford Carl. Victoria Daily Times, February 13th, 1943.
- "The Provincial Museum—Past and Present." G. Clifford Carl. Victoria Daily Times, March 13th, 1943.
- "Field Observations on the Forest Tent Caterpillar, *Malacosoma disstria* var. *eros* Stretch." George A. Hardy. Proceedings Entomological Society of B.C., Vol. 40, pp. 28-29, 1943.
- "Bracket Fungus—The Dryad's Saddle." George A. Hardy. Victoria Daily Times, February 6th, 1943.

"'Bandy'—The Varied Thrush." George A. Hardy. Daily Colonist, February 28th, 1943.

"From Forest to City." George A. Hardy. Victoria Daily Times, May 29th, 1943.

In addition to the above, the manuscript has been prepared for Handbook No. 3, "The Reptiles of British Columbia," which will be published in 1944. Material prepared by Miss Alice Ravenhill under the title "A Corner Stone of Canadian Culture" has been edited and prepared for publication as Occasional Paper No. 5. Handbook No. 1, "Fifty Edible Plants of British Columbia," by G. A. Hardy, published by the Museum in December, 1942, has met with a wide demand, possibly because it has been one of the first contributions to appear in this field. Copies have been supplied to various fortified points along the coast and also to branches of the Royal Canadian Air Force. Further copies were printed during the year to satisfy requests which are still being received.

The Provincial Museum is the subject of a chapter in "Ports of British Columbia," by Agnes Rothery, published in 1943 by McClelland & Stewart, Limited, Toronto.

#### ILLUSTRATIONS.

The major part of Mr. Beebe's time has been spent in producing illustrations. These have included representations of the snakes of British Columbia to be used in Handbook No. 3, some freshwater fishes and a series depicting local mushrooms, some of the latter being in colour. These diagrams and illustrations are to be used in publications now in the course of preparation.

Mr. Beebe has also prepared a set of title backgrounds in colour to be used in the motion-picture film now being prepared.

#### MOTION-PICTURES.

A motion-picture film in colour featuring the amphibians of the Province was commenced in 1942 and was added to during the past year through the co-operation of Mr. C. R. D. Ferris, of the British Columbia Government Travel Bureau. At the time of writing, this material has been edited and title backgrounds have been prepared, but the film will not be completed until early 1944.

Three more silent, black and white films have been added to the library by the purchase of the following:—

"Voracious Plants and Insects." Insect-eating plants and animals.

"Singing and Stinging." Life-history of the mosquito.

"Do you know Beans?" Germination of the bean seed.

A copy of the coloured film "Sea-birds," produced by the Museum in 1941, was loaned to the National Film Society of Canada for use in camps of the Royal Air Force in Eastern Canada. Up to December the film had been viewed by over 2,500 persons and the loan period was extended three months.

#### EDUCATION.

##### MUSEUM LECTURES.

Once again a series of illustrated lectures was given at the Museum for school children of the Greater Victoria area. Sound motion pictures were obtained for each lecture from the Vancouver School Board film library and talks were given by members of the Museum staff and by guest speakers. The lecture series was opened by the Honourable H. G. T. Perry, Minister of Education.

The following table summarizes the programme and attendance:—

*Museum Nature Talks, Saturday Mornings, 9.30 and 11.*

Date.	Subject.	Speaker.	Number of Children.
February 20.....	"How Plants Grow".....	Mr. William R. Foster.....	340
February 27.....	"Underwater Life".....	Dr. G. Clifford Carl.....	360
March 6.....	"Hide and Seek in Animal Land".....	Mr. George A. Hardy.....	435
March 13.....	"Buried Treasure".....	Major H. Nation.....	471
March 20.....	"Animals in Armour".....	Dr. G. Clifford Carl.....	382
March 27.....	"Indian Masks and Music".....	Dr. G. Clifford Carl.....	378
Total.....			2,366

We are again grateful to Mr. A. T. Goward, Vice-President of the British Columbia Electric Railway Company, for granting to children attending the lectures permission to travel to and from the Museum on school tickets. We also wish to thank Mr. Foster, of the Department of Agriculture, and Major Nation, of the Department of Mines, for their contribution to the programme, and Mr. Ferris, of the Department of Trade and Industry, for providing and operating the motion-picture projector.

#### SCHOOLS AND OTHER LECTURES.

The programme of illustrated lectures in the schools of the Victoria area commenced in the fall of 1942 was continued into the spring months of the following year. During this series the Director and the Botanist each visited the following schools: Burnside, George Jay, Margaret Jenkins, North Ward, Oaklands, Quadra, Sir James Douglas, South Park, and Victoria West.

Other lectures and illustrated talks have been given by the Director as follows: University Women's Club (January 16th); Lions Auxiliary (March 2nd); Y.M.C.A. (March 7th); Colwood School (March 22nd); Oak Bay P.T.A. (May 25th); Mount Douglas High School (May 31st and September 30th); St. Michael's School and Cloverdale School P.T.A. (October 6th); Duncan Consolidated School (October 26th); University of British Columbia Biological Discussion Club (December 1st); P.E.O. (December 7th), and by the Botanist at St. Michael's School (March 10th) and Colwood School (March 31st).

Early in July Mr. Hardy and Dr. Carl conducted groups of boys on two natural history outings in connection with the Vacation Club programme presented by the Y.M.C.A. under the direction of Mr. Archie Morrison. In August Dr. Carl also led a sea-shore group as part of the Playground activities at Windsor Park, Oak Bay, supervised by Mrs. E. J. Costain.

Included in the Vacation Club programme offered at the Y.M.C.A. building was a course in modelling and casting of natural history specimens given by Mrs. L. C. Sweeney, of the Museum staff.

#### STAFF CHANGES.

On February 15th Mr. E. A. Cooke retired from the Civil Service after an association of more than twenty-five years. As a member of the Museum staff he is well known to many Victorians and other visitors to the Museum where his knowledge of the natural history specimens and of the Indian material was often called into use. Members of the Museum staff and of other departments join in extending best wishes to Mr. Cooke.

In May Mr. Frank L. Beebe joined the staff to take on laboratory duties and the preparation of illustrations. In the latter field Mr. Beebe has had considerable experience in the use of the air-brush in depicting natural history specimens and has been

occupied in producing illustrations for Museum publications, as noted in a previous section.

During February, March, and April Mr. Charles D. Bury was employed to assist temporarily with duties connected with the Museum lecture series given at that time.

In December the temporary services of Mrs. H. Burt were acquired in mounting, labelling, and cataloguing plant specimens in the herbarium under the direction of Mr. Hardy.

During the year the janitor service of the Museum building was taken over by the Public Works Department. The efficient work of Mr. James Cruickshank is much appreciated and we are grateful to the Department of Public Works for his services.

#### ATTENDANCE.

During 1943 the number of visitors who registered at the Museum and the estimated attendance was as follows:—

	Registered.	Estimated.
January .....	1,692	2,741
February .....	2,269	3,744
March .....	2,562	4,187
April .....	3,050	5,140
May .....	2,983	4,888
June .....	4,302	5,518
July .....	5,725	9,460
August .....	7,195	9,848
September .....	4,847	6,161
October .....	3,298	3,786
November .....	1,985	2,786
December .....	1,365	2,006
Totals .....	41,273	60,265

To these figures are to be added 2,366 children who attended the lecture series during February and March and, in addition, forty-eight school classes, three British Columbia Police classes, and five Youth Tourist Clubs who registered during the year.

Compared with the 1942 attendance record the total number of visitors registering in 1943 showed an increase of 9,588 or over 30 per cent. This is the largest registration recorded by the Museum and the estimated attendance is also one of the largest on record.

The attendance record for the month of July has again been analysed by Mr. Pegler as follows:—

Residence.	Registration.	Residence.	Registration.
British Columbia .....	3,188	Washington .....	476
Alberta .....	420	Oregon .....	116
Saskatchewan .....	288	California .....	219
Manitoba .....	130	Other States .....	471
Ontario .....	136	Alaska .....	6
Quebec .....	51	Great Britain .....	119
New Brunswick .....	11	Other countries .....	52
Nova Scotia .....	22	Country not stated .....	11
Prince Edward Island .....	7		
Newfoundland .....	3	Total .....	1,470
Total .....	4,258	Grand total .....	5,728

Compared with a similar analysis of the July attendance of previous years the total number of registered visitors for this period is greater than in 1942 but less than

in 1941. It is interesting to note that the number of visitors from British Columbia has shown a considerable increase during both years. Many of these have been members of the armed forces and other newcomers to the Province.

## REPORT OF THE BOTANIST.

### ACTIVITIES.

The herbarium has been enriched by the addition of 909 herbarium sheets, each of which comprises one or more specimens, so that the total number handled is considerably in excess of this figure. To this also must be added 140 numbers of mushrooms and other fungi, bringing the whole from all sources up to 1,045 separate records.

Sheets filed and shelved in the classified series amount to 400, while as many or more have been mounted and await final disposition. The mounting has been considerably expedited with the help of Mrs. L. Sweeney.

Plants identified for inquirers, as distinct from those retained for the herbarium, number 325. This service has often entailed considerable time-consuming research where information apart from the name has been sought.

The seasonal wild flower exhibit has continued to be a popular attraction ever since its inauguration by the present botanist just twenty years ago. In this display a succession of plants is maintained throughout the year; spring and summer flowers give place to autumn fruits and berries, which in turn are followed by the evergreens of the winter season.

Special exhibits have been featured as opportunity or the exigency of the moment dictated. Thus garden weeds, water and marsh plants, forest berries, ferns and cone-bearing trees have been instances of this phase of presentation. At all times informative labels have been appended.

The collection of the local mushrooms and related fungi has been continued from the previous year. The autumn of 1943 has been exceptionally favourable to their development so that a proportionate amount of time has been devoted to the collecting, recording, preparation, and preservation of these perishable plants. It is hoped eventually to arrive at a definite conclusion as to the composition of our more conspicuous mushroom flora with a view to making the results accessible to the public in published form.

Mr. Joseph Ewan, of the University of Colorado at Boulder, has completed a review of our *Delphiniums* in connection with a larger study of the genus. Some forty sheets have thus been intensively studied and nomenclature brought up to date.

A certain amount of time has been spent in the preparation and delivery of lectures to schools and to articles for presentation or publication, as indicated elsewhere in this report.

A life-sized coloured chart of many useful and injurious mushrooms has been loaned through the generosity of Mr. W. R. Foster, Plant Pathologist of the Department of Agriculture. This very nicely supplements the models in the case near-by.

Mr. J. W. Eastham, Provincial Plant Pathologist, Vancouver, has generously contributed 180 sheets of specimens from various parts of the Province, most of them accompanied by valuable notes on habitat, occurrence, and taxonomy.

Mr. W. H. Mathews, Department of Mines, has been responsible for a collection of 225 sheets of plant specimens from the northern portion of the Province, in parts little visited from a botanical view-point.

Mr. J. A. Munro, Chief Federal Migratory Bird Officer for British Columbia, has placed at our disposal a series of sixty sheets from the central and eastern sections of the Province.

Dr. I. McTaggart Cowan, Department of Zoology, University of British Columbia, donated 175 sheets of most acceptable material from the border-line districts of this

Province and Alberta, much of it from high altitudes and containing many new acquisitions to the herbarium.

Mr. G. R. Wyatt, under the auspices of the Geological Survey in charge of Mr. N. C. Stewart, made an excellently prepared collection of fifty-five sheets from the Beaufort Range area of Vancouver Island.

Two Museum field-trips resulted in additional plant specimens. One to the Forbidden Plateau district of Vancouver Island yielded 200 sheets collected by Mrs. G. C. Carl. This is a representative assemblage of the area concerned, particulars of which are contained in the special report elsewhere. The other collecting trip was to Cortes Island, where Mrs. L. Sweeney made a very acceptable gathering of sixty-two sheets, forty-seven from Cortes and fifteen from the near-by island of Mitlenatch, districts hitherto unrepresented by specimens in the herbarium.

In addition to the above, many short trips in the neighbourhood of Victoria were made by the Botanist, each of which has added to the quota of accessions for the year.

During the mushroom season much help has been given in the collection of material by Mr. A. Nicholls, of Duncan, who has spared no pains in effort or expense in shipping specimens to the Museum. Miss H. Hinder, of Victoria, has maintained an enthusiastic interest and has contributed many local species to our collection.

Mr. F. L. Beebe and Mrs. L. Sweeney, members of the Museum staff, have helped considerably by energetically giving of their spare time in collecting or observing the mushrooms in their respective localities.

Entomological work took up a percentage of the Botanist's time.

#### ACKNOWLEDGMENTS.

It is with much pleasure that we have the privilege of extending our most cordial thanks and appreciation to all who have in any way contributed specimens, whether to the passing attraction of the wild flower exhibit or to the permanent herbarium collection. We are particularly indebted to the following specialists who have so kindly co-operated by giving of their time and knowledge to the identification, confirmation, and examination of critical material submitted:—

Dr. C. R. Ball, Plant Extension Service, United States Department of Agriculture, Washington, D.C.

Mr. J. W. Eastham, Provincial Plant Pathologist, Vancouver, B.C.

Dr. J. Walton Groves, Dominion Experimental Farm, Ottawa, Ont.

Mrs. H. Mackenzie, Victoria, B.C.

Dr. H. L. Mason, University of California, Berkeley, California.

Dr. Francis Pennell, Academy of Natural Sciences, Philadelphia, Pa.

Mr. A. E. Porsild, National Museum of Canada, Ottawa, Ont.

The following British Columbia plants have been added to the collection:—

*Potamogeton Friesii* Rupr. Lac la Hache, June 28th, 1942; G. A. Hardy.

*Potamogeton panormitanus* Biv. var. *minor* Biv. Lac la Hache, June 29th, 1942; J. A. Munro.

*Poa Canbyi* (Schribn.) Beal. Mount Tolmie, V.I., May 26th, 1942; J. W. Eastham.

*Carex microptera* Mack. Elgin, B.C., June 29th, 1942; J. W. Eastham.

*Carex pachystachya* var. *gracilis* (Olney) Mack. Victoria, May 22nd, 1942; J. W. Eastham.

*Carex paucifructus* Mack. Nelson, B.C., July 8th, 1942; J. W. Eastham.

*Carex praticola* Rydb. Nelson, B.C., July 12th, 1942; J. W. Eastham.

*Salix candida* Fluegge. Lac la Hache, July 1st, 1942; G. A. Hardy.

*Salix bebbiana* var. *perrostrata* (Rydb.) Schneider. Chezacut, B.C., 1940; F. M. Shillaker.

*Salix melanopsis* var. *Bolanderiana* (Rowlee) Schneider. Donald, B.C., July 21st, 1941; J. W. Eastham.

*Ranunculus pedatifidus* Smith. Crowsnest Pass, B.C., June 21st, 1942; Mary Johnstone.

*Agastache anethiodon* (Nutt) Brit. Prince George, July 30th, 1942; J. E. Murray per J. W. Eastham.

*Symphytum asperrimum* Don. Ladner, B.C., May 26th, 1942; J. W. Eastham. Naturalized from Europe.

*Potentilla argentea* L. Cranbrook, B.C., July 30th, 1942; W. B. Johnstone.

*Pentstemon acuminatum* Dougl. Crowsnest Pass, B.C., June 21st, 1942; W. B. Johnstone.

The following plant is not known to have been hitherto recorded from North America:—

*Corrigiola littoralis* L. Vancouver, B.C., August 25th, 1943; J. W. Eastham (collected by W. Sandall). This plant was identified for Mr. Eastham at the University of Wisconsin. It is suggested that it may have been introduced with nursery stock of European origin.

The following species are additions to the "Flora of Vancouver and Queen Charlotte Islands," 1921:—

*Poa Canbyi* (Schribn.) Piper. Mount Tolmie, V.I., May 20th, 1942; J. W. Eastham.

*Agrostis Thurberiana* Hitchc. Mount Copley, V.I., August 14th, 1942; J. W. Eastham.

*Carex pachystachya* var. *gracilis* (Olney) Mack. Victoria, May 28th, 1942; J. W. Eastham.

*Polygonum viviparum* L. Forbidden Plateau, V.I., August, 1943; Mrs. G. C. Carl.

*Pedicularis bracteosa* Benth. Forbidden Plateau, V.I., July 30th, 1942; J. L. Clark.

*Centaurea nigra* L. (introduced). Sidney, V.I., September 23rd, 1943; E. C. Shenstone.

*Erigeron compositus* Pursh. Forbidden Plateau, V.I., August, 1943; Mrs. G. C. Carl.

*Senecio pauciflorus* Pursh.; *Senecio pauciflorus* var. *fallax* Greenm. Forbidden Plateau, V.I., August 31st, 1943; Mrs. G. C. Carl.

*Solidago corymbosa* Nutt. Forbidden Plateau, V.I., August 31st, 1943; Mrs. G. C. Carl.

## REPORT OF THE ENTOMOLOGIST.

Activity in this section has been confined mainly to routine incidental to the preservation of the collection. Donations and inquiries were chiefly centred on those of economic importance or on those that arrested the attention of the casual observer, such as pests of the pantry and parlour, large showy silkworm moths or conspicuous long-horned beetles.

Several butterflies and beetles were taken at the Forbidden Plateau, for particulars of which see the account elsewhere in this report.

The Botanist, representing the Entomological interests of the Museum, attended the annual meeting of the British Columbia Entomological Society at Vancouver in March, where he delivered a paper on "Field Observations of the Tent Caterpillar."

### ACCESSIONS.

During 1943 the following numbers of specimens were added to the catalogued collections (figures in parentheses denote the total number on December 31st, 1943): Indian material, 32 (5,127); plants, 1,274 (16,516); mammals, 75 (5,204); birds, 109 (9,010); reptiles, 28 (256); amphibians, 51 (525); fishes, 35 (605).

The following list includes the names of contributors and the number and type of specimens contributed in 1943.

## ANTHROPOLOGICAL ACCESSIONS.

*Salishan (Coastal).*

By gift .....	5
Maurice Brenton per Arthur Peake, Duncan. One jadeite chisel.	
D. Cambrey, Victoria. One stone dish.	
John Coyne per Commissioner T. W. S. Parsons, Victoria. One dagger.	
Commissioner T. W. S. Parsons, Victoria. One knife.	
Arthur Peake, Duncan. One bone arrow.	

*Haida.*

By gift .....	3
Miss Kathleen Agnew, Victoria. Two woven hats.	
A. M. D. Fairbairn, Sooke. Small collection of Haida material.	

*Nootkan.*

By gift .....	2
G. A. Gibson, Victoria. One woven hat.	
Duncan McTavish, Victoria. One woven cedar bark rain-cape.	
By purchase .....	2
G. Murray, Victoria. One obsidian spear-head.	
Christie Indian School, Kakawis. One beaded belt.	

*Okanagan.*

By gift .....	1
A. M. D. Fairbairn, Sooke. Collection of material.	

*Other Tribes.*

By gift .....	6
Mrs. T. Stanage Boyle, Victoria. One embroidered bag (Ojibway tribe).	
Miss F. Fitz Gibbon, Victoria. One model of birch-bark canoe and four birch-bark baskets (made by Ontario Indians before 1830).	
By purchase .....	2
Mrs. M. Weekes, Regina, Sask. Two ceremonial pipes (Plains Indians).	

## BOTANICAL ACCESSIONS.

E. W. Abraham, Victoria, one; T. E. Astley, Victoria, six; I. McT. Cowan, Vancouver, 175; J. W. Eastham, Vancouver, 196; Miss A. Ewart, Victoria, three; George Fraser, Ucluelet, one; G. A. Gibson, Victoria, one; A. L. Grayling, Kaslo, one; B. Hartley, Klemtu, eleven; Miss H. Hinder, Victoria, collection of mushrooms; W. B. Johnstone, Cranbrook, seventy-eight; E. Lohbrunner, Victoria, three; W. H. Mathews, Victoria, 225; J. A. Munro, Okanagan Landing, sixty; A. Nicholls, Duncan, collection of mushrooms; R. T. Nippin, Saanich, five; S. A. Norwood, Quesnel, one; the late C. C. Pemberton per Miss E. M. Pemberton, Victoria, collection of wood-growth specimens; W. P. D. Pemberton, Victoria, four; C. W. Saunders, Victoria, one; F. M. Shillaker, Chezacut, nineteen; J. Stafford, Victoria, two; R. Stearns, Burns Lake, four; G. Tester, Victoria, one; D. O. Thomas, Victoria, one; Mrs. F. M. Wotherspoon, Victoria, nine; G. Wyatt per N. C. Stewart, Victoria, sixty.

## ZOOLOGICAL ACCESSIONS.

*Mammals.*

By gift .....	12
Maurice Black, Cortes Island, per Mrs. L. C. Sweeney. One porpoise skeleton.	
Pat Dunn, Victoria. One black bear.	
W. R. Hall, H.M.C.S. Telapus. One porpoise skull.	
L. Jobin, Williams Lake. Seven little brown bats, one lump-nosed bat.	
F. M. Shillaker, Chezacut. One mink skull.	

By the staff—		
F. L. Beebe	.....	1
G. Clifford Carl	.....	17

*Birds.*

By gift	.....	6
R. Brindle, Victoria.	One sooty grouse.	
L. J. Clark, Victoria.	One winter wren.	
H. H. Currie, Nelson.	Collection of bird-nests.	
E. G. Hart, Victoria.	One upper mandible of toucan.	
J. W. Speck, Victoria.	One red-winged blackbird.	
E. White, Victoria.	One surf scoter.	
By the staff—		
Mrs. L. C. Sweeney	.....	1
F. L. Beebe	.....	11
G. Clifford Carl	.....	2

*Amphibians and Reptiles.*

By gift	.....	149
Mrs. G. Ballantyne, Redonda Bay.	One red salamander.	
C. D. Bury, Victoria.	Three prairie rattlesnake-skins.	
I. McT. Cowan, Vancouver.	One fence lizard.	
H. H. Currie, Nelson.	One western skink.	
J. M. Elliot, Jordan River.	One clouded salamander.	
Arthur Frayne, Victoria.	One prairie rattlesnake-skin.	
G. P. Holland, Kamloops.	One desert gopher snake.	
W. F. Howell, Victoria.	One bullfrog.	
R. C. W. Lett, Gordon Head.	One garter snake.	
C. Lyons, Victoria.	One salamander.	
A. C. Mackie, Vernon.	One hundred and three rattlesnakes, one gopher snake, one blue racer.	
J. A. Munro, Okanagan Landing.	Two frogs.	
Mrs. H. C. Northcote, Cracroft.	Two clouded salamanders.	
John Stevens, Oliver.	Six tiger salamanders.	
Mrs. T. L. Thacker, Hope.	Four salamanders, one frog.	
G. A. Whatmough, Oakville, Ontario.	One western painted turtle, seven sala- manders, four newts, one garter snake, one snapping turtle, three snakes.	
By the staff—		
Mrs. L. C. Sweeney	.....	1
F. L. Beebe	.....	11
G. Clifford Carl	.....	40

*Fish.*

By gift	.....	36
John Bruce, Victoria.	One ratfish.	
Ray Butt, Glen Lake.	One carp.	
Consolidated Whaling Corporation, Victoria.	One sea-lamprey.	
M. Crammond, Victoria.	One clingfish, one sculpin.	
V. M. J. David, Vancouver.	One wolf-eel.	
W. M. Ferrier, Kamloops.	Two sockeye salmon, five wild goldfish.	
F. G. Forbes, Lac la Hache.	Nine chub, six Kamloops trout, four suckers.	
W. O. Quesnel, Dawson Creek.	One wall-eyed pike.	
John Robilliard per Askey's Fish Market, Victoria.	One king-of-the-salmon.	
J. C. Scott, Victoria.	One handsaw fish.	

A. A. Sherman, Cowichan Bay. One decorated blenny.	
G. V. Wilby, Vancouver. Two lantern-fish.	
By the staff—	
G. Clifford Carl .....	3

*Invertebrates.*

By gift .....	60
G. G. Aitken, Victoria. One wasps' nest.	
W. B. Anderson, Ucluelet. One beetle.	
Pupils of Redonda Bay School per Mrs. G. Ballantyne. One spider.	
Douglas Carbol, Victoria. One sea-urchin.	
Gerald Cruickshank, Laddie Gawthrop, Gordon More, and Gary Webster, Victoria. Eight black widow spiders.	
Miss E. Eley, Victoria. One spider.	
Mrs. W. H. Foote, Victoria. Furniture beetles.	
George Forbes, Lac la Hache. One moth, two beetles.	
W. H. Golby, Victoria. One sponge.	
W. K. Hardy, Victoria. One wasps' nest.	
E. C. Hart, Victoria. One beetle.	
Miss N. R. Hinds, Victoria. One spider.	
D. S. Hobbies, Victoria. One beetle.	
L. E. Johnson, Victoria. One scorpion.	
Mrs. E. Lane, Saanich. Tube of ship-worm.	
G. H. Lofts, Victoria. Caterpillar attacked by small black fly.	
E. Lohbrunner, Victoria. Four beetles.	
S. H. McCall, Victoria. One moth.	
Mrs. A. McCurdy, Victoria. One tapeworm.	
D. C. McDowell, Victoria. Mud-wasps' nests.	
O. F. Maisonville, Sointula. One turtle crab.	
G. Murew, Victoria. One beetle.	
S. L. Neave, Kyuquot. Four oyster-shells.	
J. C. Newmarch, Victoria. One tick.	
Mrs. H. C. Northcote, Cracroft. One bot-fly, two moths.	
Raymond Peterson, Victoria. One electric-light bug.	
W. E. Phillips, Victoria. One moth.	
W. H. A. Preece, Saanich. One beetle.	
Rendell Rhoades, Wilmington, Ohio. Collection of crayfish.	
Miss N. Russell, Victoria. One caterpillar, one spider.	
H. Sargent, Victoria. One lappet-moth caterpillar.	
A. A. Sherman, Cowichan Bay. Four box-crabs.	
Bernie Silsby, Victoria. One sea-urchin.	
Mrs. F. Skillings, Victoria. One moth.	
J. Stafford, Victoria. One moth.	
Mrs. T. L. Thacker, Hope. Two centipedes.	
E. White, Victoria. One moth.	
Thomas Widdowson, Read Island. Two fish-lice.	

*Palæontology.*

W. Taverner, Victoria. Collection of dinosaur bones from Alberta.

*Miscellaneous.*

Mrs. A. McCurdy, Victoria. Forty-three lantern-slides.  
The late C. C. Pemberton per Miss E. M. Pemberton, Victoria. Collection of lantern-slides.

## THE NATURAL HISTORY OF THE FORBIDDEN PLATEAU AREA, VANCOUVER ISLAND, BRITISH COLUMBIA.

BY G. CLIFFORD CARL, PROVINCIAL MUSEUM, VICTORIA, B.C.

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### INTRODUCTION.

The Forbidden Plateau is one of the most outstanding recreational areas on Vancouver Island. Situated only a short distance from the Island Highway and yet accessible only by trails, this park-like area has become more and more popular as an outdoors resort.

The name itself is intriguing and undoubtedly attracts many visitors who otherwise would pass it by. Based upon Indian legends which attribute mysterious and supernatural powers to the area the name suggests a "taboo" which arouses the curiosity. The Plateau was supposed to be the sequestered spot of medicine men; women and children disappeared when they visited the area; an unknown tribe was believed to live there. Such beliefs served to mark this upland area of lakes and mountains as forbidden ground.

Previous to 1925 the Plateau area was known only to prospectors and timber-cruisers, but since that time its recreational possibilities have been recognized and an increasing number of persons have visited the district each year.

In view of the growing interest in this area on the part of both local residents and tourists and in line with the policy of the Provincial Museum to carry on certain field-work each season it was decided to visit the Forbidden Plateau in 1943 to study the natural history of the region. For this purpose a Museum party consisting of the writer, Mrs. G. C. Carl, and Mr. Frank L. Beebe spent the period from August 23rd to September 2nd in the Plateau district collecting animals, plants, and natural history information. We were accompanied by Mr. L. J. Clark and Captain R. T. Brindle, both

of Victoria. Being thoroughly familiar with the district, Mr. Clark assisted us in many ways, both as guide and assistant collector, for which we are most grateful.

The services of Mr. J. Ward, of Dove Creek, who acted as packer in transporting our equipment and supplies to and from the Plateau are much appreciated. We are grateful also to Mr. E. Croteau, of Comox, for facilities placed at our disposal at Croteau Camp where we made our headquarters; to Mr. C. S. Wood, of Forbidden Plateau Lodge, for information and other assistance; to Mr. C. P. Lyons, Assistant Forester, Provincial Forest Branch, for data and suggestions; and to the various specialists named in the account to follow who assisted greatly in the identification of specimens.

The information concerning the natural history of the Forbidden Plateau area as gathered during our visit and as obtained from other sources is presented herein. This report, however, can not in any way be considered as exhaustive. Rather it should be looked upon as a preliminary account which may form a basis for future work in this interesting area.

## DESCRIPTION OF THE AREA.

### LOCATION AND SIZE.

The Forbidden Plateau is a district the centre of which lies approximately 16 miles west of Courtenay, Vancouver Island. In area it comprises about 100 square miles. Boundaries have not been defined since the Plateau lies within the Esquimalt & Nanaimo Railway land grant. However, in 1929 the greater part of the district known as the Forbidden Plateau was taken in as a part of the Strathcona Park Reserve in order to protect its wild-life population. The boundaries of this reserve were fixed by Order in Council approved January 17th, 1929, as follows:—

“Commencing at a point on the easterly shore of Buttle Lake where the easterly boundary of Strathcona Park intersects the said easterly shore of said lake; thence in a straight line in an easterly direction to the top of Mount Washington; thence in a straight line south-easterly to the top of Mount Beecher (Becher); thence astronomically west to the easterly boundary of Strathcona Park; thence northerly, following said easterly boundary to the point of commencement.”

Although this preserve as defined does not take in all the area usually considered to be part of the Forbidden Plateau it includes the district referred to in the present report.

### TOPOGRAPHY.

The use of the term “plateau” for this area is somewhat misleading since only a small part of the region is flat or plateau-like. In general it consists of a series of ridges, sloping wet meadows, and open park land at various elevations ranging from 3,500 to 4,000 feet. Towering above these general levels are several peaks such as Becher (4,538 feet), Indian Head (4,304 feet), Elma (4,519 feet), Washington (5,415 feet), Brooks (4,960 feet), Strata (4,722 feet), Jutland (6,003 feet), Castle Crag (5,700 feet), and Albert Edward (6,968 feet).

Cutting the southern boundary of the reserve is the deep valley of the Cruikshank River which flows at the bottom of a canyon with walls rising almost sheer for over 1,000 feet.

Numerous lakes, ponds, and streams form a confusing water-shed pattern draining to the sea by three routes; namely, via Cruikshank River to the south-east, Brown's River to the east, and Oyster River to the north.

### GEOLOGY.

In general terms the rocks of the Forbidden Plateau area fall into two main groups. The first and older group is an assemblage of volcanic rocks with some interbedded limestone, argillite, and quartzite, varying in age from late Palæozoic to Triassic and possibly Jurassic. These form the greater part of the Plateau. The second group,

of more recent origin, consists of sandstones, shales, and conglomerates of Upper Cretaceous age—the same as that which contains the important coal-beds of Cumberland and vicinity. The sedimentary rocks of this group are found in three isolated areas; the first includes the height of land between Harris Lake and Goss Creek; the second includes Strata Mountain and Mount Brooks; while the third consists of Mount Washington. These more or less pronounced elevations are separated by narrow areas of the older, underlying rocks exposed along intervening valleys. Fossils may be found in these Cretaceous sediments, particularly at Limestone Ridge just west of Helen Mackenzie Lake and at Mount Strata.

Mount Albert Edward is composed entirely of volcanic rocks, including pillow lava, andesite, dacite, and breccia cut by a variety of diabase and other basic dykes, all intruded by two or three small bodies and many associated dykes of granodiorite.

A few mineral deposits of some economic importance occur within the area. These include deposits of iron pyrites and small amounts of gold, silver and copper. (Data taken from Gunning, 1931.)

#### CLIMATE.

There is little information and there are no precise data available regarding the climate of the Forbidden Plateau area. From our own observations and from details supplied by others the climate appears to be more or less typical of sub-alpine regions with heavy precipitation mostly in the form of snow. Depths of 20 feet are said to be not uncommon in many parts of the Plateau and snow is present usually from the end of September until the end of May. Heavy rains may occur during the remaining months, although relatively fine weather is usually experienced during the month of August.

Certain indications of the severity of the winter may be seen in many parts of the Plateau. For example, the majority of the trees are of small size and have short, bushy branches characteristic of trees in regions of heavy snowfall. Moreover, the trees and shrubs growing on hillsides have their main trunks bent sharply down-hill just above the ground-level. This "elbowed" appearance is very striking on most steep slopes and apparently is induced by the pressure of snow which tends to slide to the valley below. The innumerable ponds and lakelets of shallow depth—i.e., less than 3 feet—are devoid of life except for a few insect larvæ and occasionally tadpoles of the tree-toad, *Hyla regilla*, apparently because they freeze solidly each winter. The banks of many of these small waterbodies and even of some of the larger lakes are often raised in ridges to form a lip higher than their surroundings seemingly by the force of expanding ice.

Despite the heavy precipitation the Plateau area does not appear to have suffered from floods and rapid run-offs. On the contrary, much of the area is exceedingly wet underfoot, even at the end of summer, indicating that the ground-cover is sufficient to retain and store water for long periods.

#### LIFE ZONES.

Within the Plateau area there are to be found several types of animal and plant life due largely to the varied climate resulting from differences in altitude between the valley bottoms and the mountain tops. Three belts or life zones may be distinguished; these are characterized as follows:—

*Canadian Zone.*—The forested belt covering the valleys, low ridges, and lower slopes of the mountains. The dominant trees in this zone are Mountain hemlock (*Tsuga Mertensiana*), Yellow cedar (*Chamæcyparis nootkatensis*), Douglas fir (*Pseudotsuga mucronata*), White pine (*Pinus monticola*), and Lovely fir (*Abies amabilis*). The dominant shrubs include rhododendron and several species of blueberries (*Vaccinium*). Animal species characteristic of this zone include the deer, bear,

Red squirrel, White-footed mouse, Ladder-backed woodpecker, Whiskey jack, Blue grouse, Northern raven, Oregon junco, Northwestern salamander, and Northwestern toad. While many of these plants and animals are commonly found in this zone they are not necessarily confined to it but may be found in adjoining zones as well.

*Hudsonian Zone.*—A comparatively narrow belt of dwarfed hemlock, Yellow cedar, and juniper in the timber-line region, which is about 5,000 feet in elevation in the Forbidden Plateau. Other dominant plants in this zone are heather (*Cassiope Mertensiana* and *Phyllodoce empetriformis*), teaberry (*Gaultheria ovatifolia*) and rhododendron (*Rhododendron albiflorum*). Among the animals the marmot is the most characteristic species found in this zone.

*Arctic-Alpine Zone.*—The treeless zone on mountain-tops above timber-line, ranging above 5,000 feet in the Forbidden Plateau area. Dominant forms in the plant kingdom here include *Saxifraga Tolmiei*, *Spiræa pectinata*, *Arenaria verna*, *Erigeron compositus*, *Phacelia sericea*, *Lomatium Martindalei* v. *angustatum*, and *Phlox diffusa* such as are found near the summit of Mount Albert Edward. Here also are found ptarmigan, pipits, and Rosy finches among the birds.

#### PLANTS.

The following list includes plant records from several sources. The names followed by catalogue numbers in parentheses are represented by specimens collected by the Museum party and now in the Museum herbarium. The majority of these specimens have been identified by Mr. George A. Hardy, of the Museum staff, to whom we are exceedingly grateful. The remaining specimens have been kindly identified by various specialists as indicated.

The arrangement is based on Henry's "Flora of Southern British Columbia and Vancouver Island," 1915, with slight changes in some instances. Common names are given wherever possible and in the case of specimens in the Museum's collections the catalogue numbers are supplied to facilitate possible future reference.

#### ALGÆ.

*Gloeotrichia echinulata* (J. E. Smith) P. Richter.

A colonial alga of the blue-green group found free-floating in Croteau Lake and no doubt in other lakes of the district.

*Sphærella nivalis* (Bauer) Summerfelt. Red Snow.

The patches of "red snow" commonly seen on Mount Albert Edward are produced by large numbers of minute, spherical plants, probably of the above species.

#### LICHENES. Lichens.

*Usnea florida* Arn. Old Man's Beard.

A light green lichen hanging in festoons from tree branches and dead snags.

*Alectora jubata* (Linn.).

A dark brown or black lichen frequently seen intermixed with the above-mentioned species.

#### HEPATICÆ. Liverworts.

The following list of liverworts known to occur in the Forbidden Plateau area has been kindly supplied by Mrs. Hugh MacKenzie, of Victoria, B.C.:—

*Lophozia Kunzeana* (Hub.) Evans.

*Lophozia alpestris* (Schleich.) Evans.

*Diplophyllum taxifolium* (Wahl.) Dum.

*Marsupella emarginata* (Ehrh.) Dum.

*Marsupella sullivantii* (De Not.) Evans.

## OPHIOGLOSSACEÆ. Adder's Tongue Family.

*Botrychium silaifolium* Presl. Grape Fern (15,868).  
Panther Lake.

## POLYPODIACEÆ. Fern Family.

*Cryptogramma acrostichoides* R. Br. Parsley Fern. (15,857A.)  
Croteau Camp; dry ridge.

*Dryopteris dryopteris* L. Oak Fern. (15,699.)  
Croteau Camp; damp hillside.

*Struthiopteris spicant* (L.) Scop. Grape Fern. (15,740.)  
Paradise Meadows.

*Athyrium filix-femina* L. Roth. Lady Fern. (15,700.)  
Croteau Lake; damp hillside.

*Cystopteris fragilis* (L.) Bernh. Bladder Fern. (15,741.)  
Paradise Meadows.

## SELAGINELLACEÆ.

*Selaginella Wallacei* Hieron.

## LYCOPODIACEÆ. Club Moss Family.

A few specimens of club mosses were collected; these were identified as follows by Mrs. Hugh MacKenzie:—

*Lycopodium annotinum* L.

*Lycopodium clavatum* L. Common Club Moss.  
Croteau Camp.

*Lycopodium lucidulum* L. var. *occidentalis*.

*Lycopodium alpinum* L.  
Mount Albert Edward.

*Lycopodium obscurum* L.

*Lycopodium complanatum* L.

*Lycopodium inundatum* L.

## CONIFERÆ. Pine Family.

*Juniperus communis* var. *montana* Ait. Juniper.  
Mount Albert Edward; not common.

*Chamæcyparis nootkatensis* (Lamb.) Spach. Yellow Cedar.  
Common throughout the lower parts of the Plateau.

*Pinus contorta* Dougl. Scrub Pine.

Lone individuals were seen at Paradise Meadows and stunted forms were present on Mount Albert Edward.

*Pinus monticola* Dougl. Western White Pine.  
Common.

*Abies amabilis* Forbes. Lovely Fir.  
Common.

*Tsuga Mertensiana* Carr. Mountain Hemlock.  
Common.

*Picea sitchensis* Carr. Sitka Spruce.  
Common throughout the lower levels of the Plateau.

## SPARGANIACEÆ. Bur-reed Family.

*Sparganium simplex* Huds. Bur-reed. (15,702.)  
Croteau Lake; backwater.

## GRAMINEÆ. Grass Family.

The grasses, sedges, and rushes have kindly been identified by Mr. J. W. Eastham, Provincial Plant Pathologist, Vancouver.

*Danthonia intermedia* Vasey. Wild Oat-grass. (15,733.)

Paradise Meadows and Murray Meadows.

*Calamagrotis canadensis* (Michx.) Beauv. Reed Bent Grass. (15,734.)

Murray Meadows and Paradise Meadows.

*Deschampsia atropurpurea* (Wahl.) Scheele. Mountain Hair Grass. (15,778.)

Murray Meadows and Mount Albert Edward.

*Agrostis exarata* Trin. Spike Redtop. (15,778A.)

Murray Meadows; alpine form.

*Agrostis thurberiana* Hitchc. Thurber Redtop. (15,778b.)

Murray Meadows.

*Hierochlæ odorata* (L.) Wahlenb. Sweet Grass. (15,782.)

Murray Meadows.

*Phleum alpinum* L. Mountain Timothy. (15,783.)

Murray Meadows.

*Glyceria pauciflora* Presl. (15,779.)

Murray Meadows.

## CYPERACEÆ. Sedge Family.

*Carex Hindsii* Clarke. Hind's Sedge. (15,735.)

Paradise Meadows and Croteau Lake; lake-shore.

*Carex physocarpa* Presl. (15,736.)

Paradise Meadows and Croteau Lake; lake-shore.

*Carex pyrenaica* Wahl. Pyrenæan Sedge. (15,810.)

Mount Albert Edward.

*Carex nigricans* Mey. Blackish Sedge. (15,811.)

Mount Albert Edward; lower slope.

*Carex limosa* L. Shore Sedge. (15,865.)

Panther Lake.

*Carex cephalantha* (Bailey) Bicknell. Larger Stellate Sedge. (15,866.)

Panther Lake.

*Carex spectabilis* Dewey. Showy Sedge. (15,789.)

Half Dome Ridge.

*Eriophorum polystachion* L. Cotton Grass. (15,857.)

Croteau Camp.

*Scirpus cæspitosus* var. *callosus* Bigel. Tufted Club-rush. (15,739.)

Paradise Meadows.

## JUNCACEÆ. Rush Family.

*Luzula Piperi* Coville. Piper's Wood-rush. (15,788.)

Half Dome Ridge and Mount Albert Edward; between rocks.

*Juncus Mertensianus* Bong. Merten's Rush. (15,738.)

Paradise Meadows and Croteau Lake; lake-shore.

*Juncus Drummondii* Meyer. Drummond's Rush. (15,813.)

Mount Albert Edward; in rocky earth pocket.

*Juncus ensifolius* Wiks. Three-stamened Rush. (15,849.)

Croteau Lake; along shore.

## LILIACEÆ. Lily Family.

- Smilacina sessilifolia* Nutt. Nuttall's Solomen's Seal. (15,859.)  
Croteau Camp; in woods.
- Veratrum viride* Ait. False Hellebore. (15,841.)  
Croteau Lake.
- Tofieldia intermedia* Rydb. False Asphodel. (15,762.)  
Murray Meadows, Paradise Meadows, and Croteau Lake.
- Stenanthium occidentale* (Gray) Rydb. Mountain Bells. (15,861.)  
Paradise Meadows and Croteau Lake; wooded hillside.
- Lilium columbianum*. Wild Tiger-lily (15,727.)  
Paradise Meadows.
- Clintonia uniflora* (Schult.) Kunth. Queen Cup.

## ORCHIDACEÆ.

- Habenaria stricta* Lindl. Slender Bog Orchid. (15,698.)  
Croteau Camp; bog.
- Habenaria dilatata* (Pursh) Hook. Boreal Bog Orchid. (15,752.)  
Croteau Camp; lake-shore.
- Spiranthes Romanzoffiana* Cham. Ladies' Tresses. (15,826.)  
Brink of Cruikshank Canyon and Paradise Meadows.
- Listera nephrophylla* Rydb. Heart-leaved Twayblade. (15,725.)  
Paradise Meadows; wooded slope.

## SALICACEÆ. Willow Family.

(Identified by Dr. C. R. Ball, U.S. Department of Agriculture, Washington, D.C.)

- Salix mackenziana* (Hooker.) Barratt. (15,759.)  
Murray Meadows and Croteau Lake; not common.

## BETULACEÆ.

- Alnus sitchensis* (Regel.) Sarg. Green Alder. (15,695.)  
Croteau Camp; fairly common.

## POLYGONACEÆ. Buckwheat Family.

- Polygonum viviparum* L. Alpine Bistort. (15,707.)  
Near Croteau Lake and Murray Meadows.
- Polygonum minimum* Wats. Leafy Knotweed. (15,824.)  
Brink of Cruikshank Canyon.
- Oxyria digyna* (L.) Campdera. Mountain Sorrel. (15,790.)  
Half Dome Ridge.

## CARYOPHYLLACEÆ. Pink Family.

- Silene acaulis* L. Moss Champion. (15,776.)  
Mount Albert Edward.
- Arenaria verna* L. Sandwort. (15,775.)  
Mount Albert Edward; summit.

## RANUNCULACEÆ. Buttercup Family.

- Anemone multifida* Poir. Wind Flower. (15,769.)  
Mount Albert Edward; near summit.
- Caltha leptosepala* D.C. Mountain Marsh Marigold. (15,709.)  
Croteau Lake.



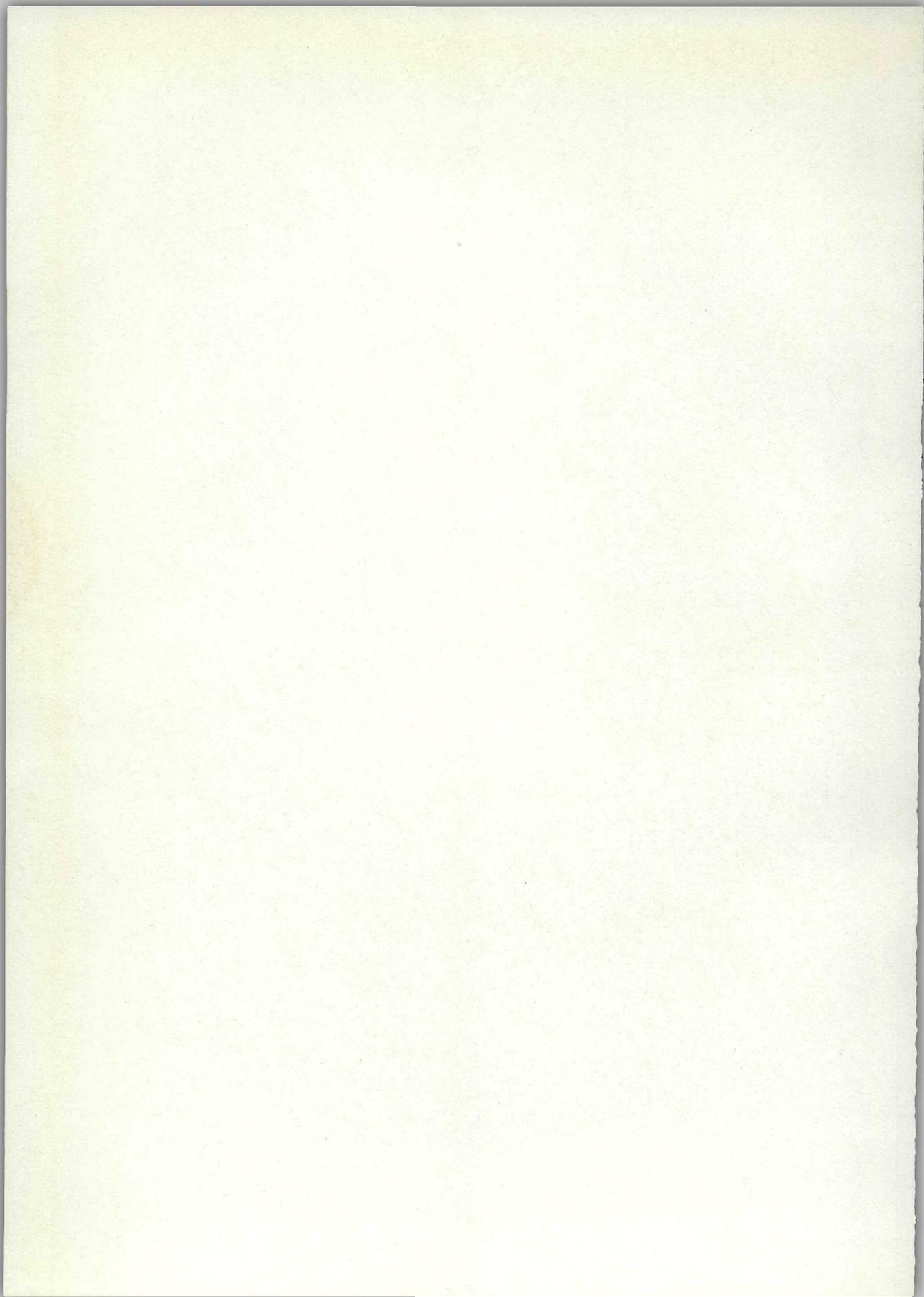
(Courtesy B.C. Government Travel Bureau.)

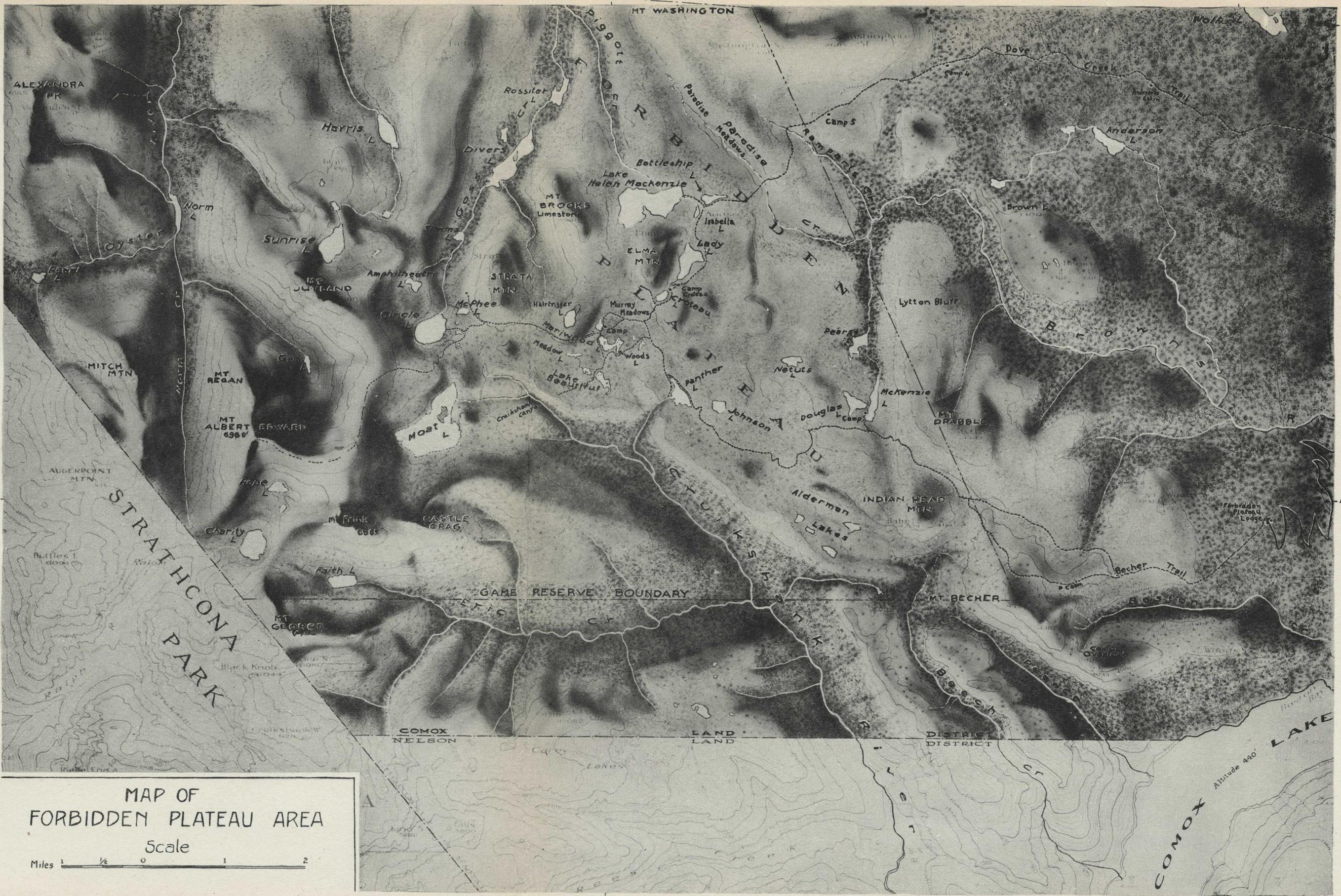
Hairtrigger Lake, Forbidden Plateau; Mount Albert Edward and Mount Regan  
in the background.



(Courtesy B.C. Government Travel Bureau.)

Mariwood Lake and Woods Lake, Forbidden Plateau; Cruikshank Canyon in  
right background.





MAP OF  
FORBIDDEN PLATEAU AREA  
Scale  
Miles 1 1/2 0 1 2

COMOX  
Altitude 440'  
LAKE

*Trollius laxus* Salisb. (15,784.)

Murray Meadows; in marshy ground.

*Aquilegia formosa* Fischer. Columbine. (15,867.)

Panther Lake; in flower by streamside.

*Actæa arguta* Nutt. Baneberry. (15,723.)

Mount Strata.

*Coptis trifoliata* Salisb. Gold-thread. (15,745.)

Paradise Meadows.

CRUCIFERÆ. Mustard Family.

*Arabis Drummondii* Gray. Drummond's Rock-cress. (15,721.)

Mount Strata.

*Erysimum elatum* Nutt. Western Wallflower. (15,878.)

Mount Albert Edward; a sweet-smelling, conspicuous, yellow flower.

DROSERACEÆ. Sundew Family.

*Drosera longifolia* L. Sundew. (15,728.)

Paradise Meadows; a sticky secretion on the leaves serves to trap insects which in part supply the plant with nourishment.

CRASSULACEÆ. Orpine Family.

*Sedum divergens* Wats. Stonecrop. (15,805.)

Mount Albert Edward and Cruikshank Canyon.

SAXIFRAGACEÆ. Saxifrage Family.

*Ribes lacustre* Poir. Swamp Gooseberry. (15,817.)

Mount Strata; rock-slide.

*Parnassia fimbriata* Banks. Fringed Grass of Parnassus. (15,834.)

Murray Meadows, Paradise Meadows, and Croteau Lake.

*Mitella pentandra* Hook. Mitrewort. (15,701.)

Croteau Camp; streamside.

*Tiarella unifoliata* Hook. Simple-leaved Tiarella. (15,830.)

Croteau Camp; damp woods.

*Saxifraga Bongardi* Presl. Pursh. Bongard's Saxifrage. (15,703.)

*Saxifraga bronchialis* var. *austromontana* (Wiegand) Piper. (15,772.)

Mount Albert Edward; crevices of rock near summit.

*Saxifraga Tolmiei* T. G. Tolmie's Saxifrage. (15,806.)

Mount Albert Edward and Mount Strata.

ROSACEÆ. Rose Family.

*Rubus pedatus* Smith. Creeping Raspberry. (15,766.)

Croteau Lake.

*Sanguisorba sitchensis* Meyer. Burnet. (15,785.)

Murray Meadows and Paradise Meadows; both white and dark purple flowers are represented.

*Spiræa pectinata* T. G. Comb-leaved Spirea. (15,807.)

Mount Albert Edward and Croteau Lake.

*Spiræa Douglasii* var. *Menziesii* Presl. Hardhack. (15,869.)

Panther Lake.

*Potentilla palustris* L. Marsh Cinquefoil. (15,870.)

Panther Lake.

- Potentilla diversifolia* Lehm. (15,694.)  
Plateau above Cruikshank Canyon, Croteau Camp and Mount Albert Edward.
- Sibbaldia procumbens* L. Sibbaldia. (15,882.)  
Mount Albert Edward.
- Pyrus occidentalis* Wats. Mountain Ash. (15,840.)  
Croteau Trail.
- Amelanchier florida* Lindl. Saskatoon. (15,822.)  
Brink of Cruikshank Canyon.

## LEGUMINOSÆ. Pea Family.

- Lupinus latifolius* Agh. var. *columbianus* (Hel.) Lupine. (15,862.)  
Croteau Camp and Half Dome Ridge.

## EMPETRACEÆ. Crowberry Family.

- Empetrum nigrum* L. Crowberry. (15,732.)  
Paradise Meadows and Mount Albert Edward; locally common.
- Pachystima myrsinites* Raf. False Box. (15,823.)  
Edge of Cruikshank Canyon.

## HYPERICACEÆ. St. John's Wort Family.

- Hypericum anagalloides* C. & S. Bog St. John's Wort. (15,748.)  
Paradise Meadows and Lake Beautiful.

## ONAGRACEÆ. Evening Primrose Family.

- Epilobium latifolium* L. Broad-leaved Willow Herb. (15,879.)  
Mount Albert Edward.
- Epilobium alpinum* L. Alpine Willow Herb. (15,835.)  
Croteau Lake; streamside.

## UMBELLIFERÆ. Parsley Family.

- Lomatium Martindalei* var. *augustatum* C. & R. Alpine Fennel. (15,800.)  
Mount Albert Edward.
- Heracleum lanatum* Mich. Cow Parsnip. (15,761.)  
Murray Meadows.

## CORNACEÆ. Dogwood Family.

- Cornus unalaskensis* Ledeb. Bunchberry. (15,712.)  
Near Croteau Lake.

## ERICACEÆ. Heath Family.

- Vaccinium occidentale* A. Gray. Western Bog Bilberry. (15,692.)  
Mount Albert Edward, Croteau Camp, and Paradise Meadows.
- Vaccinium cæspitosum* Mich. Dwarf Bilberry. (15,693.)  
Croteau Camp, Plateau above Cruikshank Canyon, and Paradise Meadows.
- Vaccinium deliciosum* Piper. Blue-leaved Bilberry. (15,864A.)  
Croteau Camp.
- Vaccinium ovalifolium* Smith. Tall Blue Bilberry. (15,864.)  
Croteau Camp and Mount Albert Edward.
- Vaccinium membranaceum* Dougl. Mountain Bilberry. (15,891.)  
Croteau Camp and Mount Albert Edward; close to tree-trunk in shade. Leaves were also found in the crop of a Blue grouse.
- Pyrola asarifolia* Michx. Wintergreen. (15,710.)  
Croteau Lake.

- Pyrola minor* L. Lesser Wintergreen. (15,773.)  
Half Dome Ridge.
- Pyrola secunda* L. One-sided Wintergreen. (15,829.)  
Croteau Lake; damp woods.
- Cladothamnus pyrolæflorus* Bong. Copper Bush. (15,842.)  
Croteau Lake; along streams.
- Arctostaphylos uva-ursi* Spreng. Kinnikinick. (15,843.)  
Croteau Lake.
- Gaultheria ovatifolia* Gray. Western Teaberry. (15,696.)  
Croteau Camp and Paradise Meadows; on stream bank.
- Cassiope Mertensiana* Don. Moss Heather.  
Common in all areas; flowers, white.
- Phyllodoce empetrifloris* Don. False Heather.  
Common; flowers, pink.
- Phyllodoce glanduliflorus* (Hook) Cov. False Heather.  
Half Dome Ridge; flowers greenish-yellow.
- Kalmia polifolia* Wang. Pale Laurel. (15,860.)  
Croteau Camp.
- Rhododendron albiflorum* Hook. White-flowered Rhododendron. (15,855.)  
Croteau Camp; common, forming dense thickets. A large proportion of the leaves show a brilliant yellow spotting.
- Hypopites hypopites* (L.). Small Pinesap. (15,838.)  
Croteau Lake; in woods.

## PRIMULACEÆ. Primrose Family.

- Dodecatheon Jeffreyi* Moor. Shooting Star. (15,754.)  
Paradise Meadows.
- Trientalis arctica* Fisch. Northern Star Flower. (15,747.)  
Paradise Meadows.

## GENTIANACEÆ. Gentian Family.

- Gentiana sceptrum* Pall. Swamp Gentian. (15,729.)  
Paradise Meadows; common.
- Menyanthes crista-galli* L. Deer Cabbage. (15,763.)  
Croteau Lake.

## POLEMONIACEÆ. Phlox Family.

- Phlox diffusa* Benth. Phlox. (15,767.)  
Mount Albert Edward.

## HYDROPHYLLACEÆ. Water-leaf Family.

- Romanzoffia sitchensis* Bong. Cliff Romanzoffia. (15,770.)  
Mount Albert Edward; among rocks at summit.
- Phacelia sericea* Gray. Grey Phacelia. (15,887.)  
Mount Albert Edward; near summit.

## SCROPHULARIACEÆ. Figwort Family.

- Pentstemon Menziesii* Hook. Menzie's Beard-tongue. (15,818.)  
Mount Strata and Mount Albert Edward; rock-slide.

- Pentstemon diffusus* Dougl. Spreading Beard-tongue. (15,819.)  
Mount Strata; rock-slide.
- Veronica alpina* L. Alpine Speedwell. (15,836.)  
Croteau Lake and Half Dome Ridge.
- Veronica americana* Schwein. Brooklime. (15,765.)  
Croteau Lake.
- Mimulus Langsdorffii* Donn. Langsdorff's Monkey Flower. (15,786.)  
Murray Meadows.
- Castilleja miniata* Dougl. Common Paint-brush. (15,792.)  
Half Dome Ridge and Croteau Camp. Agrees with *crispula* of Piper.
- Castilleja rhexifolia* Rydb. Paint-brush. (15,844.)  
Croteau Lake.
- Pedicularis bracteosa* Benth. Bracted Lousewort. (15,714.)  
Croteau Camp; lake-shore.
- Pedicularis racemosa* Hook. Leafy Lousewort. (15,793.)  
Half Dome Ridge, Paradise Meadows, and Cruikshank Canyon brink.
- Pedicularis ornithorhyncha* Benth. Bird's-bill Lousewort. (15,808.)  
Mount Albert Edward and Half Dome Ridge.

## LENTIBULARIACEÆ.

- Pinguicula vulgaris* L. Butterwort. (15,821.)  
Hairtrigger Lake; wet ground. The thick, slimy leaves serve as insect-traps.

## RUBIACEÆ. Madder Family.

- Galium trifidum* L. var. *pacificum* Wiegand. Small Bedstraw. (15,750.)  
Paradise Meadows.

## VALARIANACEÆ. Valerian Family.

- Valeriana sitchensis* Bong. Valerian. (15,881.)  
Mount Albert Edward and Croteau Lake.

## CAMPANULACEÆ. Bluebell Family.

- Campanula rotundifolia* L. Bluebell. (15,704.)  
Lake Beautiful, Mount Strata, and Mount Albert Edward.

## COMPOSITÆ. Composite Family.

- Erigeron salsuginosus* (Richards.) Gray. Aster Fleabane. (15,713.)  
Croteau Lake, Half Dome Ridge, and Mount Albert Edward.
- Erigeron compositus* Pursh. Dwarf Mountain Fleabane. (15,871.)  
Mount Albert Edward.
- Solidago corymbosa* Nutt. Northern Goldenrod. (15,873.)  
(*S. multiradiata* var. *scopulorum* Gray and *S. algida* Piper, synonyms.)  
Mount Albert Edward.
- Achillea borealis* Bong. Northern Yarrow. (15,804.)  
Mount Albert Edward; near summit.
- Petasites frigida* (L.) Fries. Alpine Coltsfoot. (15,777.)  
Murray Meadows.

- Arnica latifolia* Bong. Broad-leaved Arnica. (15,716.)  
Mount Albert Edward and Croteau Camp; streamside.
- Arnica mollis* Hook. Hairy Arnica. (15,802.)  
Mount Albert Edward.
- Senecio triangularis* Hook. Spearhead Ragwort. (15,717.)  
Croteau Lake.
- Senecio pauciflorus* Pursh. and  
*Senecio pauciflorus* Pursh. var. *fallax* Greenm. Few Flowered Ragwort. (15,771.)  
Mount Albert Edward and Half Dome Ridge.
- Luina hypoleuca* Benth. Silver-back. (15,691.)  
Plateau above Cruikshank Canyon.
- Antennaria media* Greene. Alpine Everlasting. (15,809.)  
Mount Albert Edward; near summit.
- Anaphalis margaritacea* var. *subalpina* Gray. Alpine Pearly Everlasting. (15,722.)  
Mount Strata.
- Agoseris aurantiaca* (Hook.) Greené. Golden Agoseris. (15,803.)  
Mount Albert Edward.
- Aster foliaceus* Lindl. Leafy Aster. (15,755.)  
Paradise Meadows.

## MISCELLANEOUS INVERTEBRATES.

## SPONGES.

*Spongilla* probably *lacustris* (Linn.). Fresh-water Sponge.  
Green, finger-like colonies of sponges were seen in several lakes, particularly Panther Lake and Lady Lake. In most cases the colonies were attached to submerged stones or sticks in water of medium depth.

## BRYOZOA, MOSS ANIMALS

*Plumatella repens* var. *fructosa* (Allman).

Colonies of this fresh-water bryozoan were found attached to stones and other supports in the shallows of Upper Lake Beautiful. These colonies resemble many branched rootlets, brownish in colour and forming small mats about one-quarter inch in thickness.

*Cristatella mucedo* Cuvier.

Colonies of this moss animal have the appearance of small gelatinous masses; they were found fastened to stones in association with the above-mentioned bryozoan.

The *Bryozoa* were identified by Dr. Mary D. Rogick, of the United States National Museum.

## LEECHES.

*Helobdella stagnalis stagnalis* (Linn.).

Specimens of this leech from Lady Lake were identified by Dr. Percy Moore, of the United States National Museum.

## MOLLUSCS.

*Ariolimax columbianus* (Gould). Pacific Giant Slug.

Many of these large slugs were seen on the Dove Creek Trail, but no specimens were observed on the Plateau itself.

*Prophysaon andersoni* (Cooper). Anderson's Slug.

Several specimens of this slug were found under decaying wood on damp hillsides near Croteau Lake. The species may be recognized by the diamond-mesh reticulations, the two dark bands on the mantle, and the light dorsal stripe posterior to the mantle. The largest specimen measured 1½ inches in length.

*Monodenia fidelis fidelis* (Gray). Common Snail.

This large land snail was seen on several occasions in various parts of the Plateau, usually in damp woods.

*Pisidium probum* Sterki and

*Pisidium pibula* Sterki. Fresh-water Clam.

These two species of small clams have been tentatively identified by Mr. H. B. Herrington, of Newburgh, Ont. Specimens were found in the silt in Lady Lake and in Croteau Lake; they are probably present in most of the lakes in the Plateau area.

In Croteau Lake these molluscs formed part of the diet of salamander larvæ.

#### CRUSTACEANS.

With the exception of the bottom-loving amphipods ("shrimps") the *Crustacea* of the Forbidden Plateau lakes are almost entirely composed of free-swimming forms such as water-fleas and copepods. These, together with other free-floating minute animals and plants, are usually termed "plankton" and provide a source of food for fish, particularly in the fry and fingerling stage. Samples were obtained from a few representative lakes on the Plateau by towing a fine-meshed net through the water or by pouring water through the net. Of the following records, those from McKenzie, Woods, Beautiful, Meadow, and Mariwood Lakes, and Mount Becher Pond are from samples collected in 1936 by Dr. W. A. Clemens, of the Department of Zoology, University of British Columbia; the remainder are from collections made by the writer in 1943.

#### *Water Fleas (Cladocera).*

*Sida crystallina* (O. F. Müller). McKenzie, Woods, Beautiful, Meadow, and Mariwood Lakes.

*Diaphanosoma brachyurum* (Lieven). McKenzie Lake.

*Holopedium gibberum* Zaddach. Panther and Croteau Lakes.

*Daphnia longispina* (O. F. Müller). Panther and McKenzie Lakes; Mount Becher Pond.

*Simocephalus serrulatus* (Koch). Mount Becher Pond.

*Scapholeberis mucronata* (O. F. Müller). Panther, McKenzie, Woods, Beautiful, Meadow, and Mariwood Lakes.

*Bosmina obtusirostris* Sars. Panther, Croteau, McKenzie, Woods, Beautiful, and Mariwood Lakes.

*Acroperus harpæ* Baird. Croteau, McKenzie, and Woods Lakes.

*Alona affinis* (Leydig). Panther, Woods, and Mariwood Lakes.

*Alona costata* Sars. Beautiful and Mariwood Lakes.

*Chydorus sphaericus* (O. F. Müller). Croteau, McKenzie, Beautiful, and Meadow Lakes; Mount Becher Pond.

*Polyphemus pediculus* (Linné). Panther, Croteau, McKenzie, Woods, and Beautiful Lakes; Mount Becher Pond.

#### *Copepods.*

*Diaptomus shoshone* Forbes. Panther, Croteau, and McKenzie Lakes.

*Diaptomus oregonensis* Lilljeborg. McKenzie Lake.

*Cyclops viridis* Jurine. Panther Lake.

*Cyclops serrulatus* Fischer. Croteau, McKenzie, Woods, Beautiful, and Meadow Lakes.

*Cyclops albidus* Jurine. Croteau, Woods, Beautiful, and Meadow Lakes; Mount Becher Pond.

*Amphipods.*

*Hyalella azteca* Saussure. Fresh-water Shrimp.

Shrimps were seen and collected in Lady Lake, Panther Lake, and Upper Lake Beautiful, where they were found among the stones in shallow water. Stomachs of trout taken from Upper Lake Beautiful contained numbers of shrimps, indicating that these crustaceans are an important article of food at this season.

INSECTS.

The following notes on insects of the Forbidden Plateau area were prepared by Mr. George A. Hardy, of the Museum staff. They are based on specimens collected by the Museum party in 1943 and on a collection made in 1930 and 1931 by Mr. J. D. Gregson, of the Livestock Insect Laboratory, Kamloops. We are much indebted to Mr. Gregson for permission to use the data supplied by his collection. We also wish to thank Mr. Hugh B. Leech, of the Dominion Entomological Laboratory at Vernon, and Mr. William Downes, Dominion Entomologist at Victoria, for identifying specimens.

BETLES.

*Cerambycidæ. Long-horned Beetles.*

*Ragium lineatum* L.

Croteau Camp, July 11th, 1930, J. D. Gregson.

*Pachyta armata* Lec.

On flowers of *Hieracleum lanatum* at Murray Meadows, August 31st, 1943.

*Evodinus vancouveri* Csy.

Croteau Camp, July 11th, 1930, J. D. Gregson.

*Anoplodera tibialis* (Lec.).

A species of high altitudes.

*Anoplodera chrysocoma* (Kby.).

*Anoplodera dolorosa* (Lec.).

Croteau Camp, July 10th, 1930, J. D. Gregson.

*Buprestidæ. Flat-headed Borers.*

*Melanophila Drummondii* Kby.

July 7th, 1931, J. D. Gregson.

*Cucujidæ. Cucujid Beetles.*

*Cucujus puniceus* Mann.

July 11th, 1930, J. D. Gregson.

*Elateridæ. Click-beetles.*

*Ludius resplendens* (Esch.).

From fish stomach and on herbage.

*Ludius lateralis* (Lec.).

From fish stomach, Panther Lake, August 24th, 1943.

*Ludius angusticollis* (Mann).

From fish stomach, Panther Lake, August 24th, 1943.

*Coccinellidæ. Ladybugs.*

*Hippodamia quinquesignata* Kby.

Mount Albert Edward, July 26th, 1931, J. D. Gregson.

*Cleis picta* (Rand).

Mount Albert Edward, July 26th, 1931, J. D. Gregson.

*Gyrinidæ. Whirligig Beetles.*

*Gyrinus picipes* Aubé.

Croteau Lake, September 1st, 1943.

*Dytiscidæ. Predaceous Diving Beetles.*

*Agabus tristis* Aubé.

Croteau Lake, September 1st, 1943.

*Agabus vancouverensis* Leech.

July 7th, 1931, J. D. Gregson.

*Acilius semisulcatus* Aubé.

Mount Strata, July 20th, 1931, J. D. Gregson.

*Carabidæ. Ground-beetles.*

*Carabus tædatus* Fab.

*Byrrhidæ. Pill-beetles.*

*Byrrhus kirbyi* Lec.

Mount Albert Edward, July 27th, 1931, J. D. Gregson.

*Pythidæ.*

*Priognathus monilicornis* (Rand).

Mount Albert Edward, July 21st, 1931, J. D. Gregson.

*Curculionidæ. Weevils.*

*Rhyncholus brunneus* Mann.

BUGS.

*Chlorochroa uhleri* Stal.

Mount Albert Edward, July 21st, 1931, J. D. Gregson.

*Aradus heidmanni* Bergr. Fungus Bug.

Mount Albert Edward, July 21st, 1931, J. D. Gregson.

BUTTERFLIES.

*Parnassius clodius a claudianus* Stich. Pellucid Parnassian.

The dark Vancouver Island and Lower Fraser Valley form; common on the open meadows.

*Neophasia menopia* F. & F. Pine White.

Abundant, particularly around pine-trees in which the caterpillars are found. Several adults were collected on the snow-fields of Mount Albert Edward.

*Dryas hydaspæ b. rhodopæ* Edw. Dusky Silver-spot.

Characteristic phase of Vancouver Island and Lower Fraser Valley, the latter being the type locality.

*Brenthis epithore* Edw. Western Fritillary.

A typical west coast butterfly, occurring from Alaska to California in hilly situations as distinct from plains and high mountains.

*Lycæna mariposa* Reak. Dusky Copper.

A mountain species, ranging from British Columbia to California; the clear ashy grey of the under-side of the hind wings is very distinctive.

*Lycæna helloides* Edw. Purple Copper.

A more common species elsewhere than the preceding one and of wider distribution, occurring from Vancouver Island to Iowa. Judging from specimens collected it would appear to be locally replaced by *L. mariposa*.

*Plebejus aquilo c. megalo* McD. Cascade Blue.

Essentially a northern species, occurring from Labrador to Arctic America; the race *megalo* is the south-western mountain phase occurring on most of the high mountains in the Province.

*Strymon melinus b. atrofasciata* McD. Grey Hair-streak.

Found throughout temperate America; the race is a western variation.

*Argynnis rhodope* Edw., tr. f. *gregsoni* Gunder.

Specimens of this form were collected by Mr. J. D. Gregson in 1931 on Mount Washington at 6,000 feet elevation and were described and named by Gunder (1936).

#### MOTHS.

*Trichodesia albovittata* Gn.

July 11th, 1930, J. D. Gregson.

#### FLIES.

*Tabanidæ. Horse-flies.*

Large numbers of a small tabanid fly were found in trout stomachs taken from fish caught at Circle Lake on August 29th, 1943.

#### FLEAS.

A few specimens of fleas collected from some of the mammals taken in the Forbidden Plateau area were sent to Mr. George P. Holland, of the Livestock Insect Laboratory, Kamloops, who has identified them as follows:—

*Opisodasys keeni* (Bak.).

*Catallagia charlottensis* (Bak.).

*Malaræus telchinum* (Roths.).

*Monopsyllus w. wagneri* (Bak.).

All taken from Vancouver Island white-footed mice from Croteau and Mariwood Camps.

*Thrassis spenceri* (Wag.).

From Vancouver Island marmot taken on Mount Washington.

#### VERTEBRATES.

##### FISHES.

*Salmo gairdneri kamloops* Jordan. Kamloops Trout.

The many lakes of the Plateau were apparently originally barren of sport fish, possibly because of insurmountable falls between them and the sea. A stocking programme therefore was commenced in 1929 when the Dominion Department of Fisheries planted 40,000 eyed eggs of Kamloops trout from Lloyd's Creek Hatchery in Panther Lake. This initial introduction was followed by other plantings from Penask Lake Hatchery as follows:—

In 1930: Circle (40,000); Francis (10,000); Isabella (20,000); Johnston (40,000); Mariwood (10,000); McKenzie (40,000); Meadow (40,000).

In 1931: Amphitheatre (40,000); Battleship (30,000); Bell (20,000); McPhee (10,000); Moat (30,000); Rolland (60,000) and Syms (10,000).

In 1932: Amphitheatre (30,000); Battleship (30,000); McPhee (24,000); Moat (30,000); Isabella (10,000); Johnston (3,000); Mariwood (30,000); McIntyre (30,000); Summit (6,000) and Sunrise (30,000).

In general the plantings have resulted in successful introductions; many of the lakes now provide excellent sport-fishing and in many the trout appear to be main-

taining the population by spawning in the tributary streams. In addition to the lakes into which eyed eggs were placed, the following bodies of water now contain trout: Croteau, Beautiful, Upper Beautiful, Helen Mackenzie, Pierce, and Lady.

In most lakes the fish are of small size, measuring between 8 and 10 inches in length. Large fish up to 15 lb. are reported to be present in Circle Lake and in Moat Lake.

An examination of stomach contents of a number of trout taken in Panther, Beautiful, and Circle Lakes during the last week of August revealed that the fish at that season were feeding mostly on insects taken from the surface of the water. The following kinds of insects were found:—

Panther Lake: Winged ants, wasps, leaf-hoppers, ground-beetles, click-beetles, stone-fly.

Lake Beautiful: Winged ants, ichneumon flies, horse-flies, click-beetles, dobson fly.

Circle Lake: Midge flies, horse-flies.

Stomachs from Lake Beautiful trout also contained numbers of fresh-water shrimp, *Hyaella azteca*, indicating that these *Crustacea* form an important part of the diet of the fish in this body of water.

*Cottus* sp. Sculpin.

An unidentified species of fresh-water sculpin is reported by Mr. Clark to be present in Panther Lake from observations made in 1942. No specimens were seen when a search was made in 1943.

This fish, if present, is probably the only species native to the area.

#### AMPHIBIANS.

*Ambystoma gracile* (Baird). Northwestern Salamander.

The Northwestern salamander appears to be abundant in the Forbidden Plateau area. The larvæ are particularly noticeable along the margins of lakes, especially by flashlight at night. At this time many larvæ from 3 to 6 inches in length may be seen lying motionless on the bottom or slowly moving along looking for food. When disturbed they dash off suddenly to disappear into the mud or under stones or other cover. At first sight they may be momentarily confused with fish but are easily distinguished by the presence of two pairs of legs and by the feather-like gills on either side of the neck.

The larvæ apparently transform to the adult stage toward the end of summer; eight or ten individuals, each still with gill-stumps showing, were found under logs and bark along the shore of Croteau Lake over a period of a few days during the last week in August.

Adults measuring about 5½ inches in length were found in several instances under logs on damp hillsides not far from the lake-shore. The colour patterns of these varied somewhat, a typical salamander being chocolate brown with bronze-coloured irregular spots on sides of head, body, and legs, with slate grey on the under-parts.

The greenish jelly-like remains of egg-masses of this salamander were observed in Panther Lake and in many ponds at Paradise Meadows; larvæ were collected in the latter area and in Croteau Lake. The main food of the larvæ in Croteau Lake appeared to be small clams (*Pisidium probum* and *P. pibula*) which were abundant in the bottom ooze.

*Ambystoma macrodactylum* (Baird). Long-toed Salamander.

An individual of this brightly coloured salamander was found associated with a Northwestern salamander under a log on a damp hillside near Croteau Lake on August 24th. The species has previously been reported from Forbidden Plateau by Brown and Slater (1939).

In life the present specimen was dark chocolate in colour with a bright greenish-yellow stripe down the back from the back of the head to the tip of the tail. Small irregular spots of the same colour were on the head and limbs while the sides and under-surfaces were speckled with small, whitish spots.

*Triturus granulatus granulatus* Skilton. Pacific Coast Newt.

Mr. Clark reports finding a newt in the stomach of a trout taken from Circle Lake.

*Bufo boreas boreas* Baird and Girard. Northwestern Toad.

By far the most widely spread amphibian in the area is the common toad. Individuals were seen in almost all parts of the Plateau, even near the summit of Mount Strata (at about 4,600 feet), in the rock-slide at the base of Strata and on Mount Washington. They were common along most trails and in thickets, sometimes some distance from ponds or lakes.

No tadpoles of the toad were seen but the adults probably spawn in both ponds and lakes soon after the ice leaves. Mr. Ward tells of seeing a migration of young toads across the trail some years ago toward the end of summer.

*Hyla regilla* Baird and Girard. Pacific Tree-toad or Tree-frog.

The tree-toad is common throughout the Plateau, particularly along lake-shores and stream edges. Adults were heard croaking on many occasions and both juveniles and adults were observed.

Tadpoles were numerous in small ponds in various parts of the Plateau; they were often seen crowded together in the shallow water of the margin, supposedly to take advantage of the warmer water, sunshine, and possibly greater food-supply. Larvæ with hind legs about half developed were present in most pools; tadpoles changing to the adult stage were seen in only a few cases. Since the majority of the individuals were just beginning to show development of the hind limb it seemed likely that many would be killed by the first freeze-up which usually occurs by mid-September.

Several tadpoles were seen in a small stream draining into Circle Lake, a most unusual habitat for this species. It is possible that they originated from a near-by pond draining into the stream.

#### REPTILES.

The reptiles are apparently represented in the area by garter snakes only, and these appear to be rare, since only one report is available of a snake being seen (Lake Beautiful, 1942, L. J. Clark).

#### BIRDS.

Only a very incomplete idea of the bird-life of the Forbidden Plateau area can be gained by a stay so short as ours and at only one season. However, the impression gained by our visit was that birds were remarkably few in number of species, despite the wide range of habitats and the apparently abundant food-supply. Common birds, such as robins, thrushes, Golden-crowned sparrows, and woodpeckers, which one might expect to find in numbers appeared to be either absent or extremely rare. Only a few water-birds were observed. The following annotated list is based on Mr. Beebe's notes, the writer's observations, and Sutton's published records for Paradise Meadows (1936).

*Gavia* sp. Loon.

An unidentified loon was seen flying on one occasion over Croteau Lake and was heard in other parts of the Plateau.

*Ardea herodias fannini* Chapman. Northwest Coast Heron.

Hérons are reported as being occasionally seen.

*Branta canadensis* (Linnæus). Canada Goose.

A flock of nine geese was seen or heard several times during our stay. The birds were first observed on Woods Lake on August 25th; they were seen or heard in flight on several later occasions, but not within range so that they could be identified as to subspecies.

*Glaucionetta clangula americana* (Bonaparte). American Golden-eye.

Three golden-eyes were seen on Lower Lake Beautiful on August 25th and a pair was observed on Hairtrigger Lake the following day. An immature bird, possibly a female, was present on Croteau Lake during our stay in camp. It apparently was unable to take off from the water.

*Astur atricapillus striatulus* Ridgway. Western Goshawk.

A goshawk was seen on more than one occasion during our visit.

*Accipiter velox velox* (Wilson). Sharp-shinned Hawk.

Several Sharp-shinned hawks were seen. On one occasion a pair were observed harrying two ravens which had been feeding upon a deer carcass at the foot of Mount Strata.

*Aquila chrysaetos canadensis* (Linnæus). Golden Eagle.

Pearse (1943) provides a possible sight record of this bird near Mount Albert Edward in August, 1924.

*Haliaeetus leucocephalus alascanus* Townsend. Northern Bald Eagle.

Two immature individuals were seen soaring over the western slope of Mount Elma.

*Falco columbarius suckleyi* Ridgway. Black Merlin; Black Pigeon Hawk.

A Black merlin was seen to chase Canada jays into cover on one occasion near camp. A second individual was seen pursuing a Blue grouse near the summit of Mount Washington.

*Dendragapus fuliginosus fuliginosus* (Ridgway). Blue Grouse; Sooty Grouse.

Blue grouse are common; individuals and small flocks were seen in all parts of the Plateau. Males were heard hooting on several occasions.

*Bonasa umbellus sabinii* (Douglas). Oregon Ruffed Grouse.

One individual only was seen below Paradise Meadows.

*Lagopus leucurus saxatilis* Cowan. Vancouver Island White-tailed Ptarmigan.

Ptarmigan are present on Mount Albert Edward above 5,000 feet elevation. A hen bird with three three-quarters-grown young was seen on the lower reaches of the ridge leading to the summit and two other adult birds were seen higher up, one almost at the peak. The adults were in preliminary winter plumage; that is, as follows: Ground colour of back and sides of breast rich brown mottled with black; feathers of wings, belly, legs, and tail, white. The coloration of the juveniles was brownish with dark and light brown barring on head, neck, and breast; the wing feathers only were white.

*Fulica americana* Gmelin. American Coot.

Coots or mud-hens were seen on McKenzie Lake by Mr. C. P. Lyons about September 23rd, 1941. They are probably regular visitors.

*Columba fasciata fasciata* Say. Band-tailed Pigeon.

Two individuals were seen at Croteau Lake. Sutton (1936) reports them to be present at Paradise Meadows.

*Nephæcetes niger borealis* (Kennerly). Black Swift.

Swifts were seen on one occasion, near the summit of Mount Washington. They probably also occur in other parts of the Plateau near the high peaks where strong updrafts carry food in the form of insects to a high elevation.

*Selasphorus rufus* (Gmelin). Rufous Hummingbird.

A hummingbird was seen at Panther Lake and at Half Dome near the lower slopes of Mount Albert Edward.

*Megaceryle alcyon caurina* (Grinnell). Western Belted Kingfisher.

Kingfishers are reported to be present by Mr. Lyons.

*Colaptes cafer cafer* (Gmelin). Red-shafted Flicker.

Several flickers were seen during our stay, but they do not appear to be common.

*Picoides tridactylus fasciatus* Baird. Alaska Three-toed Woodpecker; Ladder-backed Woodpecker.

This species has been reported from Paradise Meadows by Sutton (1936). It may be distinguished by the black back banded with broken white bars and by the presence of three instead of four toes; the male has a yellow cap.

A single bird, possibly of this species, was seen near Croteau Lake on August 30th.

*Empidonax hammondi* (Xantus). Hammond's Flycatcher.

This small flycatcher has been reported from Paradise Meadows by Sutton (1936).

*Perisoreus obscurus griseus* Ridgway. Gray Jay; Whiskey Jack; Camp-robber.

Jays are one of the most noticeable birds in the Plateau area due to their bold nature and fearless behaviour around camp. Their graceful gliding flight from tree to tree and the variety of their cries make them interesting if not welcome visitors.

Several immature birds of the year were noted at Croteau Camp; in these, the head and face were dark instead of light grey as in the adult.

*Cyanocitta stelleri stelleri* (Gmelin). Steller's Jay.

Individuals were seen on the trail below Paradise Meadows but none was noted on the Plateau.

*Corvus corax principalis* Ridgway. Northern Raven.

Ravens were one of the most conspicuous birds in the district, owing to their large size and raucous calls. A pair was observed almost daily at camp and others were seen in all parts of the Plateau, even near the summit of Mount Albert Edward. On one occasion a pair was disturbed in the act of feeding upon a dead deer near the foot of Mount Strata. As they wheeled overhead they were attacked by a pair of Sharp-shinned hawks which they easily eluded.

*Penthestes rufescens rufescens* (Townsend). Chestnut-backed Chickadee.

Chickadees were numerous in the area; they were seen in all the wooded sections of the area, usually in flocks.

*Sitta canadensis* Linnæus. Red-breasted Nuthatch.

Nuthatches were heard calling "quank, quank" in all parts of the Plateau, usually in company with chickadees. No specimens were collected for identification; it is believed those of the Plateau belong to this species, since birds of this species are known to occur in Mount Arrowsmith vicinity.

*Cinclus mexicanus unicolor* Bonaparte. American Dipper.

Dippers are occasionally seen along streams.

*Nannus hiemalis pacificus* (Baird). Western Winter Wren.

Winter wrens appeared to be common in the area.

*Turdus migratorius propinquus* Ridgway. Western Robin.

A robin was heard on only one occasion. They appear to be uncommon in the Plateau area.

*Ixoreus naevius naevius* (Gmelin). Pacific Varied Thrush.

Several birds were seen about Croteau Camp.

*Hylocichla guttata nanus* (Audubon). Dwarf Hermit Thrush.

One individual only was seen, near Croteau Lake.

*Regulus satrapa olivaceus* Baird. Western Golden-crowned Kinglet.

These birds were noted on several occasions, often associated with chickadees. They were also observed at Paradise Meadows by Sutton (1936).

*Anthus spinoletta rubescens* (Tunstall). American Pipit.

Pipits were seen in a flock on the slope of Mount Albert Edward at about 5,000 feet elevation. In all likelihood these birds breed in this region. They are easily distinguished by the long bill, the long hind claw, and the skylark-like habit of mounting and singing high in the air.

*Dendroica townsendi* (Townsend). Townsend's Warbler.

Warblers of this species have been reported from Paradise Meadows (Sutton, 1936).

*Leucosticte tephrocotis tephrocotis* (Swainson). Gray-crowned Rosy Finch; Leucosticte.

Several rosy finches were observed on Mount Albert Edward, one of them at the very summit. The birds were exceedingly shy, flitting from rock to rock or diving from the sheer face into space at the approach of a human. This bird is not likely to be confused with any other in this habitat; it is easily recognized by the suffusion of light rose colour over rump, flanks, abdomen, and the greater part of the wings. It probably breeds on Mount Albert Edward.

*Spinus pinus pinus* (Wilson). Northern Pine Siskin.

Several flocks of siskins were seen about camp and in other parts of the Plateau.

*Junco oregonus oregonus* (Townsend). Oregon Junco.

Juncos were common; a flock visited camp almost daily in the early morning. Fledglings just learning to fly were seen at Croteau Lake on August 29th.

#### MAMMALS.

*Myotis lucifugus* (Le Conte). Little Brown Bat.

Bats, possibly of this species, were seen at Panther Lake on two occasions; no specimens were obtained for positive identification.

*Euarctos americanus vancouveri* Hall. Vancouver Island Black Bear.

Bears are common throughout the Plateau area. Signs of their presence were seen in almost all parts, and individuals were seen at Panther Lake and at Paradise Meadows. It is said that in blueberry season bears are commonly seen in the open feeding upon the fruit.

*Martes caurina vancouverensis* Grinnell and Dixon. Vancouver Island Pine Marten.

Marten are probably occasionally present in the Forbidden Plateau area. An individual was seen on the Dove Creek Trail below Camp 5 by Mr. Clark in 1942.

*Mustela vison evagor* Hall. Vancouver Island Weasel.

An individual in summer pelage was found one morning at camp, drowned in a water-bucket. The animal had apparently fallen in while examining a freshly used landing-net hanging on the cabin wall above the bucket.

*Canis lycaon crassodon* Hall. Vancouver Island Wolf.

Wolves apparently pass through the district occasionally. From the presence of tracks and a "deer kill" a wolf was known to have been present in the Plateau in 1936 according to Mr. Ward.

About 1933 Mr. J. Cecil ("Cougar") Smith, of Campbell River, shot a female at Mount Washington and reared four cubs found in the litter.

*Felis oregonensis vancouverensis* Nelson and Goldman. Vancouver Cougar.

Cougars are apparently occasionally present in the Plateau area. Fresh tracks were seen on Mount Elma and on the trail below Paradise Meadows, and the remains of a deer possibly killed by a cougar were seen on Paradise Meadows.

*Marmota vancouverensis* Swarth. Vancouver Island Marmot.

Marmots are known to be present on Mount Washington and Mount Strata within the Plateau area. The colony on Mount Washington appears to be quite small, occupying an area of open country on the southern slope at about 5,000 feet elevation. Here there are a number of burrows and other signs of marmot activities.

The animals are very dark in appearance; except for a white spot on the forehead and a white streak down the mid-line of the belly, the fur is almost black with a few grizzled hairs around the shoulders of adults. A large male may be over 2 feet in length. Their chief food appears to be blueberry shrubs (*Vaccinium*). Like other ground-squirrels this rodent has a loud chirping call and a piercing whistle of alarm.

Only one burrow appeared to be occupied in the small colony on Mount Strata slope. A lone individual was seen there in 1942 by Mr. Clark, but no animals were noted during our visit.

*Sciurus hudsonicus vancouverensis* Allen. Vancouver Red Squirrel.

Squirrels were not commonly seen, although heaps of cone fragments and ground workings at the bases of trees were numerous; individuals were observed on only a few occasions.

*Peromyscus maniculatus interdictus* Anderson. Vancouver Island White-footed Mouse.

Several mice of this subspecies were taken at Croteau and Mariwood Camps. They are apparently common in the Plateau area, but appear to be most abundant around the cabins, where they occasionally do some damage to foodstuffs and stored blankets.

The original specimens described by Anderson (1932) were collected on the Forbidden Plateau by Mr. Hamilton M. Laing, of Comox.

*Microtus* sp. Meadow Mouse.

Burrows, runs, droppings, and an abandoned nest indicated that meadow mice were present at Paradise Meadows, but no specimens were taken.

*Ondatra zibethica osoyoosensis* (Lord). Rocky Mountain Muskrat.

Signs of muskrat activities in the form of cut grasses and sedges and burrows in the bank were noted in sloughs at Paradise Meadows. One individual was seen.

The muskrat is not native to Vancouver Island; it was introduced some years ago and is slowly spreading through all water systems suitable to its well-being. It has apparently reached Paradise Meadows within recent years since it has not been noted previously.

*Odocoileus hemionus columbianus* (Richardson). Coast Deer.

Deer are common throughout the Plateau region. Lone individuals and groups of two or three were seen on several occasions.

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