

PROVINCE OF BRITISH COLUMBIA

REPORT

OF THE

PROVINCIAL MUSEUM

OF

NATURAL HISTORY

AND

ANTHROPOLOGY

FOR THE YEAR 1942



PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C. :
Printed by CHARLES F. BANFIELD, Printer to the King's Most Excellent Majesty.
1943.

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 1942.

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., December 31st, 1942.

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 1942.

I have the honour to be,

Sir,

Your obedient servant,

G. CLIFFORD CARL,
Director.

7

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* (from April 1st).

GEORGE A. HARDY, *Botanist.*

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

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

H. H. PEGLER, *Attendant.*

E. A. COOKE, *Laboratory Assistant and Attendant.*

F. L. BEEBE, *Artist* (November and December).

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.

ADMISSION.

The Provincial Museum is open to the public from 9 a.m. to 5 p.m. daily and from 1 p.m. to 5 p.m. on Sundays.

Admission is free.

5

DEPARTMENT OF EDUCATION

The Honourable H. G. T. Prater, Minister

Dr. S. J. Willis, Superintendent

PROVINCIAL MUSEUM OF NATURAL HISTORY AND ANTHROPOLOGY

Staff

- G. Gifford, Curator (from April 1st)
- George A. Hart, Botanist
- William C. Swann, Assistant Curator (Antiquities)
- Marion C. Smith, B.A., Curator (Invertebrates)
- H. H. Taylor, Assistant
- R. A. Cook, Laboratory Assistant and Assistant
- F. J. Brown, Artist (November and December)

PROVINCIAL MUSEUM OF NATURAL HISTORY AND ANTHROPOLOGY

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CONTENTS.

	PAGE.
Report of the Director.....	9
Exhibition and Preparation.....	9
Loan Exhibits and Museum Displays.....	9
Field-work.....	10
Publications.....	10
Motion-picture Production.....	11
Education.....	11
Air-raid Precautions.....	13
Administrative and Staff Changes.....	14
Structural Changes.....	14
Attendance.....	15
Report of the Botanist.....	16
Report of the Entomologist.....	19
Accessions to the Museum.....	20
Report on a Collecting Trip to the Lac la Hache area, British Columbia, by G. Clifford Carl and George A. Hardy.....	25

CONTENTS

PAGE	
2	Report of the Director
3	Exhibitions and Restoration
7	Loan Exhibits and Museum Displays
20	Field-work
26	Publications
27	Section on the Evolution
28	Education
29	Administrative Recruitments
33	Administrative and Staff Changes
34	Structural Changes
35	Attendance
36	Report of the Botanist
36	Report of the Entomologist
36	Accessions to the Museum
37	Report on a Collecting Trip to the Lac de Haché area, British Columbia, by G. C. S. Ford and George A. Hardy

REPORT of the PROVINCIAL MUSEUM FOR THE YEAR 1942.

REPORT OF THE DIRECTOR.

The year 1942 has been an eventful and fruitful period for the Provincial Museum from several standpoints. The work accomplished and the changes that have taken place during this year are briefly reviewed in the following pages.

EXHIBITION AND PREPARATION.

A few additions have been made to the exhibition material. Outstanding, perhaps, is the fine specimen of grizzly bear taken by Mr. J. F. Stanwell-Fletcher in the Driftwood River area of British Columbia in October, 1938, and mounted by Mr. R. J. Pop, of Vancouver, B.C. This animal replaces the old specimen which has been on display for many years.

Another model by Mrs. Sweeney has been added in the form of an enlarged replica of a female Black widow spider and egg-sac. The model has been constructed many times life size to show the characteristic features of this notorious creature.

During the year Mrs. Sweeney has also constructed several more fish models, including the following: Rainbow trout, cut-throat trout, kokanee, black crappie, mackerel shark, black cod, true cod, fringed sole, dogfish, northern shiner, yellowtail rockfish, black rockfish, bocaccio, butterfish, marine sunfish, and king-of-the-salmon. The latter model has recently been placed on display and has aroused considerable interest because of its unusual appearance.

The exhibit of living animals has been maintained by Mr. Pegler and continues to attract considerable attention and comment. Recent additions to this section are a juvenile flying squirrel and several reptiles, including a rattlesnake taken at Osoyoos, B.C. The latter were presented by Mr. George Holland, of Kamloops. The rattlesnake has aroused a great deal of interest, no doubt because it sounds its rattle when approached.

The display of living trout and salmon eggs and the resulting fry has been maintained and has continued to receive much attention from visitors. We would like to express here our thanks to the Provincial Game Commission who has supplied us with Kamloops trout eggs and to Mr. E. V. Epps, of the Cowichan Lake Hatchery, Fisheries Research Board of Canada, who has gone to some trouble to provide eggs of coho salmon for this exhibit.

The display of living wild flowers and other plants of British Columbia, arranged and maintained by Mr. Hardy, has been of special interest this season, since it featured plants which could be used as food and beverage substitutes.

LOAN EXHIBITS AND MUSEUM DISPLAYS.

Indian material from the Museum collection was again loaned for exhibition purposes to the following:—

Calgary Exhibition and Stampede—July 6th to 11th.

Nineteenth Annual Women's International Exposition of Arts and Industries, New York City—November 19th to 24th.

In April the Director attended the British Columbia Teachers' Convention at Vancouver and placed on display two portable exhibition cases as examples of a type of loan exhibit being prepared for school use.

During the period May 1st to 10th an exhibit of art and handicrafts of British Columbia Indian children was on display in the Museum. The material consisted of art work in the form of drawings, paintings, designs, and handicrafts such as bead-work, wood-carving, and embroidery. The schools represented in the exhibition included the following: Songhees Indian Day School, Victoria (Miss K. Keeble, teacher); St. Catherine's School, Duncan; Christie Indian School, Kakawis, west coast of Vancouver Island; Tsartlip Indian School, Brentwood Bay (Mrs. Mary Ormond, teacher); Kootenay Residential School, Cranbrook; Seton Lake School, Shalalth; Inkameep School, Oliver (Anthony Walsh, teacher). The exhibition was sponsored by the Society for the Furtherance of British Columbia Indian Arts and Crafts of Victoria, B.C., under the distinguished patronage of Lieutenant-Governor and Mrs. W. C. Woodward.

During the last two weeks in November (16th to 30th) an exhibition of Indian portraiture by Mrs. Mildred Valley Thornton was held in the Museum. The display included thirty-one oil paintings of both British Columbia and plains Indians, representing many tribes. Dr. S. J. Willis, Superintendent of Education, formally opened the exhibition and introduced the artist who was also present.

FIELD-WORK.

Two expeditions were made during the year for the purpose of acquiring fresh material for the Museum. In May a trip was made to the Lower Fraser Valley by the Director, in company with Dr. Ian McTaggart Cowan, of the Zoology Department, University of British Columbia. Areas visited included Burnaby Lake, Hatzic Lake, Nicomen Island, Cultus Lake, and Abbotsford. A visit was also made to Woodlands, on the North Arm of Burrard Inlet. Among the specimens collected, which were new to the Museum, were black crappies (*Pomoxis nigro-maculatus*), giant salamander larvæ (*Dicamptodon ensatus*), bullfrogs (*Rana catesbeiana*), and tailed toads (*Ascaphus truei*). The facilities and courtesies extended by Mr. and Mrs. Fred Martin, of the Smith Falls Hatchery, Cultus Lake, were greatly appreciated.

Toward the end of June the Director and Mr. Hardy made a trip to the Lac la Hache area in the Cariboo, a district not well represented in the Museum collections. The results of this field-trip are presented in a separate account in this report.

During the year other short trips were made for the purpose of gathering exhibition material, but in general the Museum truck was used less than usual to conserve gasoline and tires.

PUBLICATIONS.

During the year several articles and other publications have originated from the Museum. These are as follows:—

- "An easily made vivarium." G. Clifford Carl, *Canadian Nature*, Volume 4, No. 1, p. 10, Jan.-Feb., 1942.
- "The long-toed salamander on Vancouver Island." G. Clifford Carl, *Copeia*, No. 1, p. 56, 1942.
- "The Western spadefoot toad in British Columbia." G. Clifford Carl, *Copeia*, No. 2, p. 129, 1942.
- "Another record of the King eider in British Columbia." G. Clifford Carl, *Murrelet*, Vol. 23, p. 62, 1942.
- "*Polygala vulgaris* new to the North American flora." G. A. Hardy, *Rhodora*, Vol. 44, No. 517, pp. 9-10, 1942.
- "The Black witch moth, *Erebus odora* (L.), in British Columbia." G. A. Hardy, *Proceedings Entomological Society of B.C.*, Vol. 39, pp. 7-9, 1942.
- "Notes on some wood-boring beetles of Saanich, Vancouver Island, B.C. (Coleoptera, Cerambycidæ, and Buprestidæ)." G. A. Hardy, *Proceedings Entomological Society of B.C.*, Vol. 39, pp. 9-13, 1942.

"Food and drink for the picking." G. A. Hardy, *Victoria Daily Times*, September 12, 1942. *The Daily Colonist*, September 13 and 20, 1942.

"Fossil and subfossil mammals from the Quaternary of British Columbia." Ian McTaggart Cowan. *Transactions Royal Society of Canada*. 3rd Series, Section 4, Vol. 25, pp. 39-50, 1941.

"Notes on some pelagic birds of the coast of British Columbia." Patrick W. Martin, *Condor*, Vol. 44, No. 1, pp. 27-29, 1942.

A new series was commenced in December with the publication of Handbook No. 1, entitled "Fifty edible plants of British Columbia," by G. A. Hardy. This new series is designed to form an outlet for articles written in popular and non-technical style which do not fall within the realm of either the "Occasional Paper" series or the Annual Report. The Handbooks are planned to deal with various groups of plants and animals of the Province and also certain phases of anthropology. They will contain illustrations whenever possible and will be of pocket size. Papers in the course of preparation include "Amphibians of British Columbia" (to appear early in 1943), "Reptiles of British Columbia," "Fresh-water fishes of British Columbia," and "Mushrooms and Toadstools."

Occasional Paper No. 4, entitled "Some accounts of the flora and fauna of the Driftwood Valley region of North Central British Columbia," by J. F. and T. C. Stanwell-Fletcher, is in the course of preparation and will be issued early in 1943.

In September a series of notes under the heading "Preparation and Preservation of Natural History Specimens" was prepared and submitted to the "Lesson-aids" committee, Vancouver. The material is to be published in mimeographed form for the use of teachers in the Province.

MOTION-PICTURE PRODUCTION.

Through the co-operation of Mr. C. R. D. Ferris, of the British Columbia Government Travel Bureau, whose services were loaned through the kindness of Mr. E. G. Rowebottom, Deputy Minister of Trade and Industry, several hundred feet of motion-picture film in colour have been obtained, showing phases of life-history and characteristics of frogs, toads, and salamanders. This material is being organized into a film which will be completed in the spring.

During the year three additional black and white silent pictures were purchased. The Museum library now contains the following 400-foot, 16-mm., silent films:—

"Sea-birds." Kodachrome; breeding cormorants and gulls in Georgia Strait.
Produced by Provincial Museum.

"Monarch of the Glen." Black and white; antler development in Scottish deer.

"American birds." Black and white; some common birds of eastern North America.

"Dexterity and mimicry of insects." Black and white; a study of protective devices in insects and other forms.

"Seed and seed dispersal." Black and white; dispersal mechanism in seeds; opening of flowers.

"Silent world beneath the sea." Black and white; a study of coelenterates.

"Underwater pirates." Black and white; enemies of fishes.

"Micro-biology." Black and white; one-celled organisms seen through the microscope.

EDUCATION.

MUSEUM LECTURES.

During a six-week period commencing February 21st a series of illustrated "Nature Talks" was presented to school children on Saturday mornings and a similar

set of lectures was given to adults in the evening. The lectures were given on the main floor of the Museum building, of which part was cleared of exhibit cases to make room for chairs and projection equipment. Since the seating capacity was limited to about 300 it was necessary to present each morning lecture twice, once at 9.30 and again at 11. For each lecture free tickets were issued to various public and private schools of the Greater Victoria area; this system helped to control the number of children attending each lecture and at the same time distributed the opportunity over a wide area.

By a special arrangement with the British Columbia Electric Railway Company children were allowed to travel to and from the Museum on school tickets, provided they showed their ticket or ticket stub. We are grateful to Mr. A. T. Goward, Vice-President of the B.C. Electric, for this privilege.

We are also greatly indebted to Mr. C. R. D. Ferris, of the British Columbia Travel Bureau, for the use of his time and sound motion-picture equipment, which added greatly to the success of the venture.

The programme and attendance is summarized in the following table:—

Nature Talks, Saturday Mornings, 9.30 and 11.

Date.	Speaker.	Subject.	Number of Children.
Feb. 21	Dr. I. McT. Cowan	"Whales, great and small"	537
Feb. 28	Mr. J. A. Munro	"Bird-life on the cattle-range"	459
Mar. 7	Mr. Harry Andison	"Insect friends and foes"	522
Mar. 14	Mr. G. A. Hardy	"Wild flowers as they grow"	441
Mar. 21	Mr. Eric Garman	"Trees are green gold"	435
Mar. 28	Mr. J. A. Cunningham	"Starfish and their relatives"	458
Total			2,852

Adult Lectures, Saturday Evenings, 8 p.m.

Date.	Speaker.	Subject.	Attendance.
Feb. 21	Dr. I. McT. Cowan	"Whales, great and small"	94
Feb. 28	Mr. J. A. Munro	"Bird-life on the cattle-range"	139
Mar. 7	Mr. W. Downes	"Insect friends and foes"	98
Mar. 14	Dr. R. E. Foerster	"Migration of fishes"	135
Mar. 21	Mr. Eric Garman	"Trees are green gold"	94
Mar. 28	Rev. Robert Connell	"Written in rock"	82
Total			642

We would like to thank once more the speakers who kindly gave their time to this work and also those who assisted in other ways to make this series of lectures a success.

SCHOOL AND OTHER LECTURES.

During the fall term the Director and the Botanist gave a series of illustrated lectures to several Victoria City and Saanich schools. The schedule arranged through the respective School Boards included the following schools: Victoria City—Burnside, George Jay, Margaret Jenkins, North Ward, Oaklands, Quadra, Sir James Douglas, South Park, and Victoria West; Saanich—Tolmie, Cloverdale, Tillicum, McKenzie, and Cedar Hill.

In addition to these, lectures have been given by the Director as follows: Langford School P.T.A. and pupils (January 14th); P.E.O. (January 20th); St. Michael's School (February 4th); Gordon Head P.T.A. and pupils (February 17th); Victoria Lions Club (February 26th); Civil Service Camera Club (March 18th); Victoria Hard-of-

hearing Club (March 25th); Rotary Club (April 2nd); British Columbia Government Crafts and Social Club (April 21st); Y.M.C.A. Hobby Show, New Westminster, B.C. (April 25th); Duncan Consolidated School, Queen Margaret's School, and Duncan Rotary Club (June 16th); Civil Service Camera Club (September 2nd); St. Michael's School (October 21st); St. John's Church (November 7th); Vancouver Natural History Society (November 25th).

In the spring six radio talks were given over Station CJVI in connection with the "Women's Programme" arranged and produced by Miss Violet Wilson. These addresses were as follows:—

Dr. Carl: March 18th, "Snakes in our lives"; April 1st, "Spring songsters"; April 15th, "A fish-eye view of life."

Mr. Hardy: April 29th, "Flowers and folks"; May 13th, "Forest and field"; May 27th, "Living jewels."

In addition to school lectures, nature talks, and radio talks, Mr. Hardy gave an address on "Free food for all" to the Victoria Lions Club on September 3rd.

INSTRUCTION IN NATURAL HISTORY.

During the period July 13th to 25th the Director spent several days of each week at the Y.M.C.A. boys' camp at Glinz Lake, near Sooke, giving instruction in the natural history of the area. Short collecting trips were organized and the boys were shown how to prepare small mammal skins, to press plants, to make blue-prints of specimens, and to carry out other projects. Over sixty boys were in camp at the time and most of them took some part in the programme.

On August 1st and 8th Mr. Hardy took charge of a small group of children for a short sea-shore study in connection with a playground programme sponsored by Oak Bay Municipality and conducted by Mrs. Powell.

OTHER ACTIVITIES.

The Museum supplied material and was the subject of a fifteen-minute broadcast on July 20th over CBR, given by Miss Violet Wilson of Victoria radio station CJVI. In the address Miss Wilson described several outstanding exhibits of the Museum and gave some details of the construction of fish models as carried out by Mrs. Sweeney, of the Museum staff.

Further material in the form of information and photographs supplied to Miss Wilson appeared in four articles in the "Victoria Daily Times," as follows:—

"Fine mushroom collection at Provincial Museum," July 18th, 1942.

"Fish wear polka dots in Provincial Museum," August 22nd, 1942.

"Footprints of great dinosaur found in Crowsnest Pass," September 19th, 1942.

"30,000 moths and butterflies in Museum's new collection," December 13th, 1942.

AIR-RAID PRECAUTIONS.

In addition to assigning certain duties to the various members of the staff and holding occasional practice withdrawals to the air-raid shelter in the east wing basement of the main building, certain other steps have been taken to lessen the danger of loss or damage to the contents of the Museum.

Under this category are additions to the fire-fighting equipment in the form of a sand-box, pail and scoop on the main floor, and a large barrel of water with buckets and stirrup-pump in the attic. In this part of the building, which is perhaps the most vulnerable to air attack, bags of sand have also been made available.

With respect to the safeguarding of the contents of the Museum the staff has been confronted with a most difficult problem. It was obviously impractical, if not impos-

sible, to remove all specimens and documents to a less vulnerable storage-place, and yet it was necessary to take some steps to reduce the danger of loss. A compromise was finally reached whereby only the most valuable specimens or representative collections, together with copies of the most important records, were selected and carefully crated for storage. The material chosen under this plan consists of type specimens of mammals and birds, specimens forming the first or only record for the Province, representative selection of Indian material from the various tribes, rare or costly books, and, finally, copies of the card-index pertaining to all catalogued material in the Museum at the time. The latter is a photographic record on 35-mm. film, a very efficient and compact means for preserving data.

These materials were removed to a recently constructed storage-vault not far from the city, where they are relatively immune from damage by air attack or dampness and yet are available for periodic inspection.

To comply with the "dim-out" regulations which came into effect in the late fall, all windows of the Museum building not already equipped with blinds were fitted with curtains or covered with tar-paper. The skylight has also been covered so that no light can be seen from above.

ADMINISTRATIVE AND STAFF CHANGES.

During a period of more than fifty years following its founding in October, 1886, the Provincial Museum has grown to its present size and importance under the administration of the Provincial Secretary's Department, but lately, due to the gradually increasing size of this Department, it has been necessary to transfer the Museum, along with the Provincial Library and the Archives, to the Department of Education. This change was ratified during the spring session of the Legislature by the passing of Bill No. 26, an amendment to the "Museum Act" of 1913, and the Provincial Museum officially joined the Department of Education on February 13th, 1942.

We would like to express our appreciation here to the Provincial Secretary's Department for the splendid co-operation received during the long period that the Museum has been associated with it, and especially to Mr. P. Walker, Deputy Provincial Secretary, who has always maintained an interest in the work of this branch. At the same time we wish to express our pleasure at being associated with the Department of Education, particularly at this time, when the work of the Museum is being directed more and more along educational lines. We feel that under the new administration the Museum's services to the public will continue to flourish.

Two changes were made during the year in connection with the Museum staff members. On April 1st the writer was appointed to the position of Director after occupying the position of Acting Director since October, 1940. During November and December Mr. F. L. Beebe, air-brush artist, was employed in making black-and-white illustrations of amphibians, reptiles, fresh-water fishes, and other animals and plants for use in forthcoming publications.

STRUCTURAL CHANGES.

In the fall months shelves were installed in the south-east room of the attic in order that the space may be used for the storage of Indian material. Formerly all anthropological specimens possessed by the Museum were placed on display as a result of lack of storage-space, but lately a few duplicates have been removed from the exhibition cases and have been placed in temporary storage in the attic. Now that more shelf-space is available it is planned to remove more duplicate material from the exhibition cases to the attic where it will be available to students who wish to examine it. At the same time this will help to remedy the present crowded conditions of the display cases housing the Indian collection.

ATTENDANCE.

Over the twelve-month period the number of visitors registered at the Museum and the estimated attendance was as follows:—

	Registered.	Estimated.
January	1,399	2,544
February	1,834	2,961
March	1,910	2,771
April	2,172	3,659
May	3,132	5,351
June	2,731	4,094
July	4,034	6,832
August	5,435	8,736
September	3,681	5,895
October	2,360	3,716
November	1,672	2,684
December	1,327	2,221
Totals	31,687	51,454

These figures do not include the 2,852 children and 642 adults attending the series of lectures given in February and March.

Compared with the 1941 attendance record the total number of visitors registering in 1942 was 6,349 less, a decrease of about 17 per cent. On the other hand, it is interesting to note that the winter attendance as represented by December, has shown an increase of approximately 20 per cent., possibly as a result of the increased numbers of men and women in uniform now in the district.

Mr. Pegler has again analysed the attendance record for the month of July and reports the following results:—

Residence.	Registration.	Residence.	Registration.
British Columbia	2,580	Washington	379
Alberta	201	Oregon	60
Saskatchewan	198	California	101
Manitoba	88	Other States	165
Ontario	106	British Empire	84
Quebec	29	Other countries	10
New Brunswick	3	Country not stated	5
Nova Scotia	17		
Prince Edward Island	2	Total	804
Alaska and Northwest Territories	5		
Newfoundland	1		
Total	3,230	Grand total	4,034

Compared with a similar analysis of the July attendance of the previous year the total number of visitors for this period is almost exactly 50 per cent. less in 1942. This no doubt is due to the general falling-off in tourist travel during the past year. At the same time it is interesting to note that the number of British Columbia visitors in July shows a slight increase, 2,580 as compared with 2,352 in 1941, and that the numbers of Provinces, States, and countries represented remains unchanged.

REPORT OF THE BOTANIST.

ACTIVITIES.

Additions to the herbarium for the year from all sources amount to 1,275 specimens. The number of sheets filed is 510 with many more mounted and waiting to be listed.

Plants identified from inquiries were 475. This entailed not only the work of naming but in many cases looking up special information concerning them.

The seasonal exhibit of wild flowers continued to be popular with all classes and is well worth the time involved in providing fresh specimens. An average of thirty-five species of trees, shrubs, and herbs per month was maintained during the spring and summer. A special exhibit of native food-plants comprising thirty different kinds was prepared during the course of the season. At another period the common garden weeds prevalent at that time were shown.

Considerable time has been devoted to research in connection with the preparation of a pamphlet "Fifty edible plants of British Columbia," one of the various other papers, lectures, and talks enumerated in the Director's report.

The study of the more popular aspect of mushrooms and allied subjects has continued from the previous season. This includes the collection, identification, and storage of specimens, and the construction of a card catalogue system of reference.

Included in the accessions to the herbarium are a few outstanding contributions. Archdeacon R. Connell presented a collection of eighty marine algæ of the southern Vancouver Island district. Mr. Connell not only collected and prepared the specimens but named and consulted the leading authorities on the subject. This collection is therefore of special interest to local students, forming a valuable and easily accessible means for identification. The specimens are well selected and beautifully mounted.

Mr. Connell also donated a collection of eastern Canadian plants.

Mr. J. W. Eastham, Provincial Plant Pathologist, Vancouver, has continued his good offices of previous years by contributing the results of his activities in out-of-the-way parts of the Province, increasing our collection by 183 species. This material is of particular value as much of it has been identified by specialists in the various groups.

Mr. W. B. Johnstone, of Cranbrook, has donated 128 sheets of carefully prepared specimens from the Cranbrook area and adjacent territories, parts of the Province that are of exceptional botanical interest.

Mr. G. C. Emerson, of the British Columbia Survey Department, collected for the Museum a fine series of 100 sheets of plants from the Cameron Lake district of Vancouver Island.

Mr. L. J. Clark, Victoria, contributed a very welcome series of fifty-eight specimens from the Forbidden Plateau.

Mr. W. P. D. Pemberton has demonstrated his keen interest in the botanical section of the Museum by presenting a number of excellently preserved specimens from Cameron Lake and other localities. Several of the species he collected are represented by unusually good series.

Mr. A. Nicholls, Duncan, V.I., has maintained an enthusiastic interest in the collection and presentation of a series of mushrooms and other fungi from his district.

A Museum trip to the Lac la Hache district of British Columbia resulted in the addition of 392 catalogued specimens, together with an extra fifty sheets gathered *en route*. A detailed account of these will be found elsewhere in this report.

ACKNOWLEDGMENTS.

A complete list of contributions to the herbarium will be found under "Accessions to the Museum."

We have much pleasure in conveying our cordial thanks to all those who have gone to the trouble of collecting and donating specimens, and also the following specialists for their willing co-operation in giving of their time and knowledge in the examination of material, and in submitting specimens of related species and genera from adjacent areas for exchange.

Dr. L. Constance, University of California, Berkeley. Two hundred Washington-Oregon specimens for exchange.

Dr. F. Dickson, Department of Biology and Botany, University of British Columbia, Vancouver. Identification of fungi.

Mr. J. W. Eastham, Provincial Plant Pathologist, Vancouver. Determination of Gramineæ, Juncaceæ, and Cyperaceæ.

Mr. J. Ewan, University of Colorado Museum, Boulder, Colorado, who is undertaking research in connection with Ferns and Delphiniums for which the Museum material is being studied.

Professor T. C. Frye, University of Washington, Seattle. Research in the Hepatics and donation of specimens.

Dr. J. Walton Groves, Dominion Experimental Farm, Ottawa. Identification and investigation of British Columbia mushrooms and other fungi.

Mrs. H. Mackenzie, Victoria. Determination of mosses.

Mr. A. E. Porsild, National Museum of Canada, Ottawa. Examination and naming of 230 plants of Northern British Columbia and adjacent territories, resulting in many new records for our herbarium.

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

Calamagrostis inexpana A. Gray. Big Bend Highway, July 21st, 1941; J. W. Eastham.

Festuca altaica Ledeb. Omineca Mountains, August 4th, 1941; T. C. Stanwell-Fletcher.

Festuca capillata Lam. Vancouver, May 24th, 1942; J. W. Eastham.

Panicum miliaceum L. Parksville, V.I., August 15th, 1942; J. W. Eastham.

Luzula Wahlenbergii Rupr. Omineca Mountains, August 2nd, 1941; T. C. Stanwell-Fletcher.

Carex anthoxantha Presl. Omineca Mountains, August 3rd, 1941; T. C. Stanwell-Fletcher.

Carex concinna R. Br. Fairmont Hot Springs, July 19th, 1942; J. W. Eastham.

Stellaria obtusa Engelm. Rossland, July 5th, 1942; J. W. Eastham.

Arabis lyrata L. var. *glauca* (D.C.) Hopkins. White Pass, June 27th, 1936; E. and J. Lohbrunner.

Braya humilis (C. A. Mey) Robins. Kechika River, July 17th, 1940; N. C. Stewart.

Draba borealis D.C. White Pass, June 27th, 1936; E. and J. Lohbrunner.

Rorippa palaustre (L.) Bess. var. *hispida* (Desv.) Rydb. Dease and Liard rivers juncture, July–September, 1941; A. G. Slocomb.

Parnassius palaustris L. var. *neogaea* Fern. Lake Bennet, June 28th, 1936; E. and J. Lohbrunner.

Potentilla uniflora Ledeb. White Pass, June 27th, 1936; E. and J. Lohbrunner.

Oxytropis retrorsa Fern. Kechika River, July 16th, 1940; N. C. Stewart.

Malvastrum coccineum (Pursh.) A. Gray. Windermere, July 20th, 1942; J. W. Eastham.

Viola lanceolata L. Lulu Island, May 7th, 1942; J. W. Eastham. (Presumably imported from eastern Canada along with Cranberry plants.)

Epilobium glaberrimum var. *fastigiatum* (Nutt.) Trel. Rossland, July 5th, 1942; J. W. Eastham.

- Pyrola asarifolia* var. *incarnata* (D.C.) Fern. Dease and Liard rivers juncture, July–September, 1941; A. G. Slocomb.
- Polemonium acutifolium* Willd. Dease and Liard rivers juncture, July–September, 1941; A. G. Slocomb.
- Lappula Redowskii* (Hornem.) Green. var. *occidentalis* (Wats.) Rydb. White Pass, June, 1936; E. and J. Lohbrunner.
- Mertensia Horneri* Piper. Kootenay Bay, April 4th, 1941; H. Murray per J. W. Eastham.
- Symphytum asperrimum* Donn. Ladner, May 28th, 1942; J. W. Eastham.
- Agastache anethiodora* (Nutt.) Brit. Prince George, July 30th, 1942; J. W. Eastham.
- Castilleja remota* Greene. Nanaimo, V.I., June 10th, 1941; J. W. Eastham.
- Heterocodon rariflorum* Nutt. Nelson, July 8th, 1942; J. W. Eastham.
- Antennaria philonipha* A. E. Porsild. White Pass, June 4th, 1936; E. and J. Lohbrunner.
- Antennaria umbrinella* Rydb. Chezacut, 1940; J. M. Shillaker.
- Arnica chionopappa* Fern. Dease and Liard rivers juncture, July–September, 1941; A. G. Slocomb.
- Arnica rhizomata* A. Nels. Chezacut, 1941; J. M. Shillaker.
- Erigeron acris* var. *elatus* Greene, and *E. acris* var. *asteroides* (Andrz.) D.C. Kechika River, July 16th, 1940; N. C. Stewart.
- Solidago multiradiata* Ait. Kechika River, July 17th, 1940; N. C. Stewart.
- Plants added to the herbarium from adjacent areas include the following:—
- Cystopteris montana* (Lam.) Bernh. Ogilvie Mountains, Yukon, July, 1936; E. and J. Lohbrunner.
- Woodsia glabella* R. Br. Dawson Dome, Yukon, July, 1936; E. and J. Lohbrunner.
- Larix laricina* (DuRoi) Koch. Olness, Alaska, August 11th, 1936; E. and J. Lohbrunner.
- Cypripedium guttatum* Sw. Dawson, Yukon, July, 1936; E. and J. Lohbrunner.
- Iris setosa* Pall. Fairbanks, Alaska, August 15th, 1936; E. and J. Lohbrunner.
- Salix phlebophylla* Anders. Eagle Summit, Alaska, August, 1936; E. and J. Lohbrunner.
- Salix pseudopolaris* Flod. Eagle Summit, Alaska, August, 1936; E. and J. Lohbrunner.
- Alnus crispa* (Ait.) Pursh. Yukon River, Alaska, July 15th, 1936; E. and J. Lohbrunner.
- Polygonum Bistorta* L. Eagle Summit, Alaska, August, 1936; E. and J. Lohbrunner.
- Arenaria obtusiloba* (Rydb.) Fern. Ogilvie Mountains, Yukon, July, 1936; E. and J. Lohbrunner.
- Arenaria physodes* D.C. Eagle Summit, Alaska, August, 1936; E. and J. Lohbrunner.
- Delphinium simplex* Dougl. Creston, Washington, July 4th, 1942; J. W. Eastham.
- Papaver alaskanum* Hulten. Yukon-Alaska Boundary, July, 1936; E. and J. Lohbrunner.
- Cardamine purpurea* Cham. & Schl. Eagle Summit, Alaska, August, 1936; E. and J. Lohbrunner.
- Sisymbrium sophioides* Fisch. Eagle Summit, Alaska, August, 1936; E. and J. Lohbrunner.
- Boykinia Richardsonii* (Hook.) Gray. Ogilvie Mountains, Yukon, July, 1936; E. and J. Lohbrunner.

- Parnassia Kotzebuei* Cham. & Schlect. Isabella Pass, Alaska, August 18th, 1936; E. and J. Lohbrunner.
- Saxifraga Eschscholtzii* Sternb. Isabella Pass, Alaska, August 18th, 1936; E. and J. Lohbrunner.
- Saxifraga radiata* Small. Ogilvie Mountains, Yukon, July, 1936; E. and J. Lohbrunner.
- Potentilla biflora* Willd. Ogilvie Mountains, Yukon, July, 1936; E. and J. Lohbrunner.
- Potentilla nana* Willd. Lewes, Yukon, June 30th, 1936; E. and J. Lohbrunner.
- Astragalus yukonis* Jones. Isabella Pass, Alaska, August 18th, 1936; E. and J. Lohbrunner.
- Sidalcea oregona* A. Gray. Creston, Washington, July 4th, 1942; J. W. Eastham.
- Arctostaphylos rubra* (Rehd. & Wils.) Fern. Isabella Pass, Alaska, August 18th, 1936; E. and J. Lohbrunner.
- Diapensia obovata* (Fr. Schm.) Nakai. Eagle Summit, Alaska, August 18th, 1936; E. and J. Lohbrunner.
- Primula egaliksensis* Wormskj. Eagle's Nest Rock, Yukon River, July, 1936; E. and J. Lohbrunner.
- Lomatogonium rotatum* (L.) Fries. Fairbanks, Alaska, August 10th, 1936; E. and J. Lohbrunner.
- Phacelia Franklinii* R. Br. Lewes, Yukon, June 30th, 1936; E. and J. Lohbrunner.
- Phlox Richardsonii* Hook. Eagle Summit, Alaska, August, 1936; E. and J. Lohbrunner.
- Castilleja hyperborea* Pennell. Eagle Summit, Alaska, August 10th, 1936; E. and J. Lohbrunner.
- Verbena stricta* Vent. Creston, Washington, July 4th, 1942; J. W. Eastham.
- Achillea sibirica* Ledeb. Ogilvie Mountains, Yukon, July 15th, 1936; E. and J. Lohbrunner.
- Erigeron radicans* Hook. Eagle Summit, Alaska, August 5th, 1936; E. and J. Lohbrunner.

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

- Panicum miliaceum* L. Parksville, V.I., August 15th, 1942; J. W. Eastham. Sent to Mr. Eastham. It is said to have been introduced with beet-seed.
- Euphorbia cyparissias* L. Victoria, V.I., May 6th, 1942; J. Noble. Mr. Noble mentions its occurrence at Metchosin in 1940. A garden escape.
- Epilobium Halleianum* Haus. Southern Saanich, V.I., May 25th, 1941; G. A. Hardy.

The following plants are not known to have been previously reported from British Columbia:—

- Muhlenbergia sylvatica* Torr. Griffin Lake, B.C., July 23rd, 1941; J. W. Eastham.
- Grindelia perennis* A. Nels. West of Golden, B.C., July 21st, 1941; J. W. Eastham.

REPORT OF THE ENTOMOLOGIST.

As intimated elsewhere in this report, the Museum collections have been enriched by two outstanding entomological acquisitions; one the work of the late J. K. Jacob, of Vancouver, the other donated by Mr. A. W. Hanham, of Duncan, V.I.

The Jacob collection consists of 6,000 specimens of insects, more than half of which are Diptera, nearly doubling in number of specimens those contained in the remaining orders put together. Lepidoptera and Coleoptera form a very representative collection of the localities visited, while the other orders, though represented by smaller numbers of specimens, are of equal if not greater value because of the comparatively scant

amount of attention that is usually given to them by the majority of students in entomology.

The especial value of this assemblage of insects is the fact that it is made up of properly authenticated British Columbia material in extensive series and all in a first-class state of preservation.

The Hanham collection represents the work of its collector over a period of fifty years, and in character is representative of the whole of Canada from east to west, with emphasis on the Vancouver Island insect fauna. It includes 30,000 specimens of all orders, particularly Coleoptera and Lepidoptera. To students of variation and distribution it is of especial value because of the exceptionally long series of so many of the species, collected from widely separated localities.

A considerable time has been expended on the care and storage of these collections; they are now available to any one interested in their study.

Mr. Cecil French, of Victoria, has evinced keen enthusiasm in the possible establishment of a silkworm industry, and in line with this has loaned or presented various stages in the life-history and culture of the Silk moth from the egg to the finished product.

A small collection of insects from the Lac la Hache area was made during the course of a short Museum field-trip, partial results of which are included in the account appearing elsewhere in this report.

Several smaller but very acceptable additions to the insect collections have been made from time to time during the course of the year. A complete list of contributions will be found under "Invertebrate Accessions."

Apart from specific donation of specimens there have been innumerable inquiries for information and identifications, ranging from ticks to butterflies, from each of which some interesting side-light or worth-while knowledge has been gleaned to the mutual advantage, it is to be hoped, of all concerned.

To the various donors and contributors are extended our cordial thanks and the assurance of our appreciation for the manner in which they have helped to increase the entomological knowledge of the Province of British Columbia.

ACCESSIONS.

Several outstanding gifts have been received by the Museum in the past year. Among these is a large, named insect collection, assembled and arranged by the late John Kenneth Jacob, a graduate student of the University of British Columbia. Mr. Jacob was an ardent student and collector, during his short career becoming an authority on the termites of this Province and developing a keen interest in the flies. His insect collection represents many years' patient and painstaking work and, as a result, is of considerable value to students of entomology. The material was donated by Mr. and Mrs. R. S. Jacob, of Vancouver, B.C.

A second entomological gift received in 1942 is the exceptionally large insect collection presented by Mr. A. W. Hanham, of Duncan, B.C. This material consists of over 30,000 specimens representing most of the insect orders and originating from many parts of the world. In general, butterflies, moths, and beetles are in the majority and most of these have been taken in British Columbia and other parts of Canada. The collection is contained in 150 storage-boxes, some of fine workmanship.

Another addition of note is a collection of British Columbia birds and mammals prepared and donated jointly by Mr. James Hatter and Mr. F. L. Beebe, of Lake Cowichan, V.I. The skins are housed in a specially built cabinet which was presented with the collection.

Of interest among the living animals received during the past twelve months was a collection of snakes of the Dry Belt, donated by Mr. George P. Holland, of the

Dominion Field Insect Laboratory, Kamloops. The specimens included a blue racer, a gopher snake, and a rattlesnake, which have provided a source of interest to many visitors.

Early in the season a circular letter was sent to all lighthouse-keepers and wharf-tenders along the coast, through the Victoria office of the Department of Transport, asking their co-operation in reporting and securing marine specimens, particularly small whales, which may occasionally be washed ashore. The response has been encouraging; we have received reports and other information from several sources and have acquired a harbour porpoise and a mackerel shark through Thulin Brothers, of Lund, B.C. We wish to express here our appreciation to the Department of Transport in distributing the circular letters, to the various persons who have contributed information and specimens, and to the B.C. Packers for their co-operation in transporting the specimens received so far.

On December 31st, 1942, the catalogued specimens in the Museum numbered as follows: Anthropological, 5,095; botanical, 15,261; mammals, 4,949; birds, 8,991; reptiles, 228; amphibians, 474; fishes, 570.

The following list includes the names of contributors and the number and type of specimens contributed in 1942. It does not include specimens collected by staff members. Under "Fishes" there is added an accession list for 1941, which was accidentally omitted from the report for that year.

ANTHROPOLOGICAL ACCESSIONS.

Salishan (Coastal).

- A. H. S. Cohquhoun, Duncan. Two polishing-stones and one arrow-head.
 R. J. Levelton, Vancouver. One Indian mask and one paddle (by purchase).
 W. A. MacDonald, Victoria. One slate spear-head.
 C. B. McIntosh, Victoria. One stone hammer.
 H. E. Whyte, Victoria. One stone axe-head, one chisel.

Salishan (Interior).

- Mrs. F. G. Forbes, Lac la Hache. Two arrow-heads.

Athapascan.

- G. H. Blanchet, Victoria. One dried-meat bag.

Haida.

- Commissioner T. W. S. Parsons, Victoria. One sample of spruce-bark binding material, one adze.

Kwakiutl.

- Mrs. C. E. Bradshaw, Elstow, Saskatchewan. Two Indian silver bracelets, one brooch (by purchase).

Nootkan.

- H. E. Whyte, Victoria. One bottle enclosed in basket-work.

Tahltan.

- P. M. Monckton, Victoria. One horn spoon.

Tsimshian.

- Miss K. Agnew, Victoria. One wooden spoon.
 John Zarelli, Parksville. One wooden spoon.

Eskimo.

G. H. Blanchet, Victoria. One parka made of caribou-skins, hair-seal shorts and stockings made of caribou-skins.

BOTANICAL ACCESSIONS.

Mrs. C. Boice, Victoria, one; Talbot H. Bond, Douglas Lake, four; J. T. Braden, Victoria, one; Mrs. K. Bridge, Ladysmith, two; L. J. Clark, Victoria, fifty-eight; A. H. S. Cohquhoun, Duncan, one; Rev. R. Connell, Victoria, two collections presented and three plants; Miss M. T. Deloume, Victoria, collection of mosses and lichens for display; J. W. Eastham, Vancouver, 189; G. C. Emerson, Victoria, 100; Arthur Frayne, Victoria, one; C. L. Harrison, Victoria, two; Miss Joan Hearle, Victoria, one; W. Herod, Blubber Bay, one; J. M. Hicks, Victoria, one; W. B. Johnston, Cranbrook, 128; Mrs. Carl Junke, Sidney, one; A. E. Lawrance, Chilliwack, nine; J. A. Munro, Okanagan Landing, collection of seeds; Constable A. H. Muskett, Port Essington, one; A. Nicholls, Duncan, collection of fungi and thirty-four specimens; J. Noble, Victoria, one; W. P. D. Pemberton, Victoria, twenty-seven; A. E. Pickford, Victoria, one; F. M. Shillaker, Chezacut, twenty-seven; Ted Sommer, Victoria, one; M. W. Tuckey, Victoria, one; University of California, Berkeley, 200 on exchange basis; Dr. White, Victoria, one; Miss H. M. Williams, Sidney, one.

ZOOLOGICAL ACCESSIONS.

Mammals.

Arlie Aiken, Takla Landing. Five mammal skulls.
 Ted Cooke, Victoria. One racoon.
 George Forbes, Lac la Hache. One little brown bat.
 James Hatter and F. L. Beebe, Lake Cowichan. Collection of mammals.
 Charles Haynes, Victoria. Teeth of horse.
 W. H. Jones, Royal Oak. One lynx skull, one cougar skull.
 D. Leavens, Cultus Lake. One water-shrew.
 A. P. McBean, Victoria. Six mice.
 E. H. Marcotte, Victoria. One cougar (by purchase).
 J. A. Munro, Okanagan Landing. One meadow mouse.
 P. M. Monckton, Q.C.I. Bones of whale and sea-lion.
 Oak Bay Police, Oak Bay. One harbour seal.
 Inspector R. Owens, Victoria. One bat.
 A. E. Pickford, Victoria. One bat.
 Dr. A. G. Price, Victoria. Two black rats.
 H. Self, Cadboro Bay. One black rat.
 F. M. Shillaker, Chezacut. One bear skull.
 S. Vato, per R. Thulin, Lund. One harbour porpoise.

Birds.

D. Ashby, Duncan. One harlequin duck-egg.
 B. Cash, Victoria. One merganser.
 R. Christianson, Victoria. One screech-owl.
 L. J. Clark, Victoria. One ruddy duck.
 M. Cooke, Victoria. One killdeer.
 Ted Cooke, Victoria. One king eider.
 R. Guppy, Wellington. One winter wren's nest.
 James Hatter and F. L. Beebe, Lake Cowichan. Collection of birds.
 R. Howard, Victoria. One bald eagle.

- P. Leavens, Cultus Lake. One fox sparrow.
 A. E. Pickford, Victoria. One sandpiper.
 Mrs. L. E. Pierce, Victoria. One vireo's nest.
 B. Whitney-Griffiths, Metchosin. One whistling swan.
 Mrs. F. M. Wotherspoon, Victoria. One vireo's nest.

Amphibians and Reptiles.

- G. C. Boyd, Lake Cowichan. One salamander.
 J. Elliot, Jordan River. One salamander.
 F. L. Fatt, Jordan River. One salamander.
 C. R. D. Ferris, Victoria. One toad.
 D. Fowle, Vancouver. One salamander.
 K. Graham, Victoria. One adult tailed toad, one tadpole tailed toad.
 G. P. Holland, Kamloops. Four snakes and five salamanders.
 D. Leavens, Cultus Lake. Tadpoles of tailed toad.
 C. Lyons, Victoria. Eggs of salamander.
 A. C. Mackie, Vernon. Fifty-four snakes.
 T. O. Mitchell, Nanaimo. One salamander.
 J. A. Munro, Okanagan Landing. One frog.
 B. C. M. Nevile, Hope. Sixteen salamanders.
 Dr. M. Prebble, Victoria. One snake.
 W. Stevens, Oliver. One salamander.
 Mrs. T. L. Thacker, Hope. One salamander.

Fish.

(1941 accessions not listed in previous report.)

- J. F. S. Fletcher, Takla Landing. Collection of fishes taken in Driftwood River district from May to September, 1941.
 M. Harbidge, Sperling. One lamprey.
 Jack Helmeson, Victoria. One electric ray.
 Kyuquot Trollers, Victoria. One mackerel scad, per T. Patterson.
 F. Neave, Lake Cowichan. Two lampreys, two eastern brook-trout.
 C. H. Robinson, Nelson. Collection of minnows.
 Mrs. Duncan Ross, Prospect Lake. One cut-throat trout.
 Rowe's Fish Market, Victoria. One California pompano.
 A. A. Sherman, Cowichan Bay. One broad-finned cod.
 P. Stacey, Saanich Arm. One mud shark.
 R. Stranix, Victoria. One sailor fish.
 G. V. Wilby, Vancouver. One sculpin.

(1942 accessions.)

- G. Charlton and E. Jamak, Victoria. Twenty-four blennies, one cling fish.
 W. Downes, Victoria. One sculpin.
 J. R. Dymond, Royal Ontario Museum of Zoology, Toronto. Collection of fishes.
 G. F. Forbes, Lac la Hache. Four kokanee.
 Dr. E. C. Hart, Victoria. One cut-throat trout.
 G. Murrell, Victoria. One lamprey.
 E. Newman, Victoria. One electric ray.
 C. H. Robinson, Nelson. Sample of minnows from Rosebud Lake.
 A. A. Sherman, Cowichan Bay. One electric ray.
 P. M. Smith, Esquimalt. One rainbow trout.

- P. Stacey, Saanich Arm. One black cod, one dogfish.
 Mrs. T. L. Thacker, Hope. One lamprey.
 H. Thulin, Lund. One mackerel shark.
 J. Zwinger, Victoria. One king-of-the-salmon.

Invertebrates.

- F. H. Allder, Thetis Island. One egg-mass of moon snail.
 W. Belobaber and J. Kirk, Victoria. One Eyed Hawk moth.
 L. Bewley, Victoria. One moth.
 G. C. Boyd, Lake Cowichan. Six caterpillars.
 A. Burns, Victoria. One Eyed Hawk moth.
 G. C. Cook, Great Central. Two moths.
 A. Denbigh, Crofton. One sponge crab.
 D. J. DeRochie, Victoria. Two spiders.
 W. Downes, Victoria. Eggs of marine snail.
 Ted Fatt, Victoria. One Assassin bug.
 Dr. Cecil French, Victoria. Life-history stages of silkworm moth.
 A. Hancox, Royal Oak. One Polyphemus moth.
 A. W. Hanham, Duncan. Collection of insects.
 C. L. Harrison, Victoria. One slug.
 Mrs. Lillian Harrison, Nanaimo. One Hawk moth.
 V. B. Harrison, Nanaimo. One moth.
 R. T. Henderson, Victoria. One caterpillar.
 Billy Hibbert, Victoria. One insect.
 L. O. Howard, Victoria. Piece of wood infested by larvæ of Longhorn beetles.
 F. T. Humphries, Victoria. One caterpillar.
 Mrs. Ingledew, Victoria. Eggs of Silk moth.
 The late J. K. Jacob, per R. S. Jacob, Vancouver. Insect collection.
 Mrs. F. Kriegel, Victoria. One barnacle.
 Miss L. Lee, Victoria. One worm.
 H. B. Leech, Vernon. Twenty-four Longhorn beetles (*Cerambycidae*) for exchange.
 W. Moore, Victoria. Cells of Mud wasp.
 B. C. M. Nevile, Hope. One insect.
 Mrs. B. C. M. Nevile, Hope. Two slugs.
 Mrs. V. H. Northcote. Two insects, one pseudoscorpion.
 Sergeant-Major H. Nuttall, Victoria. One spider.
 F. Pearson, Victoria. One beetle.
 W. H. A. Preece, Victoria. Seven Longhorn beetles (*Cerambycidae*).
 J. H. Seedhouse, Victoria. One butterfly.
 Ted Shadbolt, Victoria. One Longhorn beetle.
 F. M. Shillaker, Chezacut. Thirty-seven moths and butterflies.
 Bill Swift, Victoria. One beetle.
 Miss Connie Sproule, Victoria. Collection of marine shell-fish and starfish, four sand dollars, one octopus.
 Mrs. T. L. Thacker, Hope. One slug.
 H. Warren, Victoria. Two spiders with eggs.
 Miss Whiteford, Victoria. One insect.
 Mrs. F. M. Wotherspoon, Victoria. One caterpillar.

Palæontology.

- Miss D. Preece, Victoria. One fossil shell and shell borings in rock.

REPORT ON A COLLECTING TRIP TO THE LAC LA HACHE AREA, BRITISH COLUMBIA.

BY G. CLIFFORD CARL AND GEORGE A. HARDY, PROVINCIAL MUSEUM,
VICTORIA, B.C.

INTRODUCTION.

In early summer of 1942 the writers spent twelve days in the Lac la Hache area collecting Museum material. The original purpose of the trip was to spend some time in the Chilcotin district in the company of Mr. J. A. Munro, Chief Federal Migratory Bird Officer for British Columbia, but due to unfavourable weather conditions previous to our arrival this plan was abandoned and we spent our available time, June 25th to July 7th, in the vicinity of Lac la Hache.

Through the kindness of Mr. F. Gilbert Forbes at 122-Mile House, we set up camp on the lake-shore and were given permission to collect over his property. We wish to express thanks to Mr. and Mrs. Forbes for the many courtesies extended us during our stay, and also to Mr. and Mrs. J. A. Munro for the great assistance rendered in showing us the country and in helping to collect and prepare specimens.

DESCRIPTION OF COUNTRY.

For the purposes of this report the Lac la Hache area includes the region about the lake itself and extending south-east to about 100-Mile House, north-west to Williams Lake and east to Anthony Lake. These arbitrary boundaries are for convenience only and do not coincide in any way with natural boundaries or faunal areas.

For the most part the country is relatively flat, with low rolling hills of uniform height separated by shallow valleys. (See illustration.) The soil, glacial in origin, consists of large deposits of drift material such as coarse sand and gravel overlaid with a thin layer of humus. As a result, the area is extremely dry except near lakes and streams or where irrigated.

The flora of the region presents several interesting features from the point of view of plant association and distribution. In general, the Canadian life zone flora predominates with the Arid and Humid transitional characteristics preponderating. In the absence of natural barriers an infiltration from neighbouring zones occasionally occurs. Thus the Canadian zone is evidenced by the forests of Lodgepole pine and Douglas fir, which clothe the long rolling ridges and upper slopes. The lower slopes and swales support isolated groves of aspen while the streamsides and moist pockets maintain stands of Engelmann's spruce. Two species of juniper, one the Dwarf juniper with a wide northern distribution, the other, Rocky Mountain juniper, with a southern centre of origin, meet here on common ground. A northern extension of the Upper Sonoran element is represented here by the cactus and feather grasses.

A notable feature of the upland coniferous forests is the almost complete absence of shrubby undergrowth, its place being taken by the Forest grass (*Oryzopsis asperifolia*) which forms a green carpet in pleasant contrast to the dark brown of the tree-trunks. In more open stands this may occasionally be relieved by extensive patches of pale blue lupine or picked out with the scarlet banners of the Indian Paint brush. Here and there the rusty-stemmed Buffalo berry or the prickly Wild rose emphasizes rather than relieves the monotony. Ferns, so characteristic of the coastal forests, were not met with in any part of the district investigated.

The numerous lakes, ponds, and sloughs which occupy the flat hollows among the ridges constitute one of the chief attractions of the region. Many of these lakes have little, if any, drainage, resulting in stagnant pools sometimes of high alkali content.

In the marginal soil, plants such as the Seaside Arrow-grass, Sea milkwort and Alkali grass, which are usually found only at the seaside, find here a suitable medium in which to grow.

Of still greater interest from the botanist's view-point is the knoll formation; this consists of great piles, heaps, and hillocks of glacial silt left as if recently dumped from a mine. These knolls with steep slopes and light, friable soil hold little moisture and absorb a maximum of heat, with the result that only plants especially adapted to such conditions can survive. Here we find representatives of the Upper Sonoran zone to the south among the almost totally arid Transition types such as feather-grass, cactus, Hoary ragweed, False Toad flax, and others.

CLIMATE.

Accurate figures concerning precipitation at Lac la Hache are not available, but records taken in 1914 and 1915 at 105-Mile House, about 15 miles south, show 15.14 and 10.77 inches respectively. Part of the precipitation is in the form of snow, the amount varying from year to year from 4 or 5 inches to 3 feet and averaging about 18 inches.

Air temperatures in this area undergo a wide range. Temperatures of 60 degrees below zero Fahrenheit have been observed in 1907 and again in 1932, according to Mr. Forbes, and 40 below is not uncommon, while 98 degrees Fahrenheit is sometimes attained in the summer. The lake freezes over, the ice attaining an average thickness of about 18 inches. A characteristic feature of the lake-shore is a conspicuous ridge of gravel, rock, and debris, produced by ice action, a foot or so above summer water-level.

LAC LA HACHE.

The lake itself lies at an elevation of 2,650 feet in a narrow valley running almost north-west and south-east. It is approximately 10½ miles long by ¼ to 1½ miles wide, and drains an area of 380 square miles. The outlet leaves the lake at the northern end and flows north-west by way of San José River through 130-Mile Lake to Williams Lake and thence into the Fraser River.

The lake is said to be moderately deep but large areas of shallow water are present in some parts. Extensive beds of aquatic vegetation provide excellent feeding-grounds which support a large population of fish. Much of the bottom is covered by a marly deposit characteristic of lakes in this district.

PLANTS.

Several complete lists of plants were made in selected areas, as indicating typical associations under natural conditions. Two such examples are given here.

Knoll Formation.—A small dry knoll near Jones Lake was chosen since it appeared to support a typical assemblage of plants flourishing under conditions of extreme heat and drought. Species noted on June 29th are as follows:—

Agropyron inerme (Wheat-grass). In scattered tufts.

Stipa comata (Needle and Thread Grass). Thinly but evenly covering the whole area.

Hordeum jubatum var. *caespitosum* (Squirreltail). In isolated patches.

Koeleria cristata (Koeler's Grass). In scattered tufts.

Opuntia fragilis (Cactus). Three isolated groups.

Arabis Hoellbellii (Hoellbell's Rock Grass). One or two specimens.

Lepidium medium (Peppergrass). In conspicuous green groups of small extent.

Commandra pallida (False Toad Flax). In scattered groups.

Astragalus tenellus (Slender Milk-vetch). Occasional clumps.



Plate 1, Figure 1. Lac la Hache from the western shore.

(Courtesy B.C. Government Travel Bureau.)



Plate 1, Figure 2. In the vicinity of Lac la Hache, looking towards Williams Lake.

(Courtesy B.C. Government Travel Bureau.)

- Astragalus serotinus* (Late Milk-vetch). Several clumps.
Lomatium macrocarpum (Desert Parsley). One or two plants.
Eriogonum heracleoides (Creamy Eriogonum). One or two scattered plants.
Orobanche fascicularis (Cancer Root). Parasitic on *Artemisia*.
Galium boreale (Northern Bedstraw). One or two plants on north exposure.
Artemisia frigida (Pasture Wormwood). In tufts at wide intervals.
Senecio canus (Gray Ragweed). One small community.
Antennaria parvifolia (Small-leaved Everlasting). In mats and groups.
Amelanchier cusickii (Cusick's June Berry). Small stunted specimens on north aspect.
Gaillardia aristata (Gaillardia).

All these plants were thinly distributed with bare soil exposed between clumps and individual plants. The Needle and Thread grass was the dominant species, suggesting a carpet or net weaving the remaining plants into a composite whole.

Woodland Association.—The site selected was an open Douglas fir wood on the crest of a broad ridge, facing toward the south. A tract measuring 40 yards square was paced out and a list of plants included in this area was made on June 27th, as follows:—

Trees—

- Pseudotsuga mucronata* (Douglas Fir). One large tree, four smaller.
Populus tremuloides (Aspen). Three or four scattered saplings.

Bushes—

- Shepherdia canadensis* (Buffalo Berry). Two bushes.
Rosa Sayi (Wild Rose). One or two small specimens.
Salix Bebbiana (Willow). One tall bush.

Low Shrubs—

- Arctostaphylos uva-ursi* (Bearberry). Forming scattered mats.

Herbs—

- Oryzopsis asperifolia* (Forest Grass). Forming the background or setting for everything else and thinly covering the ground throughout.
Antennaria parvifolia (Everlasting). Compact mats here and there.
Fragaria glauca (Strawberry). Plentiful all over the tract; one of the most noticeable ground covers.
Galium boreale (Northern Bedstraw). In occasional groups.
Vicia americana (American Vetch). Both in small tangly groups or as individuals clinging to other plants.
Lathyrus ochroleucus (Yellow Pea).
Arnica fulgens (Arnica). One or two specimens accenting the general assemblage.
Achillea millefolium (Yarrow). Several scattered about.
Erigeron (Fleabane). Only in the leaf stage, but forming noticeable rosettes of green leaves.

This gives a general idea of the woodland growth of this particular tract. Much variation as to species occurs according to slope, aspect, and season.

Plants favouring Alkaline Soils.—The following is an enumeration only; the plants are not necessarily associated together in one locality:—

- Triglochin maritima* (Seaside Arrow-grass).
Spartina gracilis (Alkali Cord-grass).
Distichlis stricta (Desert Salt Grass).
Puccinellia distans (European Alkali Grass).
Puccinellia Nuttalliana (Nuttall's Alkali Grass).

Scirpus americanus (Three-square Rush).
Scirpus paludosus (Marsh Bulrush).
Rumex maritimus var. *fuiginus* (Golden Dock).
Chenopodium glaucum (Oak-leaved Goosefoot).
Ranunculus cymbalaria (Seaside Buttercup).
Potentilla anserina concolor (Silver-weed).

The aquatic plants formed an important element in the district's flora. The alga, *Chara*, is abundant in the alkali waters. The most noticeable feature of the water-plants was the abundance of individuals of a species which often occurred in dense monospecific masses. Further details are incorporated in the annotated list.

Agricultural Weeds.—While most attention was paid to the native flora certain introduced weeds were also noted. Among them were the dandelion (*Taraxacum officinale*) and the couch-grass (*Agropyron repens*), both of which, according to Mr. Forbes, are most difficult to contend with. In another part of the district, near Jones Lake, a field of several acres was a mass of stinkweed (*Thlaspi arvense* L.). Canada thistle (*Cirsium arvense* L.) was met with in a woodland bordering the road. As all the terrain covered is devoted either to grazing or to hay production, arable fields, the source of most troublesome weeds, were few and far between.

ANNOTATED LIST OF PLANTS.

The following list comprises the trees, shrubs, and higher flowering plants collected or observed during the period of June 24th to July 6th.

The arrangement is based on Henry's "Flora of Southern British Columbia," with slight changes in some instances. Herbarium catalogue numbers are included to facilitate future reference. Popular names are added for the convenience of the many who prefer to remember the plants in this way.

We are greatly indebted to Mr. J. W. Eastham for his kindness in checking over and identifying the grasses, rushes, and sedges.

EQUISETACEÆ.

Equisetum hyemale L. (Scouring Rush). (14,885.)

Growing in a small patch on the bank of San José River in the shade of willows. They still retained the earlier spore-bearing heads.

CONIFERÆ.

Juniperus scopulorum Sarg. (Red "Cedar," Rocky Mountain Juniper). (14,843.)

This occurred most commonly in the vicinity of our camp, growing as scattered bushes and small trees, in an open aspen grove having a southern slope on the lake-shore.

Juniperus communis var. *montana* Ait. (Dwarf Juniper). (14,749.)

Not observed so frequently as the first named, its low habit of growth not rendering it at all conspicuous.

Pinus contorta Dougl. (Lodgepole Pine).

The inland form is referred to as var. *Murrayana* Engelm. This is one of the most prevalent forest trees, often mixed with Douglas fir, but as often forming pure stands of close-set trees. This tree is in demand for the characteristic split rail fences of the district, the wood being durable, straight grained, and easily split. A good fence will last twenty to thirty years. (See illustration.)

Pseudotsuga mucronata Raf. (Douglas Fir).

One of the dominant trees of the dry ridges and slopes where it may be found in pure stands or more often mixed with Lodgepole pine. While several fine specimens were noted they do not attain the development of the coastal forms.

Picea Engelmanni Engelm. (Engelmann's Spruce).

This forms dense bands along streamsides or isolated patches in moist but not stagnant hollows.

TYPHACEÆ.

Typha latifolia L. (Broad-leaved Cat-tail; Tule). (14,679J.)

Abundant in the shallow margins of lakes, often forming almost impenetrable aquatic jungles.

SPARGANIACEÆ.

Sparganium simplex Huds. (Simple Stemmed Bur-reed). (14,714.)

Occasionally in shallow water. Specimens collected were just coming into bloom.

NAJADACEÆ.

Potamogeton natans L. (Common Floating Pondweed). (14,757.)

Particularly noted forming masses in the shallows of 130-Mile Lake.

Potamogeton Richardsonii (Benn.) Rydb. (Richardson's Pondweed). (14,715.)

Anthony Lake; 130-Mile Lake, where it forms large beds at the edge of the open channel entering the lake.

Potamogeton pectinatus L. (Fennel-leaved Pondweed). (14,724.)

Jones Lake, 130-Mile Lake; also in the bed of San José River.

Ruppia occidentalis Wats. (Ditch Grass). (14,909.)

One small collection from Jones Lake.

JUNCAGINACEÆ.

Triglochin maritima L. (Seaside Arrow-grass). (14,734.)

Jones Lake; growing in company with *Glaux maritima*; in flower and fruit. A sea-shore plant also growing in the Interior in alkali soil.

Triglochin palustris L. (Marsh Arrow-grass). (14,816.)

In a small marshy area at the east side of Lac la Hache.

ALISMACEÆ.

Sagittaria latifolia Willd. (Arrow-head).

The Wapato of the Indians, who prized its tuberous roots as an article of food. One immature specimen was collected in the shallows of Lac la Hache.

GRAMINEÆ.

Spartina gracilis Trin. (Alkali Cord-grass). (14,731.)

Jones Lake; a plant favouring alkali soil.

Beckmannia syzigachne (Steud.) Fern.

= *erucæformis* (L.) Host. (Slough-grass). (14,811.)

Mile 111, in a slough by side of trail.

Stipa columbiana Macoun. (Sub-alpine Stipa). (14,923.)

Forbes Point; on dry knoll.

Stipa comata Trin. and Rupr. (Needle and Thread Grass). (15,007.)

Jones Lake; dry knolls, growing in evenly scattered tufts intermingled with the other flora. It is typical of the Upper Sonoran zone.

Stipa Richardsonii Link. (Richardson's Feather-grass). (14,861.)

Mile 122; dry knolls and slopes.

- Stipa spartea* Trin. (Northern Buffalo Grass). (14,860.)
Mile 122; dry slope near camp, among a large association of plants growing in a combined natural meadow and open woodland formation.
- Stipa Williamsii* Scribn. (Williams' Stipa). (14,861A.)
Mile 122; with the former, both growing in small scattered tufts.
- Oryzopsis asperifolia* Michx. (Mountain Rice). (14,839.)
Forms the chief ground cover in the Lodgepole pine woods; locally known as "Forest Grass." It was not in flower, but the verdant green blades gave a distinctive character to the woodland association.
- Calamagrostis inexpansa* A. Gray. (Narrow Spiked Reed-grass). (14,768.)
Mile 130; growing on bank of San José River.
- Agrostis hyemalis* (Walt.) B.S.P. (Tickle-grass). (15,048.)
- Koeleria cristata* (L.) Pers. (Koeler's Grass). (14,856.)
122-Mile Lake; Jones Lake; common on knolls and open slopes.
- Trisetum projectum* Louis-Marie. (Tall False Oat-grass). (14,803.)
= *canescens* Buck.
103-Mile Lake; dry slopes in open wood.
- Distichlia stricta* (Torr.) Rydb. (Desert Salt Grass). (14,742.)
Jones Lake; an alkali-loving plant.
- Glyceria borealis* (Nash.) Batch. (Northern Manna-grass). (14,819A.)
122 Mile; open meadow near the lake.
- Glyceria grandis* S. Wats. (Reed Manna-grass). (14,819.)
122 Mile; with the preceding species.
- Glyceria striata* (Lam.) Hitch. (Fowl Manna-grass). (14,700.)
130 Mile; Anthony Lake; low places by lake-side or creek.
- Fluminea festucaceæ* (Willd.) Hitch. (River-grass). (14,999.)
Jones Lake, on marshy border. Previously recorded in British Columbia from Kamloops by J. W. Eastham.
- Puccinellia distans* (L.) Parl. (European Alkali Grass). (14,778.)
103-Mile Lake; along the flat shore margin. Introduced from Europe.
- Puccinellia Nuttalliana* (Schult.) Hitch. (Nuttall's Alkali Grass). (14,744.)
Jones Lake; grassy flats.
- Poa interior* Rydb. (Inland Blue-grass). (14,785.)
103-Mile Lake; dry slopes in woods at edge of lake.
- Poa pratensis* L. (Kentucky Blue-grass). (14,810.)
Introduced from Europe; common on range areas.
- Festuca ovina* L. (Sheep Fescue). (14,788.)
Nason's swamp.
- Agropyron inerme* (Scribn. & Smith) Rydb. (Great Basin Wheat-grass). (14,810.)
111 Mile; Jones Lake; on dry knolls and open slopes. Common, in thinly scattered tufts.
- Agropyron trachycaulum* (Link.) Malte. (Slender Wheat-grass). (14,787.)
103-Mile Lake; dry slope in open woods.
- Elymus condensatus* Presl. (Giant Rye-grass). (14,733.)
Jones Lake; a thick patch in a slight hollow on a low dry ridge, forming a conspicuous element in the plant association of this station.
- Hordeum jubatum* L. var. *cæspitosum* (Scribn.) Hitch. (Squirreltail Barley-grass). (15,002.)
Jones Lake; alkali soil at base of slopes and knolls bordering the lake.

CYPERACEÆ.

Carex aquatilis Wahl. (Water Sedge). (14,711.)

Anthony Lake. The borders of the lake have an extensive flat grassy area well suited to the requirements of sedges.

Carex atherodes Spreng. (Awned Sedge). (14,727.)

Jones Lake. The several species were growing together; intermingled, not in pure stands.

Carex aurea Nutt. (Golden Fruited Sedge). (14,709.)

Anthony Lake.

Carex lanuginosa Michx. (Woolly Sedge). (14,686q.)

Anthony Lake; 103-Mile Lake.

Carex prægracilis W. Boot. (Clustered Field Sedge). (14,687r.)

Anthony Lake.

Carex rostrata Stokes. (Beaked Sedge). (14,698.)

Anthony Lake.

Scirpus americanus Pers. (Three-square Rush). (14,752.)

Jones Lake; an alkali-loving rush.

Scirpus paludosus Nels. (Marsh Bulrush). (14,721.)

Jones Lake; alkaline shore margin. This and the former were growing in mono-specific patches and were at once noticeably conspicuous among the general vegetation.

Scirpus validus Vahl. (Great Bulrush). (14,725.)

According to Mr. Eastham the rush found in the Interior is now considered by Dr. Beetle to be *S. acutus* Muhl.—*S. occidentalis* Chase. *S. validus* is essentially a Coast species.

Found at Jones Lake and in every lake or slough visited. It forms dense jungles in the shallow water.

Eleocharis palustris (L.) R. & S. (Creeping Spike-rush). (14,699.)

Common everywhere, both in the water and on the margins of sloughs, ponds, and lakes; usually in the shallower water between the *Scirpus validus* belt and the shore.

LEMNACEÆ.

Lemna trisulca L. (Ivy-leaved Duckweed). (14,829.)

Jones Lake; the only station noted in the district.

JUNCACEÆ.

Juncus balticus Willd. (Baltic Rush). (14,735.)

Common everywhere around slough and lake borders.

Juncus longistylis Torr. (Long-styled Rush). (15,000.)

Jones Lake; apparently an uncommon species in British Columbia as far as available records show.

LILIACEÆ.

Smilacina sessilifolia Nutt. (Few-flowered False Solomon's Seal). (14,822.)

In moist woods at Forbes Point.

Zygadenus venenosus Wats. (Poison Camas). (14,858.)

Jones Lake; 122 Mile. Scarce; an occasional plant occurring on slopes or flat areas near the lake.

Allium cernuum Roth. (Nodding Onion). (14,821.)

On shady slope near Forbes Point. Some plants observed were only in bud stage and so easily overlooked.

Lilium parviflorum (Hook.) Holtz. (Wild Tiger-lily). (14,677H.)

In the lower parts of open aspen groves wherever the soil is rich in humus.

IRIDACEÆ.

Sisyrinchium angustifolium Miller. (Blue-eyed Grass). (14,703.)

Mile 122; Jones Lake; Anthony Lake. Frequent in open meadows and on slopes bordering lakes and sloughs.

ORCHIDACEÆ.

Habenaria bracteata R. Br. (Long-bracted Rein Orchid). (14,683N.)

Mile 122; in aspen grove on low ground near streamside.

Habenaria viridiflora (Cham.) Rydb. (Tall Green Orchid). (14,922.)

With the former and at 103-Mile Lake, in woods on margin of lake.

SALICACEÆ.

Salix candida Fluegge. (Hoary Willow). (14,770.)

San José River; not common. The specimen collected was growing on the edge of the creek among aspen trees and Twin honeysuckle bushes.

Salix Bebbiana Sarg. (Beb Willow). (14,945.)

Nason's swamp; forming extensive clumps fringing the bog. In company with aspen and birch.

Salix exigua Nutt. (Slender Willow). (14,844.)

On the margins of Lac la Hache, forming small bands and strips along the shore where the soil is rich, as at Forbes Landing.

Salix glaucops Anders. (Gray Willow). (14,901, 14,993.)

On the edge of Lac la Hache, streamside and in other moist or damp localities.

Populus tremuloides Michx. (Aspen).

Forming numerous detached groves on the lower slopes of the hills and ridges or fringing the borders of coniferous woods.

Populus trichocarpa T. & G. (Black Cottonwood). (14,823.)

Not met with to the same extent as the former. Specimens were collected at Forbes Point growing on the edge of the lake.

BETULACEÆ.

Betula glandulosa Michx. (Glandular Birch). (14,942.)

Among the shrubs fringing Nason's swamp; common.

Betula fontinalis Sarg. (Mountain Birch). (14,670A.)

Along the lake-shore and streams near camp.

Alnus tenuifolia Nutt. (Mountain Alder). (14,930.)

On the edge of the lake at Forbes Point; not common.

SANTALACEÆ.

Commandra pallida A.D.C. (Pale Commandra). (14,962.)

Frequently occurring on the dry knolls and slopes in both open and lightly wooded localities; not in flower.

POLYGONACEÆ.

Eriogonum heracleoides Nutt. (Creamy Eriogonum). (14,740.)

Met with on most of the dry knolls and slopes where it occurred in widely scattered tufts and clumps, accenting the general assemblage by its size and showiness of bloom.

Rumex occidentalis Wats. (Western Dock). (14,868.)

An occasional plant was seen growing in the flat wet areas bordering ponds and ditches.

Rumex maritimus L. var. *fueginus* Dusen. (Golden Dock). (14,750.)

Margins of alkali lakes and sloughs. This plant seems to withstand the trampling of stock better than the majority of plants in such places.

Polygonum amphibium L. (Water Knotweed). (14,736.)

Jones Lake and most of the other lakes investigated.

CHENOPODIACEÆ.

Chenopodium glaucum L. (Oak-leaved Goosefoot). (14,796.)

103-Mile Lake; in the mud at the edge of lake.

CARYOPHYLLACEÆ.

Arenaria lateriflora L. (Side-flowered Sandwort). (14,799.)

Frequently met with in open woodland, where it forms a sprawling open network close to the ground.

Stellaria borealis Bigel. (Northern Starwort). (14,704.)

In bogs or on the margins of lakes and sloughs. A small floating mass of decayed *Scirpus validus* supported a tuft of this plant, together with *Scutellaria galericulata* and *Epilobium adenocaulon*.

Silene Menziesii Hook. (Menzies' Campion). (14,967.)

In dry open woods; not common.

CERATOPHYLLACEÆ.

Ceratophyllum demersum L. (Hornwort). (14,759.)

130-Mile Lake; occurring in dense masses.

NYMPHACEÆ.

Nymphaea polysepala (Engelm.) Greene. (Yellow Pond Lily).

Common in nearly every lake or slough, usually in the deep water flanking the outer margins of the *Scirpus* beds.

RANUNCULACEÆ.

Clematis columbiana Hornem. (Columbia Clematis). (14,926.)

Forbes Point; one specimen in open woods; not in flower.

Anemone multifida Poir. (Wind Flower). (14,968.)

Occasionally met with in the open aspen woods.

Thalictrum occidentale Gray. (Western Meadow-rue). (14,694.)

Anthony Lake; in patches in open aspen woods bordering the lake. In flower and fruit.

Ranunculus aquatilis capillaceus D.C. (Water Crowfoot). (14,716.)

Anthony Lake; 130-Mile Lake; in small continuous beds in shallow water.

Ranunculus Bongardi Greene. (Little Buttercup). (14,685P.)

Anthony Lake; in shady aspen woods.

Ranunculus cymbalaria Pursh. (Seaside Buttercup).

103-Mile Lake; on alkaline flat, bordering the lake.

Ranunculus Macounii Britt. (Macoun's Buttercup). (14,762.)

Mile 111; Mile 122; aspen groves by streamside or lake-shore.

Ranunculus Macounii var. *oreganus* (Gray) Davis. (14,820.)

In similar situations as the former.

Ranunculus Purshii Rich. (Pursh's Buttercup). (14,710.)

Forbes Landing, in running stream; Anthony Lake, on muddy margin of lake.

Ranunculus sceleratus L. (Celery-leaved Buttercup). (14,877.)

In bogs and wet margins of sloughs. This plant and *Rumex maritimus* were often all that survived the visitations of roaming stock.

Actæa arguta Nutt. (Western Baneberry). (14,845.)

Forbes Landing; in a shady aspen grove on the shore of the lake. Berries in the green stage.

Delphinium columbianum Greene. (Columbia Larkspur). (14,882.)

One locality near camp; several specimens grew in the shelter of *Juniperus scopulorum*.

BERBERIDACEÆ.

Berberis repens Lindl. (Creeping Barberry). (14,852.)

Occasional; thinly scattered in highland forests.

FUMARIACEÆ.

Corydalis aurea Willd. (Golden Corydalis). (14,679.)

Along roadside near camp.

CRUCIFERÆ.

Lepidium medium Greene. (Tall Western Peppergrass). (14,997.)

Forming small but conspicuous beds and patches on the dry knolls and slopes.

Thlaspi arvense L. (Stinkweed).

A noxious weed in cultivated fields.

Radicula palaustris (L.) Moench. var. *hispida* (Desv.) Robins. (Marsh Cress). (14,824.)

In marshy flats and hollows; in flower and fruit.

Arabis Holboellii Hornem. (Holboel's Rock Cress). (14,998.)

Jones Lake; among the dry knoll association. In fruit.

Sophia viscosa Rydb. (Tansy Mustard). (14,786.)

103-Mile Lake; Mile 122.

Erysimum cheiranthoides L. (Wormseed Mustard). (14,986.)

Frequent, scattered among the stones lining the edge of the lake. Occasionally forms dense stands along roadside ditches.

CRASSULACEÆ.

Sedum stenopetalum Pursh. (Stonecrop). (14,951.)

Found only near Nason's swamp on a dry slope by the side of the trail.

SAXIFRAGACEÆ.

Ribes irriguum Dougl. (Black Gooseberry). (14,898.)

Mile 122; in spruce wood by the side of a stream.

Ribes Hudsonianum Rich. (Black Currant). (14,681.)

Mile 122; moist shady places.

Parnassia palaustris L. (Marsh-grass of Parnassus). (14,708.)

Anthony Lake; on the landward edge of a *Carex* and Rush meadow bordering the lake.

Heuchera ovalifolia Nutt. (Oval-leaved Alum-root). (14,883.)

Sparsely scattered through open aspen woods and adjoining natural meadows.

ROSACEÆ.

Rubus pubescens Raf. (Dewberry). (14,718.)

Anthony Lake; found in abundance associated with *Lupinus Burkei* in an open pine and fir wood. This was the only locality in which it was observed in the Lac la Hache district.

Fragaria glauca (Wats.) Rydb. (Glaucous Strawberry). (14,940.)

Common everywhere in dry open woods.

Rosa Sayi Schw. (Say's Rose). (14,974.)

The common rose of the district, it is the most abundant shrub in the open aspen groves; occurs more rarely in the pine and fir woods.

Rosa Woodsii Lindl. (Wood's Rose). (14,919.)

Forbes Point; not noticed so frequently as the former.

Spiræa lucida Dougl. (White Spirea). (14,841.)

Mile 122; forming dense masses and clumps on a dry slope in an open fir wood; just coming into bloom on July 5th.

Potentilla anserina L. (Silver Weed). (14,772.)

Common on damp margins of lakes and sloughs.

Potentilla anserina var. *concolor* Ser. (14,950.)

In damp alkaline soil on lake borders.

Potentilla glandulosa (Lindl.) Rydb. (Sticky Cinquefoil). (14,981.)

Open slope bordering wood.

Potentilla gracilis Dougl. (Slender Cinquefoil). (14,848.)

On border of aspen grove.

Potentilla monspeliensis L. (Rough Cinquefoil). (14,948.)

Nason's swamp; rich soil on margin of swamp.

Potentilla pentandra Engelm. (Five-stamened Cinquefoil). (14,815.)

Mile 115; the only locality in which it was noted; in the bed of a dry alkali slough.

Potentilla strigosa Pall. (Bristled Cinquefoil). (14,990.)

Nason's swamp; in grassy border.

Geum macrophyllum Willd. (Large-leaved Avens). (14,947.)

Nason's swamp; Mile 122; in rich, moist soil.

Geum rivale L. (Purple Avens). (14,697.)

Anthony Lake; slope between aspen wood and lake meadows.

Amelanchier Cusickii Fern. (June Berry).

Jones Lake; a small patch 18 inches high on a dry knoll.

LEGUMINOSÆ.

Lupinus Burkei Wats. (Burke's Lupine). (14,753.)

Anthony Lake; one large area in open pine and fir wood where it was flowering in profusion, in association with *Rubus pubescens*.

Astragalus Mortoni Nutt. (Morton's Milk-vetch). (14,875.)

103-Mile Lake; one or two plants on a low hummock between lake and fir wood.

Astragalus hypoglottis L. (Milk-vetch). (14,961.)

Nason's swamp; on dry slope near trail.

Astragalus tenellus Pursh. (Slender Milk-vetch). (14,723.)

Astragalus serotinus Gray. (Late Milk-vetch). (15,017.)

One of the most abundant plants, on dry slopes and banks, on the edges of forest or along woodland trails, where it formed isolated tufts or continuous masses of bloom. Most attractive to butterflies and moths.

Vicia americana Muhl. (American Vetch). (14,969.)

Common in thickets and woodland glades.

Lathyrus ochroleucus Hook. (Yellow Pea). (14,955.)

In open aspen groves and borders in well-drained situations.

LINACEÆ.

Linum Lewisii Pursh. (Western Blue Flax). (14,911.)

Jones Lake; on dry slope.

GERANIACEÆ.

Geranium viscosissimum F. and M. (Sticky Geranium). (14,832.)

Common; open aspen woods and among shady thickets.

Geranium Richardsonii F. and M. (White Geranium). (14,684 o.)

Aspen woods and glades on the higher land.

VIOLACEÆ.

Viola canadensis var. *Rydbergii* (Greene) House. (Canada Violet). (14,680.)

Moist shady places on margin of the lake, rooted among the piles of stones, or by streamsides in the spruce belts.

CACTACEÆ.

Opuntia fragilis Haw. (Brittle Prickly Pear Cactus).

Jones Lake; Cummings Lake; occasionally seen on dry knolls and ridges.

ELÆAGNACEÆ.

Elæagnus argentea Pursh. (Silverberry). (14,914.)

Along the edge of the lake at one place near camp.

Shepherdia canadensis Nutt. (Buffalo Berry, Soopolallie).

Much more abundant than the former; occurring as scattered bushes both among the aspens and in the open fir woods.

HALORAGIDACEÆ.

Hippuris vulgaris L. (Marestail, Bottle Brush). (14,932.)

In most of the lakes investigated.

Muriophyllum spicatum L. (Whorled Water-milfoil). (14,910.)

Jones Lake.

ONAGRACEÆ.

Epilobium adenocaulon Haus. (Common Willow-herb). (14,756.)

UMBELLIFERÆ.

Sanicula marylandica L. (Snake-root). (14,888.)

In open aspen woods and borders; scarce.

Leptotænia multifida Nutt. (Lace-leaved Leptotænia). (14,887.)

Aspen grove bordering Lac la Hache. Specimens were growing luxuriantly at the base of *Juniperus scopulorum*.

Lomatium macrocarpum (Nutt.) C. & R. (Gray Desert Parsley). (14,726.)

Jones Lake; in scattered tufts on the dry knolls.

Heracleum lanatum Mich. (Cow Parsnip).

Growing luxuriantly in isolated patches along streamsides and lake borders.

Cicuta vagans Greene. (Western Water-hemlock). (14,672c.)

Frequent along the shore of Lac la Hache, growing at the water's edge among the piles of stones. It causes some loss among grazing animals in the spring.

ARALIACEÆ.

Aralia nudicaulis L. (Sarsaparilla). (14,929.)

Forbes Point; in moist humus in shady woods by lake or streamside; some specimens were in the green fruit stage.

CORNACEÆ.

Cornus canadensis L. (Bunchberry). (14,690.)

Anthony Lake; the only locality in which it was seen, growing on the border of a woodland trail.

Cornus stolonifera Michx. (Red Osier Dogwood). (14,918.)

A few tall bushes along the edge of Lac la Hache near camp.

ERICACEÆ.

Pyrola secunda L. (One-sided Wintergreen). (14,800.)

Mile 103; sloping bank in dry fir forest.

Pyrola chlorantha Swartz. (Green Wintergreen). (14,691.)

Mile 103; growing along with the former.

Pyrola asarifolia Michx. (Wintergreen). (14,779.)

Mile 103; Mile 122; in fir and pine forests.

Arctostaphylos uva-ursi Spreng. (Bearberry).

A common ground cover in the dry, open woodlands.

PRIMULACEÆ.

Glaux maritima L. (Sea Milkwort). (14,729.)

Jones Lake; one small patch on edge of lake among sedges and rushes; an alkali-loving plant.

APOCYNACEÆ.

Apocynum androsæmifolium L. (Spreading Dogbane). (14,684.)

Mile 122; forming large beds and patches on a dry slope in an open fir wood. Just coming into flower on July 6th.

POLEMONIACEÆ.

Gilia linearis Gray. (Narrow-leaved Gilia). (14,771.)

Mile 130; dry, open woodland.

HYDROPHYLLACEÆ.

Phacelia Menziesii Torr. (Menzies' Phacelia). (14,835.)

Dry, open slopes and knolls; one of the most conspicuous and beautiful flowers in the district.

BORAGINACEÆ.

Lappula occidentalis (Wats.) Rydb. (Western Stickseed). (14,846.)

Dry slopes and roadsides.

Lithospermum angustifolium Michx. (Gromwell). (14,963.)

Dry slopes and meadows; in tufts when intermingled with *Astragalus serotinus*. The bright yellow of the former and the blue of the latter made a showy contrast of colour.

Lithospermum pilosum Nutt. (Puccoon). (14,971.)

Mile 122; one specimen, just coming into flower. Open dry slope on higher margin of aspen wood.

LABIATÆ.

Scutellaria galericulata L. (Marsh Skullcap). (14,730.)

Jones Lake; 103-Mile Lake; wet marshy ground. One clump was growing on a floating mass of decayed *Scirpus*.

Dracocephalum parviflorum Nutt. (Dragon's-head). (14,818.)

Mile 122; on an open dry slope; scarce.

Stachys palaustris L. var. *pilosa* (Nutt.) Epling. (Swamp Hedge Nettle). (14,812.)

Mile 115; in the bed of a dry slough along with *Potentilla pentandra* and *Rumex maritima*.

Lycopus lucidus Turcz. (Western Water Horehound). (14,824.)

Forbes Point; in wet place at edge of lake.

Mentha canadensis L. (Canada Mint). (15,011.)

Jones Lake; wet soil at edge of lake.

SCROPHULARIACEÆ.

Pentstemon procerus Dougl. (Tall Pentstemon). (14,906.)

In scattered tufts on dry slopes.

Veronica americana Schwein. (Brooklime).

Brooks and ditches everywhere.

Castilleja lancifolia Rydb. (Lance-leaved Paint-brush). (14,746.)

Jones Lake; rich soil near willows by lake margin.

Castilleja miniata Dougl. (Common Paint-brush). (14,696.)

Everywhere in open thickets bordering lakes and hollows and shady slopes on the higher ground.

Orthocarpus luteus Nutt. (Yellow Lesser Paint-brush). (14,814.)

Mile 115; lower slopes of ridge near wet ground. In beds and patches along with *Erigeron lonchophyllus*.

Rhinanthus crista-galli L. (Yellow Rattle). (14,831.)

Near cultivated ground.

OROBANCHACEÆ.

Orobanche fasciculata Nutt. (Clustered Broom-rape). (14,732.)

Jones Lake; parasitic on the roots of *Artemisia frigida*.

LENTIBULARIACEÆ.

Utricularia vulgaris L. (Common Bladderwort). (14,862.)

Abundant, forming a floating network in the shallow reaches of lakes and sloughs; notable at the time for the profusion of bright yellow flowers.

RUBIACEÆ.

Galium boreale L. (Northern Bedstraw). (14,704.)

Common in small beds and groups on the dry knolls and slopes or in open thickets on lower ground.

Galium trifidum L. (Small Bedstraw). (14,944.)

Nason's swamp; on adjoining meadow flat.

CAPRIFOLIACEÆ.

Linnæa borealis var. *Americana* (Forbes) Rehder. (14,798.)

Common in dry coniferous woods.

Lonicera involucrata Banks. (Black Twinberry). (14,677.)

San José River; shady woods by the side streams.

Symphoricarpos racemosa Michx. (Wax Berry). (14,739.)

Mile 122; scrubby bushes up to 2 feet high forming close-set clumps and patches on the dry slopes at the edges of woods.

VALERIANACEÆ.

Valeriana sylvatica Banks. (Wood Valerian). (14,717.)

Anthony Lake; in the open aspen woods; both in flower and fruit.

COMPOSITÆ.

Erigeron lonchophyllus Hook. (Low Meadow Fleabane). (14,780.)

Mile 115; Mile 130; in scattered groups on the alkali flat bordering the lake.

Erigeron acris var. *Dræbachiensis* Blytt. (Bitter Fleabane). (14,686 I.)

Mile 122; rich soil among aspen trees near a stream.

Erigeron flagellaris Gray. (Flagellate Fleabane). (14,988.)

Mile 122; dry slopes, forming dense mats in scattered groups. One of the earliest *Erigerons* to flower.

Erigeron philadelphicus L. (Common Fleabane). (14,941.)

Rich soil on the bank of a stream near Lac la Hache.

Erigeron speciosus D.C. (Showy Fleabane). (14,830.)

Dry slopes of the natural meadows; occurring as widely scattered plants.

Solidago lepida var. *elongata* (Nutt.) Fern. (Narrow Goldenrod). (14,682M.)

Mile 122; moist banks, just coming into flower.

Gaillardia aristata Pursh. (*Gaillardia*). (14,855.)

A most conspicuous plant of the dry knolls.

Achillea millefolium L. (Yarrow). (14,880.)

Common everywhere; one small patch consisted of pink-flowered individuals.

Artemisia canadensis Michx. (Canada Wormwood). (14,685.)

One specimen; on open slope below coniferous forest.

Artemisia frigida Willd. (Pasture Wormwood). (14,836.)

A characteristic plant of the dry slopes and knolls; tufted.

Arnica fulgens Pursh. (Shining Arnica). (14,916.)

Nason's swamp, Mile 122; dry areas in open woods and natural upland meadows.

Senecio canus Hook. (Gray Ragwort). (14,720.)

Jones Lake; on a dry knoll, scarce.

Senecio cymbalarioides Nutt. (Pale Ragwort). (14,905.)

Open aspen groves and lower slopes of upland meadows.

Senecio Balsamitæ var. *thomsoniensis* Greenm. (Balsam Ragwort). (14,705.)

Anthony Lake; in open aspen wood.

Senecio multnomensis Greenm. (Multnomah Ragwort). (14,792.)

Mile 103; lower slopes of open fir forest near lake.

Antennaria Howellii Greene. (Howell's Everlasting). (14,692.)

Met with occasionally in open coniferous forest.

Antennaria parvifolia Nutt. (Small-leaved Everlasting). (14,793.)

Common on dry slopes and openings in woods. In flower end of June; in fruit July 6th.

Tragopogon pratensis L. (Yellow Oyster Plant).

Forbes Point; one specimen in flower on a dry knoll.

Taraxacum officinale Weber. (Common Dandelion). (14,948.)

Abundant; thriving in every situation, from large succulent plants in moist areas to tiny attenuated specimens on the dry slopes.

Crepis intermedia Gray. (Intermediate Hawkweed). (14,747.)

Jones Lake; on the dry slopes and knolls; scarce.

Agoseris glauca (Pursh.) Greene. (Pale Agoseris). (14,817.)

Scattered individuals in the aspen groves and upper meadows bordering the forest.

Hieracium cynoglossoides Arvet. (Houndstongue Hawkweed). (14,847A.)

One specimen only, on a dry slope near camp.

INSECTS.

Insects were collected at every opportunity but since the limited time at our disposal precluded an intensive effort in this direction, attention was devoted more to the conspicuous species such as would indicate the types common to the region.

Much of the material has not yet been worked up; hence the following list can only be considered as an interim report.

BUTTERFLIES.

Papilio glaucus canadensis R. & J. (Tiger Swallowtail).

Fairly common in the glades and open spaces in the aspen groves.

Papilio zelicaon Luc. (Mountain Swallowtail).

One specimen taken near camp.

Ascia occidentalis Reak. (Western White).

About low meadow lands.

Ascia napi var. *pallida* Scud. (Mustard White).

Taken flying about a hay meadow.

Ascia rapæ L. (Cabbage White).

Common; roadside near meadows.

Eurymus interior Scud. (Pink-edged Sulphur).

Moderately common; often seen drifting down-wind over the open slopes or along woodland glades.

Cænonympha ampelos Edw. (Ringless Ringlet).

Commonly met with flitting weakly from flower to flower.

Oeneis macounii Edw. (Banded Arctic).

This fine species was taken or seen as it flew rapidly over the rolling hillside spaces, alighting now and then to sip at a flower.

Dryas atlantis Edw. (Northern Silver-spot).

This splendid butterfly frequented open spaces and glades in the woods, coming in over the trees or rapidly dodging between them.

Dryas biscoffi Edw. (Cariboo Silver-spot).

Frequent in meadows and glades.

- Brenthis bellona* Fabr. (Meadow Fritillary).
In similar haunts as the preceding.
- Euphydryas anicia* Dbld. & Hew. (Checker-spot).
Appearing in July in the meadows.
- Lemonias palla* Bdv. (Northern Checker-spot).
One specimen in meadow near camp.
- Phyciodes tharos pascænsis* Wright. (Pearl Crescent).
Fairly common; spends a great deal of its time on flowers.
- Hamadryas milberti* Godt. (American Tortoiseshell).
One specimen flying about damp soil at margin of a swamp.
- Basilarchia arthemis rubrofasciata* B. & McD. (Banded Purple).
Becoming common in July; taken on flowers of Cow parsnip and in the vicinity of aspen trees.
- Lycæna heteronea* Bdv. (Blue Copper).
One specimen, flying over Milk-vetch.
- Everes amyntula* Bdv. (Western Tailed Blue).
Common about flowers or by muddy slough margins.
- Plebejus melissa* Edw. (Orange-margined Blue).
Occurring with the former.
- Glaucopsyche lygdamus* var. *oro* Scud. (Northern Blue).
Common in same situations as the preceding two species.

MOTHS.

- Hemaris thysbe f. cimbiciformis* Steph. (Hummingbird Clearwing).
This fine moth was taken in a woodland glade hovering over Milk-vetch flowers. A rare species in British Columbia though common in Eastern Canada.
- Hemaris diffinis* var. *rubens* Hy. Edw. (Snowberry Clearwing).
With the preceding. Much commoner in British Columbia than the former species.
- Smerinthus jamaicensis gemminatus* Say. (Twin-spotted Hawk-moth).
A newly emerged specimen was captured as it was fluttering along the ground at dusk among aspen trees.
- Sphinx gallii intermedia* Kby. (Bedstraw Hawk-moth).
Found on the ground by George Forbes near a window to the light at which it may have been attracted during the previous night.
- Pachysphinx modesta* Harris. (Big Poplar Sphinx).
Two specimens taken; one at rest on aspen stub, the other floating on the water of the lake.
- Sepsis packardii* Grt. (Scape Moth).
One specimen taken flying in an aspen wood.
- Nemophila plantaginis* L. (Black and White Tiger-moth).
Taken at rest on leafy herbage and in flight. When disturbed it starts up unexpectedly, flies erratically for a short distance then abruptly dives into the herbage.
- Euclidia cuspidata* Hbn. (Pointed Grass Moth).
Euclidia distincta Newn. (Range Grass Moth).
Both found among the grass in open spaces, the latter appearing to be the commoner of the two.
- Malacosoma disstria* Hbn. c. *erosa* Stretch. (Tent-caterpillar).
The foliage of nearly all the aspens was completely consumed by the caterpillars of this moth, giving a very wintry appearance to the trees. The near-by bushes of rose,

willow, birch, alder, and dogwood were similarly affected. Evidence of a heavy parasitic infestation was very apparent, chiefly the work of a two-winged fly of the family Tachinidæ. An even heavier visitation of the caterpillars occurred the year before.

BEETLES.

Beetles were not noticeably plentiful. Species frequenting flowers were those chiefly collected. Cerambycidæ (Long-horned Beetles) and Buprestidæ (Flat-headed Borers) were especially sought for. Those taken in these families include the following:—

Long-horned Beetles (Cerambycidæ).

Toxotus vestitus Hald. (Russet Longhorn).

The red-legged form only. On flowers of rose or flying among the aspen trees in the vicinity of the camp.

Leptacmæops longicornis (Kby.).

Fairly common on rose flowers, feeding on the pollen by day and resting on them at dusk.

Acmæops pratensis Laich. (Meadow Longhorn).

Occasionally taken on flowers of rose or by "sweeping" the Milk-vetch blooms.

Anoplodera sanguinea Lec. (Ruddy Leptura).

On rose flower.

Neoclytus muricatulatus (Kby.).

Taken while running over a newly-felled Engelmann spruce.

Xylotrechus obliterated Lec.

On trunks of aspen trees.

Monochamus oregonensis Lec. (The Blacksmith).

Plentiful, flying or resting on a newly-felled Engelmann spruce.

Flat-headed Borers (Buprestidæ).

Buprestis langi (Mann.) (Lang's Buprestid).

Flying about aspen trees.

Melanophila fulvoguttata drummondi (Kby.) (Drummond's Buprestid).

Several; about newly-felled Engelmann spruce.

Anthaxia æneogaster Cast. (Metallic-fronted Buprestid).

Common on rose and other flowers.

Dicerca tenebrica Kby. (Dull Fork-wing).

Usually taken while at rest at the base of aspen trees; or occasionally circling about making loud buzzing noise. Identified by G. R. Hopping.

Chrysobothris pseudotsugæ Van Dyke.

Actively flying or running about the trunk and branches of newly-felled Engelmann spruce. Identified by G. R. Hopping.

FLEAS.

Many specimens of fleas were collected from some of the mammals taken at Lac la Hache. These were sent to Mr. George P. Holland, of the Livestock Insect Laboratory, Kamloops, B.C., who has kindly submitted the following identifications and notes:—
From Sagebrush White-footed Mouse (*Peromyscus m. artemisiæ*).

Catallagia decipiens Rothschild. Found in the interior of the Province; also in Alberta and Saskatchewan.

Monopsyllus wagneri wagneri (Baker). The most common flea on native western mice.

From Columbian Red Squirrel (*Sciurus h. columbiensis*).

Orchopeas caedens duras (Jordan).

Monopsyllus vison (Baker). Both regularly found on squirrels east of the Cascades.

Monopsyllus w. wagneri (Baker). Usually on mice.

Megabothris sp. Female specimen only.

From Bushy-tailed Wood Rat (*Neotoma c. occidentalis*).

Orchopeas sexdentatus agilis (Rothschild). Commonly found on Pack rats.

From Okanagan Flying Squirrel and nest (*Glaucomys s. columbiensis*).

Opisodasys vespertalis (Jordan).

Opisodasys pseudarctomys (Baker). Both regularly found on flying squirrels.

Monopsyllus vison (Baker).

Orchopeas caedens durus (Jordan). Both usually found on red squirrels.

FISHES.

Oncorhynchus nerka kennerlyi (Suckley) (Kokanee).

Kokanee or land-locked sockeye occur in Lac la Hache in large numbers and are of considerable importance as a sport fish. In early summer they take a worm readily when trolled behind a spoon or flasher on light tackle. At this season the fish are about 12 inches in length and in good condition. The stomach of one was found to contain large numbers of emerging chironomid flies.

In late September and October kokanee appear in large numbers to spawn along the beaches of the lake. At this time many are taken by Indians using beach-seines up to 100 feet in length. The native salmon measure from 11 to 13 inches in length and exhibit the coloration and jaw development typical of their larger salt-water relatives. The fish are smoked or salted for winter use by the Indians.

Four spawning specimens (545-548) were collected on October 4th, 1942, and were sent to the Museum by Mr. G. F. Forbes.

Salmo gairdneri kamloops (Kamloops Trout).

According to Dominion Fisheries Reports eyed eggs of Kamloops trout were planted in Lac la Hache as follows: 1932-33, 15,000 eggs; 1933-34, 20,000 eggs; 1934-35, 40,000 eggs; 1935-36, 20,000 eggs; 1936-37 (into Forbes Creek), 30,000 eggs; 1937-38, 30,000 eggs. All the eggs were from the Pemberton Hatchery, except the last lot, which was from Lloyds Creek.

Trout of this species are said to be present in the lake but they are not commonly caught. The size is reported to range up to 6 lb. in weight.

Cristivomer namaycush (Walbaum) (Great Lake Trout).

Lake trout appear to be common. In summer they are taken by trolling in deep water with a large spoon on a wire line. Seven fish were caught by this means and several were lost during the period June 29th to July 4th. The fish ranged in weight from 9 to 19 lb., and all but one were females. One female contained well-developed eggs and in addition large numbers of shells which were apparently from last year's eggs, indicating that the fish had failed to spawn in the previous season.

In winter, Lake trout are "skated down" under the ice and are speared. This is possible only when the ice is clear and fairly thin at which time fish can be seen in water up to 20 feet in depth. When a fish is sighted, one or two skaters approach the fish from the deep-water side and slowly drive it into shallower water. When the fish appears to be travelling in a favourable direction a third person quickly chops a hole in the ice at a point some distance in front of the fish. The victim is then easily speared as it slowly passes the hole. Lake trout up to 40 lb. in weight have been taken in this manner.

Prosopium williamsoni (Girard) (Rocky Mountain Whitefish).

Whitefish, presumably of this species, are sometimes seen in schools under the ice but they are not often taken. Twenty-three small individuals, measuring about 1¾ inches in length were taken in a beach-seine on June 29th (535); they appear to be of this species.

Catostomus catostomus (Forster) (Fine-scaled Sucker).

The Fine-scaled sucker is said to be numerous; large numbers ascend 122-Mile Creek in April as soon as the ice goes out, according to Mr. Forbes.

Catostomus macrocheilus (Girard) (Coarse-scaled Sucker).

The Coarse-scaled sucker is also common in the Lac la Hache area. It is said to run up the tributary streams in May shortly after the preceding species appears. Several adult specimens (554-559) were taken in the San José River between Lac la Hache and 130-Mile Lake on July 1st. They were in an emaciated condition, suggesting that they were the remnants of a spawning run earlier in the season.

Ptychocheilus oregonensis (Richardson) (Squawfish).

Squawfish are reported to be plentiful in Lac la Hache; many fish, presumably of this species, were seen rising at the surface on several occasions.

Richardsonius balteatus (Richardson) (Shiner).

Shiners are said to be plentiful in Lac la Hache; large numbers ascend tributary streams each spring. One adult (534) was taken by seine in Lac la Hache on June 29th; six immature individuals (533), each measuring about 1½ inches in length, were taken in San José River on July 1st.

Lota maculosa (LeSeur) (Ling).

Ling are reported to be common; they used to be taken in some numbers by Indians using set-lines in deep water. In winter, individuals up to 4 feet in length may be caught by spearing through the ice. Two small specimens (536), each measuring 1 inch in length, were taken by seine in Lac la Hache on June 28th.

AMPHIBIANS.

Bufo boreas boreas (Baird and Girard) (Northwestern Toad).

By far the most common amphibian in the region around Lac la Hache is the toad. Adults of various sizes were seen in practically every moist area and tadpoles were present in all small lakes and swamps examined. In some lakes, such as 103-Mile Lake, Anthony Lake, Jones Lake, and Cummings Lake, larvæ were exceedingly numerous, milling around in tremendous swarms or grouped in droves all moving in one direction. In the latter lake, tadpoles were concentrated in one end where the water was foul with decaying algæ and other aquatic vegetation; apparently as a result of lack of oxygen or the presence of poisonous substances, many larvæ were dead or dying.

Some tadpoles collected in Nason's swamp (121 Mile) on June 26th underwent metamorphosis about July 5th.

Rana pretiosa (Baird and Girard) (Western Spotted Frog).

The Spotted frog appears to be fairly common in this area. Adults were collected from the following places: Anthony Lake, San José River, Pond (Mile 115), and 122-Mile Creek. Tadpoles which appeared to be of this species were collected in a swamp on Forbes Point and in an alkali pot-hole at Mile 90. A specimen (659) taken on June 24th in the latter locality measured 65 mm. in length and possessed well-developed hind legs; it was extremely pale in colour. The water in which it was found was almost milky white in appearance and contained large numbers of phyllopod (*Branchinecta* sp.) and cladocerans (*Daphnia retrocurva*).

Rana sylvatica cantabrigensis Baird (Northern Wood Frog).

The Wood frog is widely distributed but does not appear to be abundant. One specimen (654) was collected along a stream 9 miles north of Clinton on June 24th; another individual (651) was taken by Mr. J. A. Munro in a field near Anthony Lake on June 30th.

Ambystoma macrodactylum Baird (Long-toed Salamander).

The Long-toed salamander appears to be the only representative of the tailed amphibians in the Lac la Hache area. Mr. Forbes reports having found salamanders on one or two occasions under decaying logs. From the description given they were judged to be of this species.

REPTILES.

Thamnophis sirtalis ssp. (Northwestern Garter Snake).

Reptiles are poorly represented in this area, the garter snake apparently being the only member present.

Several Northwestern garter snakes were seen, some of large size and always in the neighbourhood of water. One specimen (662) was taken at Forbes Point on June 27th.

Thamnophis ordinoides vagrans (Baird and Girard) (Wandering Garter Snake).

One small specimen of this snake was taken at Cummings Lake on June 29th (663). The coloration of this individual is of interest; the dorsal stripe is light grey instead of the more usual dull yellow, while the lateral stripe is represented only by a series of light areas between the scales. The remaining colour pattern is more or less normal in appearance.

BIRDS.

The Lac la Hache area with its large number of small lakes is a breeding centre for many species of water-fowl. Through the courtesy of Mr. J. A. Munro the writers visited many nesting-grounds in the vicinity, but only a few bird specimens were taken. Since it would be impractical to include an account of the birds in this report, interested persons are referred to Mr. Munro for particulars.

MAMMALS.

Myotis lucifugus alascensis Miller (Little Brown Bat).

Bats, presumably of this species, were seen on only a few evenings during our stay at Lac la Hache. On two occasions only one individual was seen; on one occasion two bats were observed. At all times they were flying at about the level of the tree-tops.

One specimen (4939) was taken by George Forbes on July 21st, 1942.

Ursus americanus americanus Pallas (Black Bear).

Bears are said to be plentiful but none was seen during our stay. According to Mr. Forbes, they are commonly seen in the spring where carcasses of cattle are left on the range and in fall when berries are ripe.

Martes pennanti columbiana Goldman (British Columbia Fisher).

Not known in the area covered by this report. The nearest report of their presence is from Canim Lake and Clearwater area, 30 miles east of Lac la Hache.

Mustela cicognanii richardsonii Bonaparte (Richardson Weasel).

The weasel is said to be common. Although not generally seen, the tracks are numerous in freshly fallen snow. According to Mr. Forbes, the weasels are as numerous as ever despite heavy trapping.

Mustela vison energumenos (Bangs) (Northwestern Mink).

Mink are said to be present but are not so common as they were in former years.

Gulo luscus (Linnæus) (Wolverine).

The wolverine is of rare occurrence. Mr. F. G. Forbes took one specimen in 1912.

Lutra canadensis pacifica (Rhoads) (Pacific Otter).

Many years ago otter used to be present in this area, but at present none are known.

Mephitis mephitis hudsonica Richardson (Great Plains Skunk).

Skunks are common. They often become a nuisance to residents of the district by invading farmyards and taking up residence beneath buildings. One local method of dealing with a skunk on such occasions is to catch the animal in a spring trap to which has been tied 20 to 30 feet of rope. The victim can then be led or dragged some distance from habitation before being dispatched.

One specimen (4930), an extremely fat female, was taken near an abandoned building on July 5th, 1942.

Taxidea taxus neglecta (Mearns) (Western Badger).

A badger is occasionally seen in the district but is undoubtedly rare.

Canis latrans incolatus Hall (Northern Coyote).

Mr. Forbes reports that coyotes have been more plentiful of late than they have been for many years although they were more numerous thirty years ago. Twenty-eight were taken by him last season; many were heavily infested with lice.

Vulpes fulva abietorum Merriam (British Columbia Red Fox).

Foxes, possibly of this race, are reported to be present but not common.

Canis lupus occidentalis (Richardson) (Wolf).

Wolves are seldom seen in the vicinity of Lac la Hache, but are said to be more common a few miles to the east. One was shot on Forbes' property on March 28th, 1940; a large black individual was seen chasing a deer on the highway at Mile 124 on October 30th, 1942, according to Mr. Forbes.

Felis concolor hippolestes (Merriam) (Rocky Mountain Cougar).

Cougar are not known to be present in the area immediately surrounding Lac la Hache, but they are said to occur in the hilly country to the east. Mr. Forbes reports that a steer once came in from the range country with a badly torn back which he believes was caused by a cougar.

Lynx canadensis canadensis Kerr (Canada Lynx).

Lynx are not known to occur at the present time but are said to have been present some years ago.

Marmota flaviventris avara (Bangs) (Yellow-bellied Marmot).

Marmots are common throughout the district. They are most usually seen along roadsides near cultivated fields or around abandoned buildings under which their burrows lead. These rodents were first noted in the Lac la Hache area about fifteen years ago.

Shortly after the Museum party arrived at Lac la Hache a number of persons armed with rifles cruised up and down the highway by car shooting marmots, apparently for target practice or amusement. A small colony of marmots under a near-by building was exterminated by these hunters and few were seen in the district after this episode.

Citellus columbianus columbianus (Ord) (Columbian Ground Squirrel).

This rodent is not numerous in the Lac la Hache area but it appears to be widespread. Two specimens (4928 and 4929) were taken near the camp-site; several others

were seen in the same area and on the road to Timothy Lake, a few miles east of Mile 116, and at Anthony Lake. They seem to prefer cultivated fields where they find refuge beneath rock-piles.

Mr. Forbes states that they first appeared fifteen or sixteen years ago and that occasionally they are used to feed captive mink.

Eutamias amoenus ludibundus (Hollister) (Hollister Chipmunk).

The chipmunk does not appear to be abundant in the area covered by this report; few were seen and only five specimens were collected, three of these being taken in mouse-traps. One of the latter (4917) was a pregnant female taken on June 27th, 1942.

Sciurus hudsonicus columbiensis Howell (Red Squirrel).

The Red Squirrel is exceedingly abundant in the wooded areas around Lac la Hache. Apart from its potentialities as a destroyer of young birds and as a distributor of seeds it is of considerable economic value as a fur bearer. According to local sources of information, trappers take as many as twenty-five or thirty squirrels a day and average about 300 skins per season. Despite this heavy drain on the population, squirrels are said to be as numerous as ever. Numbers 4921 and 4922 were taken as specimens.

Glaucomys sabrinus columbiensis Howell (Flying Squirrel).

Flying squirrels are said to be common in this area but they are seldom seen, no doubt as a result of their nocturnal habits. Occasionally they are taken in traps set for weasels and squirrels, but they are of little importance to the fur trapper.

An adult female (4923) was collected. It harboured many fleas, which have since been identified by Mr. G. P. Holland, as given in the account of the insects.

A young one, captured by chopping down a Douglas fir stub containing a nesting-hole, was brought to the Museum alive. It has become quite tame and feeds readily on milk, fruit, seeds, and nuts.

Castor canadensis sagittatus Benson (Pacific Beaver).

Beaver, presumedly of this race, were planted in this area by the Game Department in 1930. They were not trapped for some years, with the result that they are now said to be reasonably plentiful.

Peromyscus maniculatus artemisiæ (Rhoads) (White-footed Mouse).

The white-footed mouse is common in this area, particularly along the edge of the lake, along streams, and in other damp habitats. No specimens were taken in the dry forest.

Neotoma cinerea occidentalis (Baird) (Western Bushy-tailed Wood Rat).

Bushy-tailed rats (pack rats) are numerous. Mr. Forbes states that they were far more numerous some years ago; in one season he killed sixty around the farm buildings.

Investigation revealed signs of pack-rat activity beneath the roots of a Douglas fir tree about 30 yards from camp and traps set there caught a pair of adults (4924, 4925). A third adult (4926) was taken near an abandoned building.

Clethrionomys gapperi saturatus (Rhoads) (British Columbia Red-backed Mouse).

The Red-backed mouse is said to be common in certain areas; in particular, in the damp "spruce bottoms" and along streams.

Microtus pennsylvanicus drummondi (Audubon and Bachman) (Drummond Meadow Mouse).

Meadow mice are common in open fields and along stream edges. Three specimens (4918, 4919, and 4920) were taken.

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

Muskrats, probably of this subspecies, are common. Signs of their presence, such as feeding-platforms, houses, cut water plants, and in some cases muskrats themselves, were seen in 130-Mile Lake, Cummings Lake, and Jones Lake. They are said to have been more numerous in past years, except for 1941, than in previous times.

Zapus hudsonius tenellus Merriam (Alaskan Jumping Mouse).

The jumping mouse appears to be fairly numerous in certain areas around Lac la Hache. Specimens Nos. 4906 to 4912 were taken along the lake-shore and in a damp habitat among willow-cover along an irrigation-ditch bordering an open field.

Erethizon epixanthum nigrescens Allen (Dusky Porcupine).

Porcupines are apparently common in this area. Evidence of their presence in the form of damaged trees is occasionally noted and a lone individual was reported to have crossed a near-by hay-field while we were in camp.

At times cattle are found carrying quills in their noses, apparently as a result of an encounter with a porcupine. During one season two steers belonging to Mr. Forbes' herd were thus afflicted, and as a result of the interference with their normal feeding activities they were so thin as to be unsuitable for market.

Lepus americanus pallidus Cowan (Chilcotin Varying Hare).

Rabbits, more correctly called hares, are said to be common around fields and in open glades. No specimens were seen by the Museum party.

Odocoileus hemionus hemionus (Rafinesque) (Mule Deer).

The Mule deer is abundant despite the large number taken each year by hunters. During the short period while the Museum party was in camp, deer were seen on at least a half-dozen occasions. It is said to be not uncommon to see a dozen or more grazing over a hillside at one time.

Alces americana americana (Clinton) (American Moose).

This largest member of the deer family is present in considerable numbers in the vicinity of Lac la Hache, even during the summer months. No moose was seen while we were in the district but fresh tracks and other signs were observed on several occasions.

MISCELLANEOUS INVERTEBRATES.

MOLLUSCS.

Only a few molluscs were collected. These have been identified by Mr. J. P. Oughton, of the Royal Ontario Museum of Zoology, as given below:—

Lymnea stagnalis var. *jugularis* (Say.) (Fresh-water Snail).

Collected in Nason's swamp, Mile 121 (June 26th, 1942), and Anthony Lake, 116-Mile Road (June 30th, 1942).

Helisoma trivolis var. *subcrenatum* (Cpr.) (Ramshorn Snail).

Collected in Nason's swamp, Mile 121 (June 26th, 1942), in Anthony Lake, 116-Mile Road (June 30th, 1942), and from a dry slough, Mile 115 (July 4th, 1942).

Stagnicola palustris (Müll.) (Fresh-water Snail).

Found in dry slough, Mile 115 (July 4th, 1942).

Sphærium sp. (Fresh-water Clam).

Shells of unidentified species of *Sphærium* were found in Nason's swamp and Anthony Lake.

CRUSTACEA.

From plankton samples taken in some of the lakes visited the following organisms have been identified:—

Phyllopoda.

Branchinecta sp. An undescribed species found in an alkali pond at Mile 90 and in Mirage Lake.

Limnetis gouldii Baird. 101-Mile Lake.

Cladocera.

Sida crystallina (O. F. Müller). 130-Mile Lake.

Daphnia magna Straus. Cummings Lake and Westwick Lake.

Daphnia pulex (de Geer). Anthony Lake and Cummings Lake.

Daphnia retrocurva (Forbes). Alkali pond, Mile 90.

Daphnia longispina (O. F. Müller). 103-Mile Lake, 130-Mile Lake, and Jones Lake.

Simocephalus vetulus (O. F. Müller). 130-Mile Lake.

Scapholeberis mucronata (O. F. Müller). 103-Mile Lake and 130-Mile Lake.

Ceriodaphnia lacustris Birge. Jones Lake and 130-Mile Lake.

Chydorus sphaericus (O. F. Müller). 103-Mile Lake, 130-Mile Lake, and Jones Lake.

Polyphemus pediculus (Linné). Jones Lake.

Copepoda.

Epischura nevadensis Lilljeborg. 130-Mile Lake.

Diaptomus piscinæ Forbes. Anthony Lake and 103-Mile Lake.

Diaptomus denticornis Wierzejski. Jones Lake, Anthony Lake, and Cummings Lake.

Cyclops viridis var. *americanus* Jurine. Cummings Lake.

Cyclops bicuspidatus Claus. Anthony Lake and 103-Mile Lake.

Cyclops albidus Jurine. Jones Lake and Cummings Lake.

Cyclops serrulatus Fischer. 103-Mile Lake and Jones Lake.

Amphipoda.

Hyalella azteca Saussure. Jones Lake, Cummings Lake, and 103-Mile Lake.

VICTORIA, B.C. :

Printed by CHARLES F. BANFIELD, Printer to the King's Most Excellent Majesty.

1943.