

PROVINCE OF BRITISH COLUMBIA

REPORT

OF THE

PROVINCIAL MUSEUM

OF

NATURAL HISTORY

FOR THE YEAR 1916



THE GOVERNMENT OF  
THE PROVINCE OF BRITISH COLUMBIA.

PRINTED BY  
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:

Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.

1917.



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To His Honour FRANK STILLMAN BARNARD,  
*Lieutenant-Governor of the Province of British Columbia.*

MAY IT PLEASE YOUR HONOUR:

The undersigned respectfully submits the Annual Report of the Provincial Museum of Natural History for the year 1916.

J. D. MACLEAN,  
*Provincial Secretary.*

*Provincial Secretary's Office, Victoria,  
March, 1917.*



PROVINCIAL MUSEUM OF NATURAL HISTORY,

VICTORIA, B.C., March 24th, 1917.

*The Honourable J. D. MacLean, M.D.,*

*Provincial Secretary, Victoria, B.C.*

SIR,—I have the honour, as Director of the Provincial Museum of Natural History, to lay before you the Report for the year ending December 31st, 1916, covering the activities of the Museum.

I have the honour to be,

Sir,

Your obedient servant,

FRANCIS KERMODE,

*Director.*





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2.

Fig. 1. Stone pile-driver (Cat. No. 2891).  
Fig. 2. Carved stone baton.



# PROVINCIAL MUSEUM REPORT

FOR THE YEAR 1916.

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In reviewing the activities of the Provincial Museum for the year ending December 31st, 1916, it is to be noted that considerable progress has been made, and that a number of rare specimens have been added to the collection, with valuable data.

At the beginning of the year the Director was informed that all departments of the Civil Service would be expected to exercise the strictest economy and still keep up efficiency. With that end in view the work in the Provincial Museum has been carried on throughout the year. Only two parties were sent afield for any length of time during the summer months.

Mr. J. A. Munro was engaged from the middle of April to the end of October to carry on the biological investigations commenced last year in the Northern Okanagan and Shuswap Districts.

Mr. E. M. Anderson, of the Museum staff, was stationed in the Lillooet District from the beginning of May to the end of July, headquarters being established at the Provincial Government Hatchery, at Seton Lake, by kind permission of Mr. J. P. Babcock, Assistant to the Commissioner of Fisheries. Mr. Anderson made trips to Blackwater Lake, and also ascended Mount McLean, where some good material was secured, of which no detailed reports have been received.

The Director, accompanied by Dr. C. F. Newcombe, also visited this district, and secured some very interesting specimens for the Herbarium, also for the anthropological sections.

The matter of obtaining Bare Island for a permanent bird sanctuary has not made any further advancement. However, the Director made special arrangements again with the Indian Department for this Department to place a guard on the island during the nesting season to look after the preservation of bird-life. This arrangement has done away with the proposed matter of arbitration for the present, and is very satisfactory, as it does not prevent the Indians from camping there while gathering "camas," which is used extensively by them for food.

It will be noticed by the following lists that the field collectors have collected a vast amount of material other than their special line of birds and mammals, more particularly in collecting the plants of the district where they were located, which means a great deal of labour and time in addition to their other duties. Nearly all the botanical specimens have been identified by Mr. J. M. Macoun, of Ottawa, who has always shown a great interest in the Herbarium of the Provincial Museum.

Mr. W. R. Carter, of Alberni, has also taken a keen interest in the botanical branch, and has secured some very rare and interesting specimens for this Department.

The Director is also pleased to report that to the collection of fishes has been added several species new to British Columbia, namely: Sunfish (*Mola mola*), giant black bass (*Erilepis zonifer*), also a species of frostfish (*Benthodesmus atlanticus*), of which there is only one other known specimen.

The entomological collection has been greatly enriched by several new species, and others that are new to the Province.

Several good additions have been made to the anthropological collection. Three stone hammers were presented to the Director for the Museum while on a trip to Seton Lake, and although the Indian reservations were visited by the Director and Dr. C. F. Newcombe, little or no information could be secured concerning them, the present generation not appearing to know for what use they had been intended.

Information was received later from Lieutenant F. C. Swannell, B.C.L.S., of this city, who has one of these hammers in his possession, who states that he had received the information from the chief of the Lillooet Indians, which confirms our theory that these implements were used as pile-drivers. One of these specimens is figured in this report.

One of the most interesting specimens that has been added to the collection of fossils is the molar tooth of an extinct Sirenian species (*Desmostylus hesperus*), which is a close relation to the recently extinct mammal, the arctic sea-cow of the North Pacific, that was practically exterminated about the year 1780.

The Provincial Museum wishes to extend grateful thanks to the following gentlemen who have greatly assisted with identifications in their respective branches of biology:—

*Identification of Birds and Mammals.*—The Biological Survey, United States National Museum, Smithsonian Institution, Washington, D.C.; Mr. Henshaw, Chief of the Biological Survey; also Mr. H. C. Oberholser and others.

*Identification of Entomological Specimens.*—The Bureau of Entomology, Washington, D.C. (L. O. Howard, Chief); Mr. F. H. Wolley Dod, of Calgary; Doctors Barnes and McDunnough, of Decatur, Ill.; Mr. L. W. Swett, Boston, Mass.; and Mr. E. H. Blackmore, Victoria.

The thanks of the Department are also due to Professor John Macoun, Naturalist of the Geological Survey, Ottawa, who is now a resident of Sidney, B.C.; Mr. J. M. Macoun, C.M.G., Curator of the Herbarium, Ottawa; C. F. Newcombe, M.D., Victoria, B.C.; Mr. Lawrence M. Lambe, Palæontologist, Ottawa; Dr. Merriam; Dr. Ralph Arnold, well-known geologist of Berkeley, California; and Mr. B. L. Clark, of the University of California. Also to the following for notes on bird migrations and for specimens presented to the Museum; J. E. Kelso, M.D.; W. B. Johnson and others at Edgewood, Lower Arrow Lakes; W. R. Carter, Deputy Game Warden, Alberni; W. A. Newcombe, Victoria.

## ANTHROPOLOGY.

### ACCESSIONS, 1916.

#### *Tsimshian.*

The following were purchased from Chief Aksidar, Kincolith:—

Stone mortar (2882). A large specimen; formerly used for pounding the native tobacco.

Shaman's head-dress of grizzly-bear claws (2883).

Cellular lava (2884-2885). Used at dances.

Cannibal dancer's head-rings (3) of cedar bark (2886-2887-2888).

Cannibal dancer's neck-ring (2889).

Basket, spruce-root (2898). From Kispiox, Skeena River. Presented by Lieutenant G. T. Emmons, U.S.A.

Mirror, stone (2899). From Hoquelget, Bulkley River, a village site belonging to the Tsimshian Hazelton band, but occupied by the Hoquelgets, an Athabaskan band (2900).

Mask, copper, representing a human face. Used in winter dances. From Kispiox, Skeena River. From Lieutenant G. T. Emmons, U.S.A., in exchange.

#### *Salishan of the Coast.*

Pictograph (2874). Cast of an Indian carving on the surface of an outcrop of sandstone near Chase River, Nanaimo, B.C. From a mould made by Harlan I. Smith for the Jesup North Pacific Expedition, 1898, and illustrated in his "Archæology of the Gulf of Georgia," Vol. IV., Mem. Amer. Mus. of Nat. Hist. In exchange from Geological Survey of Canada.

Arrow-head of chipped stone (2897). From dry bed of ancient lake, Gonzales Farm, Victoria, B.C. Presented by W. B. Anderson.

Mat of coloured wool (2903). Shows designs used in the old ceremonial blankets. Purchased from Mrs. W. Charles.

#### *Salishan Interior—Lillooet.*

Nephrite boulder (2890). Slices have been sawed off it of which to make stone chisels, etc. From Seton Lake. Presented by L. Keary.

Hammer, stone (2893). Seton Lake. Presented by L. Keary.

Hammer, stone (2894). Seton Lake. Presented by J. P. Babcock.

Pile-driver, stone, two-handed (2891). Seton Lake; probably used for driving piles when setting up fish-weirs. Presented by L. Keary.

Pile-drivers (2), stone, two-handed (2895-2896). North shore, Seton Lake. Presented by W. R. Bellamy.

Hammer, stone (2892). Purchased at Indian village, Lillooet.

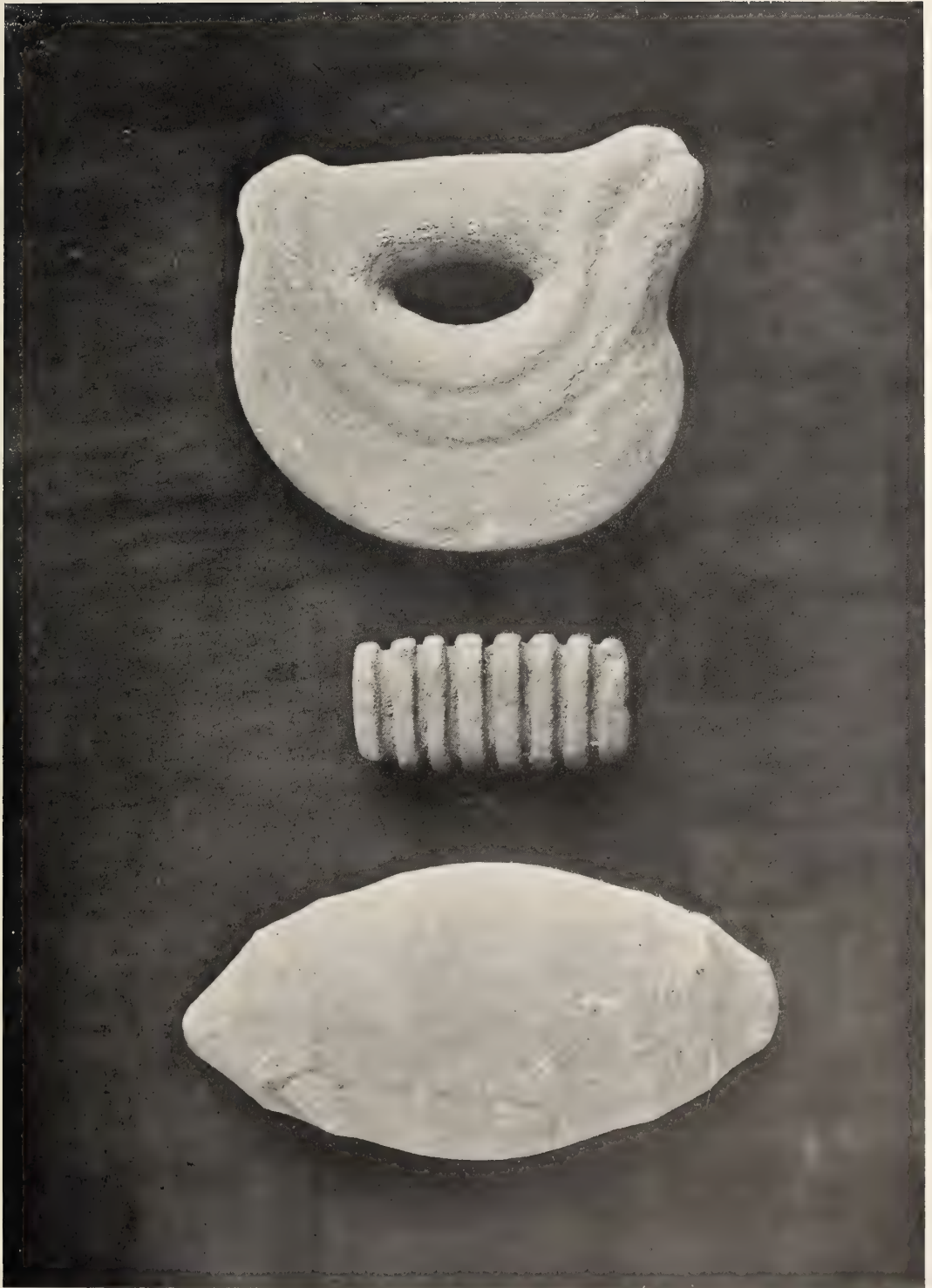


Fig. 1. Stone chopper (Cat. No. 1801).  
Fig. 2. Stone implement (Cat. No. 1793).  
Fig. 3. Stone hand-hammer (Cat. No. 1736).





*Tlingit.*

Chilkat blanket (2901). Purchased from Hon. Mr. Justice Martin.

*Haidan.*

Hat, spruce-root, with painted crest (2902). Purchased from Mrs. Wm. Charles.

*Athabaskan.*

Tobacco-bag, with ornamental bead-work (2877). From Hudson Hope, north of Peace River.  
Presented by Chief Constable Thos. Parsons.

Bag ornamented with beads (2879). Presented by Chief Constable Thos. Parsons.

Knife with wooden handle (2880). Used for barking trees. Presented by Chief Constable Thos. Parsons.

Moccasins, rawhide (2881). Presented by Chief Constable Thos. Parsons.

*Illustrations, Archæology of British Columbia.*

Plate I., Fig. 1. Stone pile-driver (2891). Size, 22 x 4½ x 4½ inches. Weight, 23½ lb. Three specimens of this type were obtained at Seton Lake in 1916, and with the exception of a few specimens in the collection of W. H. Keary, Esq., of New Westminster, none others have been observed. So far as known, no such implements have been either described or illustrated and no reference is made to them in the report on the Lillooet Indians by the well-known writer, Mr. J. A. Teit, of Spences Bridge.

Plate I., Fig. 2. Carved stone baton. Size, 13¼ x 2 inches. Collected at Hoquelget, Bulkley River, in 1897, and presented to C. F. Newcombe by A. T. Vowell, Esq., Indian Superintendent for British Columbia. The specimen was found with many others some feet below the surface of the ground when digging over the foundation of an old house by Chief Johnny Muldoe.

Several of the batons were of hard stone and not carved, and these were suitable for use as weapons. Others, like that figured, were of sandstone, deeply carved and perforated, and were too brittle, both as to material and make, to be serviceable as weapons.

The tradition obtained from Indians says that these were last used by the Gitanmax or Hazelton band of Tsimshians nearly a hundred years ago when fighting with the Kitsegukla band in alliance with the Kit-ksuns of the Upper Skeena.

The Gitanmax were nearly wiped out, but their weapons and insignia were collected after the battle by an old woman who cached them where they were found by the Babine chief mentioned.

Several similar batons are in the Victoria Memorial Museum, Ottawa, from Metlakatla. This type of batons has not hitherto been described or illustrated so far as known.

Plate II., Fig. 1. Stone implement (1801/557). Size, 6½ x 5½ inches. Of mica-schist. This specimen is shaped somewhat like the bone-bark choppers of certain Coast tribes or some of the fish-knives, having a straight upper edge and a curved lower one. It is, however, much thicker than either of these and the edge is blunt. Three similar specimens were collected in an old kitchen-midden on Digby Island, near Prince Rupert, together with a great number of bone and stone objects, and another has been in the Provincial Museum since 1889. This was collected at Port Simpson by Mr. W. B. Anderson and is numbered 753. No information as to history and use could be obtained from the Tsimshian people.

Plate II., Fig. 2. Stone implement (1793/232). Size, 3½ x 1¼ inches. Of porous sandstone, with numerous deep grooves. This is one of a few similar specimens found in the kitchen-midden at Digby Island, already referred to. No information as to use obtained from Indians. It is suggested that it might have served as a scraper for the gut used for bow-strings and other purposes.

Plate II., Fig. 3. Stone hand-hammer (1736/561). Size, 7 x 4 x 1¼ inches. Weight, 4½ lb. Of tough igneous rock, rounded oblong, narrow at the ends, each of which has two shallow grooves. There are two flattened striking surfaces parallel to each other.

In the Museum, collected from the kitchen-midden at Digby Island, there is a series of sixteen stones of similar size and shape, ranging from the natural smooth, water-worn pebble to the fully manufactured object. The series shows intermediate stages of manufacture beginning with shallow grooves made by battering the natural pebble with another hard stone.

Some of the set are very symmetrical and pointed at each end. Others are squared off narrowed ends and one circular shallow pit on each flattened side, in this respect resembling hammer stones found in shell mounds near Victoria.

The range of this implement is not confined to the Tsimshian country, as two similar specimens were collected by Dr. Newcombe at Masset, Q.C.I., where they had been found by Indians when digging up old house-sites.

#### BARE ISLAND BIRD SANCTUARY.

The Director arranged with Duncan C. Scott, Deputy Superintendent-General of Indian Affairs, Ottawa, to again give the Provincial Museum authority to place a guard on Bare Island during the nesting season of 1916. (This island is known as Indian Reserve No. 9, Saanich Tribe, and is situated in Haro Strait about twenty miles north-east of Victoria.)

Mr. W. B. Anderson was again appointed warden, he being an ardent lover of nature, and much interested in the preservation of "wild life." I do not think the Government could have engaged a more competent person to take charge of the sanctuary. Mr. Anderson remained on the island from the middle of June until the end of July continuously. The Director made several trips to Bare Island during the nesting period, and it was very gratifying to note the benefit that had resulted in protecting this island for the last two seasons; the breeding glaucous-winged gulls (*Larus glaucescens*) have about doubled in number. The pigeon guillemots (*Cephus columba*) have increased, but not so great in numbers as the gulls; "and it is to be hoped that as the rabbits get killed off that had been turned out on the island several years ago," that the guillemots will again be able to return, and take up their old nesting-places under the broken rocks and in the deep crevices. The violet-green cormorants (*Phalacrocorax p. robustus*) have increased in considerable numbers, as is to be noted by a visit to the high cliffs on the western side of the island, where these birds build their nests. The tufted puffins (*Lunda cirrhata*) do not seem to be returning, as only about four pairs were observed, they having also been driven out of their deep burrows by rabbits.

The guard was pleased to report that the Indians did not go to the island this last season to gather camas, also that the birds had not been disturbed during the incubation period, and that no other persons had been allowed to land on the island, other than those who had been given a special permit from the Director.

Many thanks are due to W. E. Ditchburn, Inspector of Indian Affairs for British Columbia, who gave Mr. Anderson a letter giving him protection, and a warning to any person or persons interfering with him in the discharging of his duties.

#### REPORT ON FIELD-WORK IN OKANAGAN AND SHUSWAP DISTRICTS, 1916.

By J. A. MUNRO.

Biological investigations in the Okanagan and Shuswap Districts were continued during the season of 1916, from April 20th to October 31st. Several months were spent in the vicinity of Okanagan Landing, enlarging the collections and adding to the field-notes commenced last season. A résumé of the topographical and forest conditions of this district was published in the field report for 1915. Collecting trips were made to the following points:—

#### NAHUN PLATEAU.

Three camps were made on the Nahun Plateau. This plateau is on the west side of Okanagan Lake, twenty miles south of Okanagan Landing. The highest point is at the eastern end, where the altitude is 3,200 feet. Field operations were confined to this portion, where the fauna and flora is typically Canadian. A considerable quantity of zonal notes and data relating to the distribution and breeding habits of some of the rarer species of birds were obtained.

The principal trees are Murray pine (*Pinus murrayana*) and western larch (*Larix occidentalis*), with small stands of western red cedar (*Thuja plicata*) and clumps of Engelmann's spruce (*Picea engelmanni*) in the bottoms.

The valley slopes gradually south-west to Bear Creek. As the altitude decreases zonal characters become less sharply defined. The Murray pine and western larch give way to yellow pine, which gradually becomes the prevailing tree. With the appearance of yellow pine there is a corresponding infusion of transitional faunal forms.

## SWAN LAKE.

Several trips were made to Swan Lake. This is a shallow alkaline lake, about four miles long and half a mile wide, lying immediately north of the North Arm of Okanagan Lake. The shores are muddy and grown up with tules, rushes, and sedges. The rich bottom land is under cultivation as close to the water as possible, but sufficient cover to make the shores an attractive breeding-ground for birds is afforded by dense patches of second growth, chiefly aspen (*Populus tremuloides*), mountain-birch (*Betula fontinalis*), willow (*Salix sp.*), and alder (*Alnus sp.*).

The following species of birds were breeding:—

- Holbøll's Grebe (*Colymbus holbølli*).
- Horned Grebe (*Colymbus auritus*).
- Loon (*Gavia immer*).
- Black Tern (*Hydrochelidon nigra surinamensis*).
- Mallard (*Anas platyrhynchos*).
- Redhead (*Marila americana*).
- Ruddy Duck (*Erismatura jamaicensis*).
- Bittern (*Botaurus lentiginosus*).
- Coot (*Fulica americana*).
- Spotted Sandpiper (*Actitis macularia*).
- Killdeer (*Oxyechus vociferus*).
- Marsh Hawk (*Circus hudsonius*).
- Osprey (*Pandion haliaetus carolinensis*).
- Short-eared Owl (*Asio flammeus*).
- Western Belted Kingfisher (*Ceryle alcyon caurina*).
- Red-naped Sapsucker (*Sphyrapicus varius nuchalis*).
- Kingbird (*Tyrannus tyrannus*).
- Western Wood Pewee (*Myiochanes richardsoni richardsoni*).
- Alder Flycatcher (*Empidonax trailli alnorum*).
- Magpie (*Pica pica hudsonia*).
- Western Crow (*Corvus brachyrhynchos hesperis*).
- Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*).
- Northwestern Redwing (*Agelaius phœniceus caurinus*).
- Western Meadowlark (*Sturnella neglecta*).
- Bullock's Oriole (*Icterus bullocki*).
- Brewer's Blackbird (*Euphaga cyanocephalus*).
- Pale Goldfinch (*Astragalinus tristis pallidus*).
- Western Vesper Sparrow (*Poæetes gramineus confinis*).
- Western Chipping Sparrow (*Spizella passerina arizonæ*).
- Sooty Song Sparrow (*Melospiza melodia rufina*).
- Spurred Towhee (*Pipilo maculatus montanus*).
- Lazuli Bunting (*Passerina amœna*).
- Cedar Waxwing (*Bombycilla cedrorum*).
- Red-eyed Vireo (*Vireosylva olivacea*).
- California Yellow Warbler (*Dendroica æstiva brewsteri*).
- Pacific Yellow-throat (*Geothlypis trichas arizela*).
- Catbird (*Dumetella carolinensis*).
- Western Marsh Wren (*Telmatodytes palustris plesius*).
- Chickadee (*Penthestes atricapillus atricapillus*).
- Willow thrush (*Hylocichla fuscescens salicicola*).
- Western Robin (*Planesticus migratorius propinquus*).
- Mountain Bluebird (*Sialia currucoides*).

## SHUSWAP DISTRICT.

The Shuswap District was visited in the early part of June and again in the latter part of October. Board was obtained at a ranch near Shuswap Falls. This proved much more satisfactory than establishing a camp, as more time could be given to the collecting and preparing of specimens.

Although only slightly higher than the Okanagan, biological conditions are quite different. On the mountain-slopes the fauna and flora are distinctively Canadian. The principal trees are western white pine (*Pinus monticola*), Murray pine (*Pinus murrayana*), western larch (*Larix occidentalis*), Engelmann's spruce (*Picea engelmanni*), and western hemlock (*Tsuga heterophylla*).

Conditions in the wide bottoms show a surprising resemblance to the humid Coast belt. Western red cedar (*Thuja plicata*) is the prevailing tree, varied by clumps of giant black cottonwood (*Populus trichocarpa*). The black-headed grosbeak (*Zamelodia melanocephala*), a characteristic Coast bird, is a regular summer resident.

Bird-life in these coniferous forests is not plentiful either in number of species or individuals. The following species could be called common and were undoubtedly all breeding:—

- Spotted Sandpiper (*Actitis macularia*).
- Western Redtail (*Buteo borealis calurus*).
- Dusky Horned Owl (*Bubo virginianus saturatus*).
- Pygmy Owl (*Glaucidium gnoma gnoma*).
- Rocky Mountain Hairy Woodpecker (*Dryobates villosus monticola*).
- Red-naped Sapsucker (*Sphyrapicus varius nuchalis*).
- Northern Pileated Woodpecker (*Phlæotomus pileatus abieticola*).
- Alaska Three-toed Woodpecker (*Picoides americanus fasciatus*).
- Nighthawk (*Chordeiles virginianus virginianus*).
- Kingbird (*Tyrannus tyrannus*).
- Western Wood Pewee (*Myiochanes richardsoni richardsoni*).
- Wright's Flycatcher (*Empidonax wrighti*).
- Olive-sided Flycatcher (*Nuttallornis borealis*).
- Magpie (*Pica pica hudsonia*).
- Black-headed Jay (*Cyanocetta stelleri annectens*).
- Pine Siskin (*Spinus pinus*).
- Western Chipping Sparrow (*Spizella socialis arizonæ*).
- Sooty Song Sparrow (*Melospiza melodia rufina*).
- Spurred Towhee (*Pipilo maculatus montanus*).
- Western Tanager (*Piranga ludoviciana*).
- Tree Swallow (*Iridoprocne bicolor*).
- Bank Swallow (*Riparia riparia*).
- Red-eyed Vireo (*Vireosylva olivacea*).
- Calaveras Warbler (*Vermivora rubricapilla gutturalis*).
- Audubon's Warbler (*Dendroica auduboni auduboni*).
- Redstart (*Setophaga ruticilla*).
- Rocky Mountain Creeper (*Certhia familiaris montana*).
- Red-breasted Nuthatch (*Sitta canadensis*).
- Chickadee (*Penthestes atricapillus atricapillus*).
- Mountain Chickadee (*Penthestes gambeli gambeli*).
- Willow Thrush (*Hylocichla fuscescens salicicola*).
- Olive-backed Thrush (*Hylocichla ustulata swainsoni*).
- Western Robin (*Planesticus migratorius propinquus*).
- Mountain Bluebird (*Sialia currucoides*).

#### KETTLE RIVER DISTRICT.

Through the courtesy of Mr. George P. Melrose, of the Forest Branch, the writer was enabled to accompany a timber-cruising party to the Kettle River Divide.

The party left Okanagan Landing for Penticton on September 25th, and reached Myra, on the Kettle River Railway, at noon of the next day. Camp was made close to the railway near Canyon Creek. Daily trips were made into the heavy forest on the north slope of Little White Mountain until October 1st, when the party returned to Vernon.

Conditions where field-work was conducted may be described as follows: A dense coniferous forest, sloping gradually east to the base of Little White Mountain and at a maximum altitude of 5,000 feet. The principal trees are Engelmann's spruce (*Picea engelmanni*), which greatly outnumbered the other species; balsam fir (*Abies lasiocarpa*); and Murray pine (*Pinus murray-*

ana). There was no undergrowth, but the fallen timber made travelling impracticable off the one trail. Owing to the lateness of the season no insects or plants were collected. The weather was cold and stormy and 2 inches of snow fell. A small collection of mammals, principally voles of the genus *Microtis*, was taken, and specimens of the following species of birds:—

- Franklin's Grouse (*Canachites franklini*).
- Gray Ruffed Grouse (*Bonasa umbellus umbelloides*).
- Alaskan Three-toed Woodpecker (*Picoides americanus fasciatus*).
- Rocky Mountain Jay (*Peresoreus canadensis capitalis*).
- Lincoln Sparrow (*Melospiza lincolni lincolni*).
- Rocky Mountain Pine Grosbeak (*Pinicola enucleator montana*).
- Columbian Chickadee (*Penthestes hudsonicus columbianus*).
- Mountain Chickadee (*Penthestes gambeli gambeli*).
- Varied Thrush (*Ixoreus naevius naevius*).
- Goshawk (*Astur atricapillus atricapillus*).

Richardson's Grouse (*Dendragapus obscurus richardsoni*) and Northern Raven (*Corvus corax principalis*) were seen, but none were secured.

During the early part of the summer and in the autumn the trapping of small mammals was systematically pursued, at varying altitudes, in every locality visited. The results were particularly gratifying. Series of several species of the genus *Microtis*, hitherto unrepresented in the Provincial collection, were taken; also large series of the following mice, voles, and shrews: *Eutamias amoenus*, *Microtis mordax*, *Microtis drummondi*, *Microtis nanus canescens*, *Perognathus lordi*, *Peromyscus maniculatus artemisioe*, *Sorex obscurus*, *Sorex personatus*, and many others which have not yet been classified. Altogether 290 specimens were preserved, a detailed report of which is being prepared.

While a general collection of zoological material was attempted, particular attention was directed to the gathering of ornithological material and data. A check-list that will serve as a basis for future investigation is in the course of preparation. To determine the specific standing of the more mutable forms a considerable series of skins is required. The writer is pleased to report that a collection of the breeding species is now fairly complete for this locality. The series of each species includes breeding birds of both sexes, moulting adults and juvenals of both sexes in their various plumages.

Nests and eggs of the following species were taken:—

- Holbæll's Grebe (*Colymbus holbælli*).
- Horned Grebe (*Colymbus auritus*).
- Black Tern (*Hydrochelidon nigra surinamensis*).
- Redhead (*Marila americana*).
- Barrow's Golden-eye (*Clangula islandica*).
- Richardson's Grouse (*Dendragapus obscurus richardsoni*).
- Marsh Hawk (*Circus hudsonius*).
- Nighthawk (*Chordeiles virginianus virginianus*).
- Calliope Hummingbird (*Stellula calliope*).
- Western Wood Pewee (*Mycobanes richardsoni richardsoni*).
- Alder Flycatcher (*Empidonax trailli alnorum*).
- Magpie (*Pica pica hudsonia*).
- Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*).
- North-western Redwing (*Agelaius phœniceus caurinus*).
- Western Meadowlark (*Sturnella neglecta*).
- Brewer's Blackbird (*Euphagus cyanocephalus*).
- Sooty Song Sparrow (*Melospiza melodia merrilli*).
- Spurred Towhee (*Pipilo maculatus montanus*).
- Lazuli Bunting (*Passerina amoena*).
- Western Marsh Wren (*Telmatodytes palustris plesius*).
- Redbreasted Nuthatch (*Sitta canadensis*).
- Willow Thrush (*Hylocichla fuscescens salicicola*).
- Olive-backed Thrush (*Hylocichla ustulata swainsoni*).
- Western Bluebird (*Sialia mexicana occidentalis*).
- Mountain Bluebird (*Sialia currucoides*).

The collection for the season numbered approximately as follows: 290 mammals, 528 birds, 1,118 insects, 10 reptiles and batrachians, 300 plants, 35 fishes, 40 sets of birds' eggs.

The writer wishes to take this opportunity of expressing his thanks to Mr. George Heggie, of Vernon, for permission to shoot over the property of the Land and Agricultural Company; to Mr. B. Thorlacson; Mr. William Johnstone and Mr. H. R. Hanna, of the Commonage, for a similar privilege; and to Mr. George N. Gartrell, Deputy Game Warden, of Summerland, for his valuable assistance in securing certain specimens.

Some of the ornithological notes made during the past two years are as follows:—

**HOLBÆLL'S GREBE (*Colymbus holbælli*).**

Found breeding commonly at Swan Lake on May 18th and June 8th, 1916. Twenty nests were found and three sets of fresh eggs were taken. The nests were composed of dead rotting vegetation, held in place by growing rushes, and floating, half-submerged, in water from 2 to 4 feet in depth. In some cases the eggs were partly or wholly covered when found, but usually were exposed. When a nest was visited both birds of the pair swam up and down in the open water 20 or 30 yards beyond the nest, showing no signs of alarm. A peculiar fact noted was that near every nest, generally within a few yards, there was invariably a coot's nest.

**RED-THROATED LOON (*Gavia stellata*).**

A juvenal female picked up dead on the shore of Okanagan Lake on November 22nd, 1915, is the first record of this species in the Okanagan. The body was in a very emaciated condition and the stomach and digestive tract empty and contracted.

**EARED GREBE (*Colymbus nigricollis californicus*).**

This species was first recorded from the Okanagan by Major Allan Brooks on April 17th, 1914. Another individual was seen by the writer two weeks later and was again noted on May 27th, 1915.

**BLACK TERN (*Hydrochelidon nigra surinamensis*).**

Usually a scarce, irregular migrant. On May 18th, 1916, a breeding colony of twenty pairs (estimated) was observed at Swan Lake. On June 8th three sets of fresh eggs were taken. The nests consisted of a few pieces of water-soaked rushes or other aquatic plants, resting on the floating mass of dead tules that had drifted against the outer fringe of marsh. This bed of flotsam, anchored securely to the growing tules and rising and falling on the waves, without wetting its upper surface, formed an ideal nesting-place. While hunting for the nests, breast-deep in mud and water, the terns kept flying about in restless excitement, often within arm's length.

**BLUE-WINGED TEAL (*Querquedula discors*).**

Once fairly common throughout the Interior of British Columbia, this species has been of rare occurrence in the Okanagan during the past ten years. Five individuals were seen during May, 1915, and three of them secured.

**CINNAMON TEAL (*Querquedula cyanoptera*).**

Rare summer resident. Five were seen at Swan Lake on May 18th, 1916.

**REDHEAD (*Marila americana*).**

Found breeding at Swan Lake. On June 8th a nest with four fresh eggs was taken on the side of a musk-rat house. The hollow containing the eggs was well lined with dry tules, but as the female had not laid her complement of eggs, no down had been added. This is the commonest duck on Okanagan Lake during the winter; large flocks gather in the shallow water at the north end of the lake, reaching the maximum number about February 15th.

**BARROW'S GOLDEN-EYE (*Clangula islandica*).**

A common summer resident. A series of skins collected includes an adult male and half-grown and immature birds of both sexes. Usually for a nesting-site this species selects an old woodpecker's hole that has become enlarged by decay, and generally in a tree close to the shore

of a small lake. On May 12th, 1916, a nest containing eleven fresh eggs was found in the hay-loft of a log barn built on the shore of an alkaline lake. The nest was concealed in the hay under one of the big cross-beams. The loft was open in many places between the logs; there was also a large opening at the end of the building, and through this the female visited the nest.

**BUFFLE-HEAD** (*Charitonetta albeola*).

A common resident. A set of ten partly incubated eggs was taken on May 22nd, 1915. The nest was in an old flicker's hole, 40 feet from the ground, at the top of a dead Douglas fir on the shore of a small alkaline lake. The cavity was much enlarged by decay, and at a touch the whole side pulled away and exposed the eggs in their bed of down. The same nest had evidently been used for several years, as there were fragments of old shells in the bottom of the hole and mixed through the down.

**LONG-BILLED DOWITCHER** (*Macrorhamphus griseus scolopaceus*).

An adult male in summer plumage taken on July 30th, 1915, and two immature males taken on September 9th, 1916, are the only Okanagan records.

**LEAST SANDPIPER** (*Pisobia minutilla*).

Common fall migrant. None observed during spring migrations until May 6th, 1916, when five were seen. A few seen daily until May 11th.

**YELLOW-LEGS** (*Totanus flavipes*).

Common fall migrant. None observed during spring migrations until May 6th, 1916, when one was seen which remained in the vicinity until May 11th.

**RICHARDSON'S GROUSE** (*Dendragopus obscurus richardsoni*).

On May 3rd, 1916, a nest containing ten fresh eggs was found under an old rail fence. The nest was a shallow depression in the ground 8 inches in diameter and 5 inches deep, well lined with pine-needles and grouse-feathers. A nest with seven partly incubated eggs was found in a similar situation on May 13th, 1915.

**MARSH HAWK** (*Circus hudsonius*).

Two pair found breeding at Swan Lake. Nest and eggs taken on May 15th and May 18th. The nests were loosely constructed of sticks, weed-stalks, and dry grass, built in the marsh 20 yards from shore. The tules had been beaten down for a distance of 3 feet around the nest, forming a small clearing in the marsh.

**GOSHAWK** (*Astur atricapillus atricapillus*).

All specimens taken here appear to be referable to this form. Both adults and young are much paler than examples of *striatulus* from the Coast.

**PYGMY OWL** (*Glaucidium gnoma gnoma*).

Common summer resident, more plentiful in the region of Murray pine and larch. A nest containing seven downy young was found in a deserted woodpecker hole, 30 feet from the ground, in a dead larch, on June 9th, 1915.

**ARCTIC THREE-TOED WOODPECKER** (*Picooides arcticus*).

Resident in the Canadian Zone. Less common than *fasciatus*. A breeding female was taken on the Nahun Plateau on May 30th, 1916.

**ALASKA THREE-TOED WOODPECKER** (*Picooides americanus fasciatus*).

A common resident in the Canadian Zone, preferring the burnt areas of spruce and larch. Taken on the Nahun Plateau, at Shuswap Falls, and Little White Mountain. A juvenal male collected at Shuswap Falls on June 17th showed the yellow crown patch, but more restricted than in the adult male.

OLIVE-SIDED FLYCATCHER (*Nuttallornis borealis*).

A common summer resident in the Canadian Zone. Taken on the Nahun Plateau and at Shuswap Falls.

YELLOW-HEADED BLACKBIRD (*Xanthocephalus xanthocephalus*).

Several breeding colonies found at Swan Lake, the only locality in this region where the writer has found them breeding. An example of how very local some species are in mountainous countries: On May 15th a number of incompleated nests were found, and on June 8th four sets of eggs were taken. The nests are more loosely constructed than those of the North-western Redwing, and are lined with flat pieces of tule fibre. Those of the North-western Redwing are lined with coarse grass. Nests of both species were found close together and they made common cause in driving away crows, marsh hawks, and other marauders from the vicinity of the nests. In common with other blackbirds, the males of this species have the habit, when uttering their harsh grating song, of elevating the shoulders and erecting the feathers until the singer appears twice his natural size.

WESTERN GRASSHOPPER SPARROW (*Ammodramus savannarum bimaculatus*).

This handsome, unobtrusive little sparrow is common locally breeding on the dry, open hill-sides above Vernon. They arrive early in May and remain until the second week in October; one of the last sparrows to leave in the fall. Contrary to the published accounts of this bird's habits, it is the writer's experience that the males generally sing while on the ground or hidden in a thick clump of sage-brush. On only two occasions has the writer heard it singing while clinging to a weed-stalk or bush in full view. A series of skins collected includes breeding males, moulting adults, and juvenals.

SLATE-COLOURED JUNCO (*Junco hyemalis hyemalis*); SHUFELDT'S JUNCO (*Junco hyemalis connectens*); MONTANA JUNCO (*Junco hyemalis montanus*).

These three subspecies occur here as migrants; also another form, evidently intermediate between *oreganus* and *connectens*. The breeding form has not yet been determined.

BLACK-HEADED GROSBEEK (*Zamelodia melanocephala*).

An adult male taken on August 24th, 1916, is the only local record. Major Allan Brooks found the species breeding in the Shuswap District, but it was not observed by the writer.

TOWNSEND'S WARBLER (*Dendroica townsendi*).

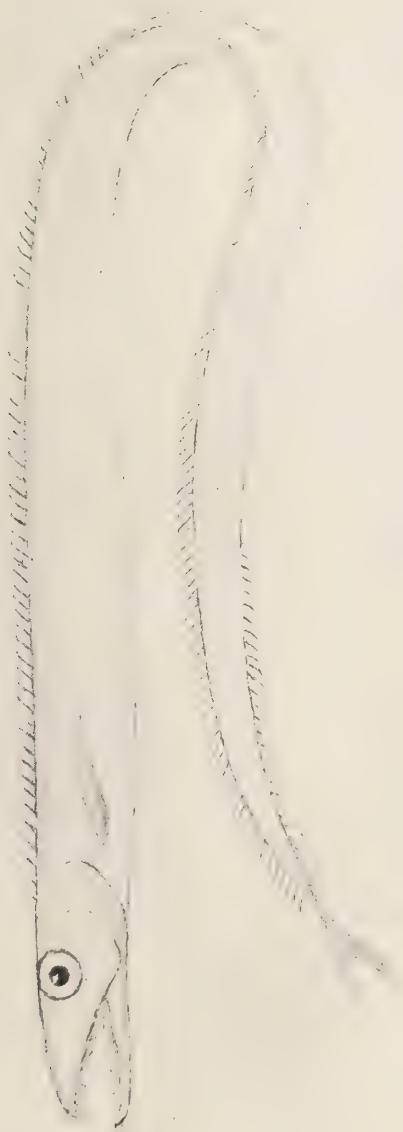
Of regular occurrence during migrations at Okanagan Landing; also taken on the Nahun Plateau on May 30th, where it appeared to be common.

FISHES.

Early in the month of June the Director drew the attention of Dr. C. H. Gilbert, of Stanford University (who was visiting the Museum), to a strange fish that had been caught and presented to the Museum by the Bentinck Island fishermen, near Race Rocks, Strait of Juan de Fuca, about ten miles south of Victoria. Dr. Gilbert noticed at once that the specimen was one that he had never seen in this portion of the Pacific, and identified it as a species of *Benthodesmus*; also suggesting that I send it to him at Stanford University, along with other fishes, which he would be pleased to examine and identify for this Department upon his return to California. The extract from his letter of November 27th, 1916, is here quoted:—

“The long silvery fish which you showed me last summer turns out to be a *Benthodesmus*, as we thought at the time. There are three other species of this genus known—one from New Zealand, one from Japan, and one from the Atlantic; each of these is known from a single specimen. A careful comparison with the brief description indicates that your specimen cannot be identified with either of the known species from the Pacific, but the differences from the Atlantic species are so small in amount that I do not care to risk describing it as a distinct species. This is the more unfortunate that the Atlantic species has received the name ‘atlanticus.’”





*Benthodesmus atlanticus*. Specimen in Provincial Museum, Victoria, B.C.





Sunfish (*Mola mola*).



NOTE.—The United States National Museum, Washington, have accepted for publication the notes prepared by Dr. C. H. Gilbert, announcing the discovery of this interesting species *Benthodesmus* in the Pacific.

The *Benthodesmus atlanticus* is uniformly silvery in colour throughout, with traces of dark colour on the head and tail—length, 41½ inches—and was caught by fishermen fishing for cod near Victoria on May 30th, 1916. (F. K.)

“The only other known specimen was taken from the stomach of a halibut caught on the western edge of the Grand Bank of Newfoundland in 80 fathoms.” (Goode & Bean.) (See Plate III.)

ON THE OCCURRENCE OF *BENTHODESMUS ATLANTICUS* (GOODE & BEAN) ON THE COAST OF BRITISH COLUMBIA.

BY DR. C. H. GILBERT, PROFESSOR OF ZOOLOGY, STANDARD UNIVERSITY, CAL.

A specimen of *Benthodesmus*, 41½ inches long, was obtained on May 30th, 1916, from a fish-dealer in Victoria, B.C., having been caught by fishermen off Bentinck Island, which lies near Race Rocks, about ten miles by water from Victoria. The specimen is the property of the Provincial Museum of Victoria, and has been submitted to us for identification by Mr. F. Kermodé, the Director of the Museum.

Description: Greatest width of body,  $2\frac{2}{3}$  in height at vent. Length of caudal peduncle, half greatest height of body. Least height of tail,  $\frac{1}{3}$  bony interorbital width. Greatest width of head,  $\frac{1}{6}$  its length. Greatest height of head,  $3\frac{3}{4}$  in its length. Width of interorbital area (bony),  $\frac{1}{4}$  height of head. Length of snout,  $2\frac{1}{4}$  in head. Tip of maxillary not reaching the orbit, the length of maxillary equalling the postorbital part of head. Length of lower jaw,  $1\frac{7}{8}$  times greatest height of body. Flexible part of mandibular tip short in the preserved specimen, about  $\frac{1}{4}$  diameter of orbit. Eye postmedian,  $5\frac{1}{3}$  in head,  $2\frac{2}{3}$  in length of snout.

Sides of maxillary with nine or ten triangular teeth, which decrease from middle of sides of jaw both forwards and backwards. Two pairs of narrow compressed fangs in the anterior part of the upper jaw, the anterior pair immediately behind the tip, the posterior pair separated by a considerable interspace, but located in front of the series of compressed lateral teeth already described. In advance of the most anterior of the compressed lateral teeth a series of six or seven short slender conical teeth continued forwards to the anterior pair of fangs and passing outside the posterior pair of fangs. Side of mandible with fourteen or fifteen compressed triangular teeth in a single series, decreasing in length forwards, and inclined slightly towards the front of the jaw. In advance of these, on each side of the symphysis, are two pairs of short retrorsely directed teeth, the anterior pair much shorter than the posterior pair. Other bones of the mouth toothless.

First gill-arch with four or five or seven or eight slender short distant rakers, the longest about 2 mm. in length. Each rise from a plate which bears short spines, and between each pair of these plates, on the outer surface of the arch, are interposed two similar smaller plates which do not bear rakers. The rakers are borne only on the posterior third of the horizontal limb of the arch, but the spinous plates are continued farther forwards, and become merged along the anterior part of the arch in a narrow spinous strip. The other arches are similar to the first, but contain fewer free rakers. The upper pharyngeals are well toothed and work against the spinous plates on the horizontal limbs of the arches.

First dorsal ray slightly in advance of the middle of the operculum, the front of the orbit midway between the first ray and the tip of the snout. There are 142 rays in all, the posterior the longest. The rays rise from the anterior ends of a series of interneural bones which form a sharp ridge along the dorsal profile.

The vent is beneath the 46th dorsal ray, its distance from the tip of the snout  $3\frac{1}{7}$  times the length of the head. Distance from vent to postanal scute,  $\frac{5}{6}$  diameter of orbit. Immediately behind the scute begins a series of eighty-eight interhamals, which forms a continuous sharp ridge along the lower profile. The anterior ones bear no rays, but these gradually appear posteriorly, about forty of the posterior plates bearing evident free rays, which increase in length posteriorly.

The pectorals contain twelve rays, the lower distinctly the longest, equalling the postorbital length of the head. Ventrals mutilated, their base posterior to that of pectoral by  $\frac{2}{3}$  diameter

of orbit. Caudal deeply forked, its longest ray equalling the diameter of the orbit. Color silvery, becoming posteriorly steel-grey, and finally black. Lips black, as are also the inside of the mouth and the gill-cavity, including the gill-arches. Peritoneum also black.

One specimen,  $4\frac{1}{8}$  inches long, the property of the Provincial Museum of British Columbia.

*Benthodesmus elongatus* (Clarke) from New Zealand differs notably from this species in the much more elongate form, the depth scarcely exceeding one-fortieth of the length. The third species of the genus *B. tenuis* (Guenther) from Japanese waters has much shorter vertical fins, the dorsal having but 126 rays and the anal but 71 rays. The specimen in hand differs in only minor respects from the description of *B. atlanticus* given by Goode & Bean. The width of the body is slightly greater,  $2\frac{2}{3}$  in its height; the snout slightly longer, its  $2\frac{1}{4}$  in the head; the mandibular tip shorter,  $\frac{1}{4}$  the orbit; the eye smaller,  $2\frac{1}{3}$  in the snout. And there are four long teeth in the upper jaw, instead of three. The species has been known hitherto from a single specimen.—*Smithsonian Miscellaneous Collections*, Vol. 66, No. 18.

In addition to the record in last year's report, there has been a second occurrence of the sunfish (*Mola mola*) in British Columbia waters. The specimen was caught by an Indian, Charles Stewart, off the coast of Princess Royal Island (which is about 450 miles north of where the first specimen was secured on Barkley Sound, V.I.); the second specimen was also secured and forwarded to the Museum by Mr. N. E. Wheeling, Butedale Cannery, at Butedale, B.C.

The sunfish in colour is a dark grey; sides greyish-brown, with silvery reflections; belly dusky; a broad blackish bar running along bases of dorsal, caudal, and anal fins. Pelagic, inhabiting most temperate and tropical seas, swimming slowly about near the surface, the high dorsal above the surface. (See Plate IV.)

The following is a list of species of fishes which the Director sent to Dr. Gilbert for identification:—

Two species of whitefish, *Coregonus quadrilateralis* and *Leucichthys pusillus*, collected by F. Kermode in Atlin Lake, September 29th, 1913; Menominee whitefish (*Coregonus quadrilateralis*), sent from Carcross, Yukon, by W. T. Townsend; *Mylochilus caurinus*, *Ptychocheilus oregonensis*, *Coregonus williamsoni*, collected by J. A. Munro, Okanagan Lake; *Leuciscus richardsoni*, *Ptychocheilus oregonensis*, *Cottus asper*, *Salmo gairdneri*, *Rhinichthys cataractæ*, collected near Hanceville by W. A. Newcombe; *Salvelinus malma*, collected at Edgewood, Lower Arrow Lakes, by G. E. T. Pittendright; *Salmo gairdneri*, *Salmo mykiss*, collected by W. R. Carter, Deputy Game Warden, Alberni.

Giant bass (*Erilepis zonifer*). This fish was presented to the Museum by A. L. Hager, manager of the Canadian Fishing Company, Vancouver, who also kindly gave permission to reproduce the accompanying photograph, which gives the comparison of its great size.

The *Erilepis* weighed when taken from the water 159 lb.; measured 5 feet  $9\frac{1}{2}$  inches in length and 19 inches in depth; was caught on halibut gear, the hooks being bated with herring, in 200 fathoms of water off the west coast of Queen Charlotte Islands, fifteen miles from Tasu, by the Canadian Fishing Company's schooner "Borealis," Captain Chris. Johnson. (See Plates V., VI.)

#### FURTHER NOTES ON *ERILEPIS*, THE GIANT BASS-LIKE FISH OF THE NORTH PACIFIC.

BY WILLIAM F. THOMPSON, OF STANFORD UNIVERSITY.

In Copeia for April 24th, 1916 (No. 30), the writer noted the second occurrence of *Erilepis zonifer* (Lockington) in the North Pacific. Since then several interesting facts have come to light concerning this huge fish that have modified what was previously said. It is especially noteworthy that there is no special reason for believing the fish a stray from Japan, as has been conjectured.

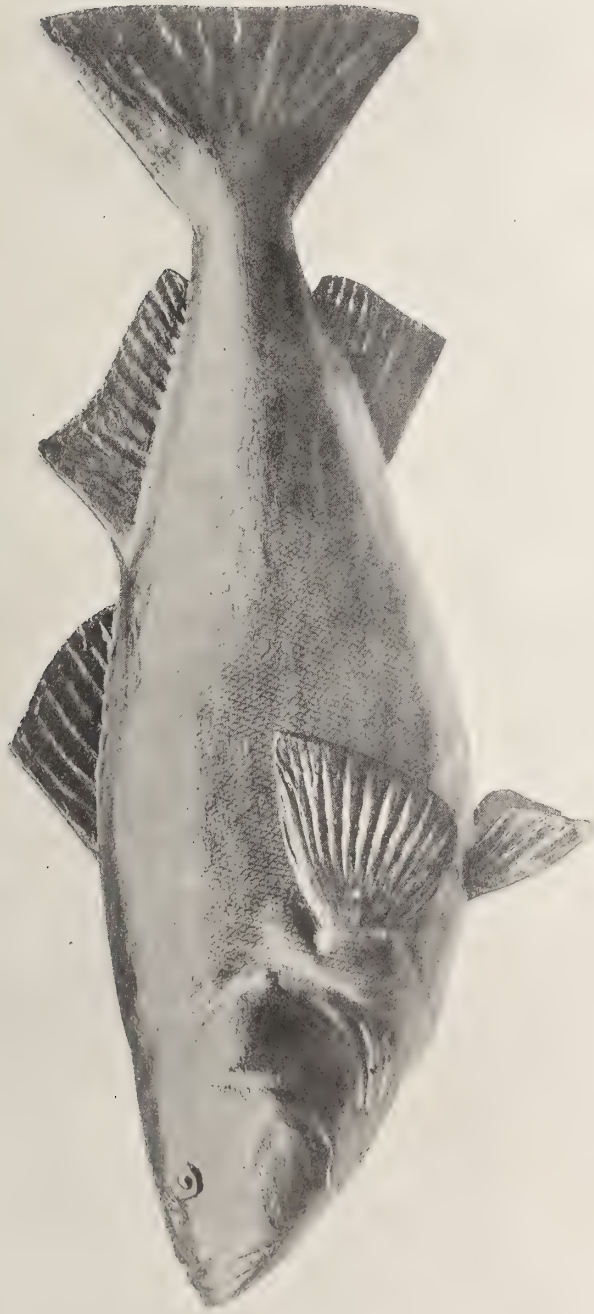
According to one of the fishermen, the specimen already recorded has been taken in South-eastern Alaska, in one of the long inland straits which form the inland passage, either in Frederick Sound or Chatham Strait: The captain of the halibut-schooner, when seen at a later date, stated positively that the specimen was taken off the western coast of the Queen



Giant Bass (*Eritepis zonifer*). Weight, 159 lb., and measured 5 feet 9½ inches.







Giant Bass (*Erilepis zonifer*). From a cast in Provincial Museum, Victoria, B.C.



Charlottes, near the northern end. His record is undoubtedly correct, and it is evident that *Erilepis* was taken on the continental shelf, rather than in enclosed waters.

While in Vancouver during November, at the plant of the Canadian Fishing Company, the writer was shown two other specimens of this fish.

Under the heading of "A Freak Fish," a statement with a photograph of the larger was given in the *Pacific Fisherman* for November, as follows:—

While the halibut-schooner "Borealis" was fishing with halibut-trawls in 240 fathoms of water in Rennel Sound, on the west coast of Queen Charlotte Island, British Columbia, during October, a fish which weighed, in the round, 175 lb., and when dressed 145 lb., was caught. It measured 5 feet 10 inches in length. The opinion was expressed that it was "a large sea-bass" from Southern Pacific waters. Through the kindness of the company manager a smaller specimen caught at the same time was sent to Stanford University in a frozen condition. There it has been carefully examined and compared with a Japanese specimen, undoubtedly the same species.

It will be noted that the locality was the same as the corrected one for the first specimen. The probability is that there is an available explanation for the occurrence. In the region indicated the continental shelf drops with great rapidity to oceanic depths, and a halibut-trawl set in 150 fathoms on its shoreward end frequently drops as far as its buoys will allow it on the seaward end. This may be as much as 400 fathoms. It has only been in recent years, particularly in the winter, that halibut-fishing has been carried on in depths of 140 fathoms and more, as has been shown in the reports of the British Columbia Commissioner of Fisheries for 1915. The cousin of the present species, the Alaska black cod (*Anoplopoma*), inhabits considerable depths also, and in the last few years more of them are being caught by the halibut-boats. The fishermen even occasionally bring up Macrouroid species, formerly utterly unknown to them. This "rare fish" then has perhaps been caught by the fishermen while they were utilizing unusual depths, and it may well be common and relatively abundant in its peculiar habitat.

The Japanese fishermen, it is worthy of note, fish their waters more closely than is done on our coasts, and Dr. Jordan and Professor Snyder say: "According to Kuma Aoki, an intelligent fisherman of Misaki, it is occasionally taken in the Kuro Siwo, it is not rare, and reaches the weight of 200 lb. Although so rare in collections, the species is well known to the fishermen." There is no good reason why more extensive exploitation of our fishing-ground will not bring to light at least an abundance equal to that of the species in Japan. It is hence unjust to call the fish a "stray," and one must be reserved in calling it "rare." Since the only specimens known to be preserved in museums have come from Japan, and the type of the species (from Monterey, California) which was in the collection of the California Academy of Sciences in San Francisco has been destroyed, the following notes regarding the specimens now at hand are appended:—

The fish, 112 cm. in total length and 98 to base of caudal, is bass-like, with massive head and rotund body; its width  $\frac{2}{3}$  its depth, but with somewhat slender caudal peduncle, nearly round and quickly tapering. The interorbital is wide, convex, and the preorbitals are prominent, nearly overhanging. The eyes are small, slightly oval lateral in outlook, and over a wide sub-orbital. The maxillary ends below the centre of the pupil. The lower jaw projects somewhat, its tip lying in the axis of the body, continues the profile lines of the head and body, which taper anteriorly and posteriorly.

The teeth are in a band six or seven series wide anteriorly in the upper jaw, four or five below, narrowing posteriorly; recurved, slender, and sharp; none of them canine-like or enlarged; in a V-shaped patch on vomer; in narrow bands on palatines.

The gill-arches and viscera were removed when the fish was frozen.

The dorsals are apparently separated by the space of two spines, but dissection shows these to be present, buried below the thick skin; two anterior spines are very short; the third is the longest, with the margin of the fin falling straightly to the first buried spine. Preceding the soft rays are two unjoined rays (or spines), closely applied to the third. The soft dorsal is highest at the fifth ray, slightly amarginate in outline. When supine the longest dorsal ray reaches over the bases of the seven following rays, while at the similarly shaped anal reaches to the base of the last. The last rays in both fins are less in length than the eye diameter.

The pectorals are a little falcate in shape, and extend back to the level of the eighth dorsal spine. The ventrals are inserted a short distance behind the pectorals.

Scales are present everywhere on exposed surfaces save the lips, edges of fins, membranes of spinous dorsal, edges of branchiostegal flaps, and the inner surfaces of paired fins; rough to touch, they are not roughly ctenoid; they appear non-imbricate because buried deeply.

The colour is very dark, save for projecting whitish edges of scales; only traces of dark bands are present, one as wide as  $\frac{1}{3}$  of the head-length lying under the pectorals, three others of equal width respectively just before the vent, over the posterior  $\frac{1}{3}$  of the anal, and on the caudal peduncle. Ventrally the body is not markedly lighter than dorsally. The peritoneum is scraped away, but the buccal lining shows very dark. Lips and the fin edges are black, with strong tinges of blue.

The measurements follow: Head, 0.32 of length to base of caudal; 0.30 depth; body width, 0.19; eye, 0.045; maxillary length, 0.13; width, 0.032; suborbital width, 0.04; snout length, 0.11; mandible, 0.16; interorbital, 0.12; pectoral base, 0.075; length, 0.18; ventral, 0.125; third dorsal spine, 0.085; fifth dorsal ray, 0.11; last, 0.037; fifth anal ray, 0.12; last, 0.037; soft dorsal base, 0.25; anal base, 0.16; depth of caudal peduncle, 0.085; width, 0.07; dorsal rays, XIII., 11, 17; anal, 11, 13; pores in lateral line, 126; scales from lateral line obliquely forward and upward to dorsal insertion, 30; downward and backward to anal, 51; pectoral rays, 19; branchiostegals, 7.—(Published by permission of J. P. Babcock, Assistant to the Commissioner of Fisheries.)

#### ENTOMOLOGY.

The season of 1916 was a very poor one from an entomological point of view, owing to the abnormal weather conditions experienced during the first part of the year. The spring was late in opening up, and the weather was cold and wet until well on in May. In addition, the Lower Mainland and the southern portion of Vancouver Island were visited by exceedingly cold winds which prevailed, more or less, until the end of July. Owing to these conditions there was a dearth of the early insects, and this adverse influence was felt right throughout the summer, causing collections to be far below normal, both in quantity and quality. However, in spite of this, many desirable insects were taken at various points, some of them being new to the Province.

#### LILLOOET DISTRICT.

Mr. E. M. Anderson, of the Museum staff, collected in the vicinity of Lillooet from the beginning of May until the end of July. Headquarters were established at the Provincial Government Hatchery at Seton Lake, about three miles from Lillooet.

On May 21st a trip was made over the Blackwater Trail about thirty miles from Seton Lake, starting in at the southern end of Anderson Lake and finishing at Blackwater Lake, getting back to headquarters on June 3rd.

An ascent of Mount McLean, which is situated eight miles north of Seton Lake, was made on July 15th, and many good things were taken during the twelve days' sojourn on the mountain, at altitudes varying from 2,000 to 7,000 feet, chief of which was that very rare mountain butterfly, *Oeneis beanii* Elwes. The only previous record of this butterfly for British Columbia is Mount Cheam, near Chilliwack; its type locality is the Rocky Mountains of Colorado.

The total number of insects taken on the trip numbered 1,065, made up as follows: Lepidoptera, 510; Coleoptera, 251; Hymenoptera, 71; Diptera, 157; and 76 of various other orders.

The most noteworthy captures amongst the butterflies, of which 157 were taken, in addition to the one noted above, were: *Pontia napi flava* Edw.; *Phyciodes mylitta pallida* Edw.; *Incisalia polios* Cook & Watson; *Strymon sepium* Bdv.; and *Pamphila juba* Scud. Amongst the *Sphingidae*, two specimens of that beautiful little sphinx, *Prosperinus clarkii* Bdv. were taken. The noctuids on the whole were disappointing, as sugaring was a complete failure owing to the cold winds prevailing at the time of their greatest abundance. In the early part of May, however, cherry-blossoms were attractive to a few species, and a long series of *Polia crotchii* Grote was taken (a moth new to British Columbia), also a fair series of *Xylomiges perlubens* Grote. Other noctuids taken during the season and worthy of special mention are: *Sidemia longula* Grt.; *Oncocnemis extremis* Em.; *Spargaloma sexpunctata* Grt.; *Syneda alleni* Grt.; and *S. hudsonica* G. & R. The Geometridae made a better showing: 153 specimens were captured, comprising thirty-eight



PLATE VII.

NOCTUIDE NEW TO BRITISH COLUMBIA.

*Catocala faustina* race *caerulea* Bent.  
Okanagan Landing, B.C. (Munro).

*Apatela tartarea* Sm.  
Cowichan Lake, B.C. (Blackmore).

*Bomolocha palparia* Walk.  
Goldstream, B.C. (Blackmore).

*Scotogramma trifolii* race *albifusa* Walk.  
Victoria, B.C. (Blackmore).

*Polia crotchi* Grote.  
Lillooet, B.C. (Anderson).

*Euxoa andera* Sm.  
Okanagan Landing, B.C. (Munro).

*Epidemas melanographa* Hamp.  
Victoria, B.C. (Blackmore).







species, the following being new to the Museum collection, viz.: *Hesperumia sulphuraria* form *baltcaria* Hulst; *Paraphia subatomaria* Wood; *Sabulodes cervinaria* Pack.; and *S. forficaria* Gn. Other desirable species taken were as follows: *Epirrhæ alternata* Mull.; *Xystrota hepaticaria* Gue.; *Acidalia fuscata* Hulst; *Baptia semiclarata* Walk.; *Dasyfidonia avuncularia* Gue.; *Drepanulatrix falcataria* Pack.; *D. pulveraria* Hulst; and *Spodolepsis substriolaria* var. *danbyi* Hulst. Amongst the Microlepidoptera, *Pyrausta funebris* Strom. and *Adela septentrionella* Wals. were the most noteworthy. The Coleoptera, Hymenoptera, and Diptera have not, as yet, been worked over, but there are many in each order new to the Museum collections.

#### OKANAGAN DISTRICT.

Mr. J. A. Munro collected in the neighbourhood of Okanagan Landing from April 20th until September 28th.

Trips were made to the Nahun Plateau, twenty miles south of Okanagan Landing, where some good insects were taken at an altitude of 3,200 feet. In June five days were spent at Shuswap Falls, about thirty miles east of Vernon; the insect fauna here is somewhat different from that in the vicinity of Okanagan Landing, and a representative collection of some 200 insects were taken during the week. The total number of insects taken during the season was 1,118, comprising: Lepidoptera, 730; Coleoptera, 184; Hymenoptera, 101; Diptera, 45; and 58 of various other orders. Amongst the butterflies worthy of notice were *Parnassius smintheus* var. *magnus* Wright; *Papilio bairdii* var. *oregonia* Edw.; *Argynnis leto* Behr.; *A. meadii* Edw.; *Cنعis chryxus* Db.-Hew.; *Nomiades lydgamas* var. *oro* Scud.; *Cupido icarioides* var. *pembina* Edw.; *Erynnis comma* var. *manitoba* Scud.; and *Pholisora catullus* Fab.

(In the above list *N. lydgamas* var. *oro* Scud. is new to British Columbia; it has been probably associated with *N. lydgamas* var. *behrii* in Mainland collections, the males of these two forms bearing a close resemblance to each other. They are in the males differentiated by the much paler blue of the upper side of *oro*; in the females they are more easily separated, *oro* being of a uniform smoky brown with a few blue scales scattered at the base of the wing, while *behrii* is blue with a broad black border. The ground colour of the under side of *oro* is brown, that of *behrii* a light stone colour; the maculation is practically the same in both forms. *Cupido icarioides* var. *pembina* is also a new name to the British Columbia list. This insect has been masquerading under no less than four different names during the last fifteen years—viz., *pheres*, *fulla*, *phileros*, and *lycea*.)

The weather conditions were much better during the summer months in the Okanagan District than they were west of the Cascade Range; consequently the noctuid moths taken were greater, both in number and variety, than those taken in the Lillooet District during the same period. In the Catocalæ two species were taken new to British Columbia—a short series of *Catocala faustina* var. *carulea* Edw. and a single specimen of *C. californica* Hy. Edw. A beautiful specimen of the rare *C. relictæ* Walk. was also taken at sugar on August 25th.

Other specimens worthy of record are the following: *Caradrina extimia* Walk.; *Rhynchagrotis rufpectus* Morr.; *R. variata* Grt.; *Abagrotis erratica* Sm.; *Porosagrotis catenula* Grt.; *Mamestra discalis* Gue.; *Heliothis scutosus* Fabr.; *Heliaca nexilis* Morr.; and *Syneda annexa* Hy. Edw.

The Geometridæ were far below the average both in quantity and quality, although two species new to the Museum collection were taken—*Eudule mendica* Walk. and *Sabulodes lorata* Grt. Other desirable species taken were *Cosymbia lumenaria* Hub.; *Acidalia subfuscata* Taylor; and *Metanema inatomaria* Guen.

The Coleoptera, Hymenoptera, and Diptera still await classification and determination. Many of them, however, are new to the Museum collections, especially in the order Coleoptera.

#### VICTORIA DISTRICT.

The following list of noctuids taken in the vicinity of Victoria during the past season by Mr. E. H. Blackmore, of this city, are of more than passing interest, as the first three are new to British Columbia, while the others are of rare occurrence: *Rhynchagrotis morrisonistigma* Grt.; *Scotogramma trifolii* var. *albifusa* Walk.; *Bomolocha palparia* Walk.; *Cerma cuerva* Barnes; *Hadena plutonia* Grt.; *Epidemas melanographa* Hamp.; *Polia radix* Walk.; *Pyrophila tragopoginis* Linn.; *Adelphagrotis apposita* Grt.; *Euxoa costata* Grt.; *Polia restora* Sm.; *Zosteropoda hirtipes* Grt.; *Stretchia muricina* Grt.; *Xylina dilatocula* Sm.; *Helotropha reniformis* Grt.; and *Ipimorpha nanaimo* Barnes.

Amongst the Geometridæ the same collector took a specimen of *Hydriomena furcata* var. *periculata* Swett. This is the first record for British Columbia of this insect, its type locality being San Francisco, Cal.; also two specimens of *Ania limbata* Haw., and one specimen of *Metanema inatomaria* Gue. These are the first captures of these two geometers that have been recorded for over twelve years from this district.

#### GEOMETRIDÆ NEW TO SCIENCE.

Through the activities of Mr. E. H. Blackmore, who is still pursuing his studies of the British Columbia Geometridæ, two species and four varieties new to science have been discovered. They have been described by Mr. L. W. Swett, the well-known geometrid specialist of West Somerville, Mass., the descriptions appearing in the *Canadian Entomologist*, Vol. XLVIII., page 249 *et seq.* (July, 1916), and Vol. XLIX., page 64 *et seq.* (February, 1917), and are here illustrated for the first time. (See Plate VIII.)

They are as follows: *Nomenia obsoleta* Swett, described from three specimens taken at Goldstream and Victoria, B.C., found in the collection of the late Captain R. V. Harvey, and one specimen found in the Provincial Museum collection taken at Victoria, and all dated April, 1908. The latter was made a male paratype and is now in the exhibition collection of the Museum; *Hydriomena californata* ab. *niveifascia* Swett, described from two specimens—one taken at Goldstream and the other at Victoria—found in the collection of the late Captain Harvey; *Diastictis andersoni* Swett, described from three specimens taken by E. M. Anderson on his trip to Atlin, B.C., in 1914. A male paratype of this new species is also in the Museum exhibition case; *Dysstroma mulleolata* ab. *sobria* Swett, described from a single male taken by E. H. Blackmore at Victoria in June, 1914; *D. mulleolata* ab. *subumbrata*, Swett, described from five specimens taken by Mr. Blackmore at Victoria in June and July, 1914-15; and *D. mulleolata* ab. *ochrofuscaria* Swett, described from specimens taken by Mr. E. H. Blackmore at Victoria, B.C., and by Mr. G. O. Day and Mr. A. W. Hanham, at Duncan, B.C.

Mr. Blackmore has kindly donated to the Museum collection a female paratype of *D. mulleolata* var. *subumbrata* Swett, and a typical specimen of *D. mulleolata* var. *ochrofuscaria* Swett.

#### CORRIGENDA AND ADDENDA.

Owing to a further examination of the types of North American butterflies by that eminent lepidopterist, Dr. J. McDunnough, of Decatur, Ill., two of the species figured in the Provincial Museum Report for 1915 have been found to be named incorrectly.

*Parnassius smintheus* var. *nanus* Neu. (page 16 and Figs. 2 and 3, Plate VIII.) should be corrected to *Parnassius smintheus* Db.-Hew. (*vide* Cont. Lep. No. Amer., Barnes & McDunnough, Vol. III., No. 2, Dec., 1916). The specimens taken at Atlin in 1914 are identical with the type specimens in the British Museum taken by Lord Derby in the Canadian Rockies. The aberration *nanus* Neu. occurs in the male only, and is distinguished by having the two red ocelli on the secondaries replaced by one black spot.

*Brenthis frigga* var. *improba* Butler (page 16 and Figs. 8 and 9, Plate VIII.) turns out to be *Brenthis youngi* Holland, described from Alaska in 1900. This is another new record for British Columbia and was taken at Atlin in 1914.

On page 17 *Æneis norna* var. *taygete* Hub. should be changed to *Æ. taygete* Hub., as the latter is a species quite distinct from *norna* Thun.

Owing to an oversight on the part of those making the "cut" of *Rhachogaster kermodei* Townsend (Plate X., Fig. 1) the name of the artist was omitted. The drawing was made by Mr. C. W. Young, who is attached to the Experimental Farm at Agassiz, and is an excellent piece of work.



PLATE VIII.  
GEOMETRIDÆ.

*Dysstroma mulleolata* Hulst.  
Victoria, B.C. (Blackmore).  
(New to British Columbia.)

*Dysstroma mulleolata* form *subumbrata* Swett.  
Victoria, B.C. (Blackmore).  
(New to science.)

*Dysstroma mulleolata* form *ochrofuscaria* Swett.  
Victoria, B.C. (Blackmore).  
(New to science.)

*Alcis sulphuraria* form *baltearia* Hulst.  
Lillooet, B.C. (Anderson).  
(New to British Columbia.)

*Hydriomena furcata* race *periclata* Swett.  
Victoria, B.C. (Blackmore).  
(New to British Columbia.)

*Hydriomena californiata* form *niveifascia* Swett.  
Victoria, B.C. (Harvey coll.).  
(New to science.)

*Nomenia obsoleta* Swett.  
Goldstream, B.C. (Harvey coll.).  
(New to science.)

*Diastictis andersoni* Swett.  
Atlin, B.C. (Anderson).  
(New to science.)





## BOTANICAL SPECIMENS COLLECTED IN THE LILLOOET DISTRICT, 1916.

By F. KERMODE AND E. M. ANDERSON.

(Identified by J. M. Macoun, Curator of Herbarium, Ottawa.)

## POLYPODIACEÆ.

- Aspidium spinulosum* (O. F. Müller) Sw. Mount McLean.  
*Cystopteris fragilis* (L.) Bernh. Mount McLean.  
*Polystichum lonchitis* (L.) Roth. Mount McLean.  
*Woodsia scopulina* D. C. Eaton. Lillooet.

## LYCOPODIACEÆ.

- Lycopodium complanatum* L. Lillooet.

## PINACEÆ.

- Juniperus communis* L. Mount McLean.  
*Pinus contorta* Douglas. Mount McLean.

## SELAGINELLACEÆ.

- Selaginella* ? *Wallacei*. Lillooet.

## GRAMINEÆ.

- Agropyron tenerum* Vasey. Lillooet.  
*Bromus sterilis* L. Lillooet.  
*Poa pratensis* L. Lillooet.  
*Phleum alpinum* L. Mount McLean.  
*Koeleria cristata* Pers. var. *major*. Lillooet.  
*Calamagrostis purpurascens* R. Rd. Mount McLean.  
*Setaria viridis* (L.) Beauv. Lillooet.

## JUNCACEÆ.

- Luzula spicata* (L.) D.C. Mount McLean.

## LILIACEÆ.

- Allium stellatum* Ker. Lillooet.  
*Calochortus macrocarpus* Dougl. Lillooet.  
*Clintonia uniflora* (Schult.) Kunth. Mount McLean.  
*Disporum oreganum* (S. Wats.) Benth. Seton Lake. (F. K.)  
*Disporum trachycarpum* S. Wats. Lillooet.  
*Lilium parviflorum* (Hook.) Holz. Seton Lake. (F. K.)  
*Smilacina racemosa* (L.) Desf. Seton Lake. (F. K.)  
*Veratrum viride* Ait. Mount McLean.  
*Zygadenus venenosus* S. Wats. Mount McLean.

## ORCHIDACEÆ.

- Calypto bulbosa* (L.) Oakes. Lillooet.  
*Cryptopidium montanum* Dougl. Mount McLean.  
*Corallorrhiza multiflora* Nutt. (*maculata* Raf.)  
*Habenaria leucostachys*. Mount McLean.

## SALICACEÆ.

- Populus tremuloides* Michx. Lillooet.  
*Populus trichocarpa* T. & G. Lillooet.  
*Salix* sp. Mount McLean.  
*Salix Bebbiana* Sargent. Lillooet.  
*Salix Scouleriana*. Lillooet.

## BETULACEÆ.

*Betula alba* var. *papyrifera* (Marsh) Spach. Lillooet.

## SANTALACEÆ.

*Comandra pallida* A. D.C. Seton Lake. (F. K.)

## POLYGONACEÆ.

*Eriogonum subalpinum* Greene. Mount McLean.

*Oxyria digyna* (L.) Hill. Mount McLean.

*Polygonum Convolvulus* L. Lillooet.

*Rumex Acetosella* L. Lillooet.

## CHENOPODIACEÆ.

*Chenopodium* sp. Lillooet.

*Chenopodium album*. Lillooet.

## AMARANTHACEÆ.

*Amaranthus retroflexus* L. Lillooet.

## CARYOPHYLLACEÆ.

*Arenaria capillaris* var. *nardifolia* (Ledeb.) Regel. Mount McLean.

*Arenaria sajanensis* Willd. Mount McLean.

*Cerastium arvense* L. var. A. Lillooet.

*Cerastium arvense* L. var. B. Lillooet.

*Cerastium Behringianum* C. & S. Mount McLean.

*Silene acaulis* L. Mount McLean.

*Silene Menziesii* Hook. Mount McLean.

## PORTULACACEÆ.

*Claytonia perfoliata* Donn. Seton Lake. (F. K.)

*Claytonia lanceolata* Pursh. Mount McLean.

## RANUNCULACEÆ.

*Anemone multifida* Poir. Seton Lake. (F.K.)

*Anemone occidentalis* S. Wats. Mount McLean.

*Anemone parviflora* D.C. Mount McLean.

*Aquilegia formosa* Fisch. Seton Lake. (F. K.)

*Clematis ligusticifolia* Nutt. Lillooet.

*Delphinium bicolor* Nutt. Seton Lake. (F. K.)

*Ranunculus glaberrimus* Hook. Lillooet.

*Ranunculus Eschscholtzii* Schlecht. Mount McLean.

*Trollius larius* Salisb. Mount McLean.

## BERBERIDACEÆ.

*Berberis aquifolium* Pursh. Lillooet.

## FUMARIACEÆ.

*Corydalis aurea* Willd. Seton Lake. (F. K.)

## CRUCIFERÆ.

*Arabis* sp. (? addition to flora of British Columbia). Lillooet.

*Arabis canescens* T. & G. Lillooet.

*Arabis Drummondii* Gray. Mount McLean.

*Arabis hirsuta* (L.) Scop. Mount McLean.



- Capsella Bursa-pastoris* (L.) Medic. Lillooet.  
*Draba alpina* L. and var. *glacialis* Dickie. Mount McLean.  
*Draba aurea* Vahl. Mount McLean.  
*Draba nemorosa* L. Lillooet.  
*Draba nivalis* Lilj. (fruit wanting; identification not positive). Mount McLean.  
*Erysimum parviflorum* Nutt. Lillooet.  
*Lepidium apetalum* Willd. Lillooet.  
*Radicula nasturtium aquaticum* (L.) Britton. Seton Lake.  
*Sisymbrium incisum* Engelm. Lillooet.

## CRASSULACEÆ.

- Sedum divergens* S. Wats. Mount McLean.  
*Sedum stenopetalum* Pursh. Seton Lake. (F. K.)

## SAXIFRAGACEÆ.

- Heuchera cylindrica* Dougl. Lillooet.  
*Mitella trifida* Graham. Mount McLean.  
*Philadelphus Lewisii* Pursh. Lillooet.  
*Ribes irriguum* Dougl. Lillooet.  
*Saxifraga bronchialis* L. Mount McLean.  
*Saxifraga cespitosa* L. Mount McLean.  
*Saxifraga occidentalis* S. Wats. Mount McLean.  
*Saxifraga nivalis* L. Lillooet.  
*Saxifraga oppositifolia* L. Mount McLean.  
*Tellima parviflora* Hook. Lillooet.  
*Tiarella unifoliata* Hook. Mount McLean.

## ROSACEÆ.

- Amelanchier florida* Lindl. Lillooet.  
*Amelanchier Cusickii* Fern. Lillooet.  
*Crataegus brevispina* (Dougl.) Heller. Lillooet.  
*Dryas octopetala* L. Mount McLean.  
*Fragaria cuneifolia* Nutt. Mount McLean.  
*Fragaria glauca* (S. Wats.) Ryal. Lillooet.  
*Geum triflorum* Pursh. Seton Lake. (F. K.)  
*Potentilla fruticosa* L. Mount McLean.  
*Potentilla oregana* Nutt. Lillooet.  
*Potentilla glandulosa* (Lindl.) Rydb. Lillooet.  
*Potentilla glaucophylla* Lehn. Mount McLean.  
*Potentilla monspeliensis* L. Lillooet.  
*Potentilla nivea* L. Mount McLean.  
*Potentilla rivalis* Nutt. Mount McLean.  
*Prunus demissa* (Nutt.) Dietr. Lillooet.  
*Rosa pisocarpa* Gray. Lillooet.  
*Rosa* sp. Lillooet.  
*Rubus parviflorus* Nutt. Lillooet.  
*Rubus leucodermis* Dougl. Lillooet.  
*Spiraea discolor* Pursh. Lillooet.  
*Spiraea lucida* Dougl. Seton Lake.

## LEGUMINOSÆ.

- Astragalus tenellus* Pursh. Lillooet. (F. K.)  
*Hosackia denticulata* S. Wats. Lillooet.  
*Lupinus arcticus* S. Wats. Lillooet.  
*Lupinus Lyallii* Gray. Mount McLean.  
*Vicia angustifolia* Reich. Lillooet.  
*Vicia sativa* L. Lillooet.

## ANACARDIACEÆ.

- Rhus Rydbergii* Small. Seton Lake. (F. K.)  
*Rhus glabra occidentalis* Torr. Lillooet.

## ACERACEÆ.

- Acer Douglasii* Hook. Lillooet.

## RHAMNACEÆ.

- Ceanothus sanguineus* Pursh. Lillooet.  
*Ceanothus velutinus* Dougl. Lillooet.

## VIOLACEÆ.

- Viola adunca* Smith. Mount McLean.  
*Viola canadensis* L. Mount McLean.  
*Viola orbiculata* Geyer. Mount McLean.  
*Viola mistassinica* Greene. Lillooet.

## LOASACEÆ.

- Mentzelia albicaulis* Dougl. Lillooet.

## ELAEAGNACEÆ.

- Elaeagnus argentea* Pursh. Seton Lake. (F. K.)

## ONAGRACEÆ.

- Epilobium alpinum* L. Mount McLean.  
*Epilobium angustifolium* L. Lillooet.  
*Epilobium paniculatum* Nutt. Lillooet.

## ARALIACEÆ.

- Aralia nudicaulis* L. Seton Lake. (F. K.)

## UMBELLIFERÆ.

- Heracleum lanatum* Michx. Mount McLean.  
*Lomatium macrocarpum* (Nutt.) C. & R. Lillooet.  
*Lomatium triternatum* (Nutt.) C. & R. Lillooet.

## CORNACEÆ.

- Cornus pubescens* Nutt. Lillooet.

## ERICACEÆ.

- Cassiope Mertensiana* Don. Mount McLean.  
*Kalmia glauca* Ait. Lillooet.  
*Moneses uniflora* (L.) Gray. Mount McLean.  
*Phyllodoce empetriflora* (Sm.) D. Don. Mount McLean.  
*Pyrola secunda* L. Mount McLean.  
*Pyrola chlorantha* Hook. Mount McLean.  
*Rhododendron albiflorum* Hook. Mount McLean.  
*Vaccinium scoparium* Leiberg. Mount McLean.

## PRIMULACEÆ.

- Androsace occidentalis* Pursh. Mount McLean.  
*Dodecatheon vulgare* (Hook.) Piper. Lillooet.

## GENTIANACEÆ.

- Gentiana acuta* Michx. Mount McLean.

## APOCYNACEÆ.

*Apocynum androsæmifolium* L. Seton Lake. (F. K.)

## POLEMONIACEÆ.

*Polemonium humile* R. & S. Mount McLean.

*Phlox diffusa* Benth. Lillooet.

*Gilia gracilis* Hook. Lillooet.

## HYDROPHYLLACEÆ.

*Phacelia leucophylla* Torr. Lillooet.

*Phacelia Menziesii* (R. Br.) Torr. Lillooet.

*Phacelia sericea* (Graham) A. Gray. Mount McLean.

## BORAGINACEÆ.

*Amsinckia lycopsoides* Lehm. Lillooet.

*Lappula hispida* (A. Gray) Greene. Lillooet. (F. K.)

*Lappula Redowskii* (Hornem.) Greene, var. *occidentalis* (Wats.) Rydb. Lillooet.

*Lithospermum angustifolium* Michx. Seton Lake. (F. K.)

*Lithospermum pilosum* Nutt. Seton Lake.

*Myosotis alpestris* Schmidt. Mount McLean.

## LABIATÆ.

*Nepeta cataria* L. Lillooet.

## SCROPHULARIACEÆ.

*Castilleja angustifolia* Nutt., var. *Bradburii* Fernald. Lillooet.

*Castilleja miniata* Dougl. Seton Lake. (F. K.)

*Castilleja Suksdorfii* Gray. Mount McLean.

*Collinsia grandiflora* var. *pusilla* Gray. Lillooet.

*Pentstemon diffusus* Dougl. Mount McLean.

*Pentstemon procerus* Dougl. Mount McLean.

*Pentstemon Scouleri* Dougl. Mount McLean.

*Pedicularis bracteosa* Benth. Mount McLean.

*Pedicularis Langsdorffii*. Mount McLean.

*Veronica alpina* L. Mount McLean.

## RUBIACEÆ.

*Galium aparine* L. Lillooet.

## PLATAGINACEÆ.

*Plantago Purshii* R. & S. Lillooet.

## CAPRIFOLIACEÆ.

*Lonicera ciliosa* Poir. Seton Lake. (F. K.)

*Symphoricarpos racemosus* Michx. Lillooet.

## VALERIANACEÆ.

*Valeriana sitchensis* Bong. Mount McLean.

## COMPOSITÆ.

*Achillea Millefolium* L. Seton Lake. (F.K.)

*Agoseris glauca* (Pursh.) Steud. Mount McLean.

*Agoseris aurantiaca* (Hook.) Greene. Mount McLean.

*Antennaria Howellii* Greene. Lillooet.

*Antennaria rosea* Greene. Mount McLean.

*Antennaria pulvinata* Greene. Mount McLean.

*Antennaria racemosa* Greene. Lillooet.  
*Aplopappus Lyalli* Gray. Mount McLean.  
*Arnica cordifolia* Hook. Lillooet.  
*Arnica latifolia* Bong. Mount McLean.  
*Artemisia frigida* Willd. Seton Lake. (F. K.)  
*Artemisia discolor* Dougl. Lillooet.  
*Artemisia racemosa*. Mount McLean.  
*Balsamorhiza sagittata* Nutt. Seton Lake. (F.K.)  
*Carduus undulatus* Nutt. Lillooet.  
*Chrysopsis villosa* Nutt. Lillooet.  
*Crepis intermedia* Gray. Seton Lake. (F. K.)  
*Erigeron callianthemus* Greene. Mount McLean.  
*Erigeron compositus* Pursh. Mount McLean.  
*Erigeron fitifolius*. Lillooet.  
*Erigeron speciosus* DC. Lillooet.  
*Gaillardia aristata* Pursh. Lillooet.  
*Hieracium albiflorum* Hook. Lillooet.  
*Solidago corymbosa* Nutt. Mount McLean.  
*Senecio exaltatus* Nutt. Mount McLean.  
*Senecio Fremontii* T. & G. Mount McLean.

PLANTS COLLECTED IN HENDERSON LAKE DISTRICT, 1916.

By W. A. NEWCOMBE.

POLYPODIACEÆ.

*Phegopteris polypodioides* Fee.

PINACEÆ.

*Juniperus scopulorum* Sarg.

LILIACEÆ.

*Tofieldia intermedia* Rydb.

*Erythronium revolutum* Smith.

*Fritillaria lanceolata* Pursh.

*Disporum oregonum* (Wats.) B. & H.

ORCHIDACEÆ.

*Habenaria stricta* Lindl.

RANUNCULACEÆ.

*Ranunculus Bongardi* Greene.

*Trautvetteria grandis* Nutt.

*Anemone Lyalli* Britt.

*Coptis asplenifolia* Salisb.

*Aquilegia formosa* Fischer.

CRUCIFERÆ.

*Arabis* sp.

SAXIFRAGACEÆ.

*Boykinia occidentalis* T. & G.

*Tiarella trifoliata* L.

*Tellima grandiflora* Dougl.

*Tolmiea Menziesii* (Pursh) T. & G.

ROSACEÆ.

*Pyrus sitchensis* (Roem.) Piper.

*Sanguisorba latifolia* (Hook.) Coville.

*Geum macrophyllum* Willd.

*Rosa* sp.

HYPERICACEÆ.

*Hypericum Scouleri* Hook.

	VIOLACEÆ.
<i>Viola</i> sp.	
	ONAGRACEÆ.
<i>Epilobium</i> sp.	
	UMBELLIFERÆ.
<i>Lomatium Martindalei</i> var. <i>angustatum</i> C. & R.	
	CORNACEÆ.
<i>Cornus canadensis</i> L.	
	ERICACEÆ.
<i>Menziesia ferruginea</i> Smith.	
	GENTIANACEÆ.
<i>Gentiana sceptrum</i> Griseb. Uchucklesit Harbour.	
<i>Menyanthes crista-galli</i> Menz.	
	POLEMONIACEÆ.
<i>Phlox diffusa</i> Dougl.	
	HYDROPHYLLACEÆ.
<i>Romanzoffia sitchensis</i> Bong.	
	SCROPHULARIACEÆ.
<i>Pentstemon Menziesii</i> Hook.	
<i>Pentstemon diffusus</i> Dougl.	
<i>Castilleja miniata</i> Dougl.	
<i>Mimulus Lewisii</i> Pursh.	
	RUBIACEÆ.
<i>Galium cymosum</i> Wiegand.	
	VALERIANACEÆ.
<i>Valeriana sitchensis</i> Bong., var. <i>Scouleri</i> (Rydb.) Piper.	
	COMPOSITÆ.
<i>Erigeron</i> sp.	
<i>Erigeron</i> sp.	
<i>Eriophyllum lanatum</i> (Pursh) Forbes.	
<i>Achillea Millefolium</i> L.	
<i>Petasites speciosa</i> (Nutt.) Piper.	
<i>Arnica</i> sp.	
<i>Luina hypoleuca</i> Benth.	
<i>Nabalus alatus</i> Hook.	

## PLANTS COLLECTED IN CRANBROOK DISTRICT.

By C. B. GARRETT.

(Identified by J. M. Macoun, C.M.G., Curator of Herbarium, Geological Survey, Ottawa.)

## POLYPODIACEÆ.

<i>Phegopteris Dryopteris</i> (L.) Fée.	St. Mary's Lake.
<i>Pteris aquilina</i> L., var. <i>lanuginosa</i> Bong.	St. Mary's Lake.
<i>Cryptogramma acrostichoides</i> R. Br.	St. Mary's Lake.
<i>Asplenium cyclosorum</i> Rupr.	St. Mary's Lake.
<i>Woodsia scopulina</i> D. C. Eaton.	Whitefoot Creek.

## CYPERACEÆ.

<i>Carex Richardsonii</i> R. Br.	Cranbrook.
<i>Carex tenella</i> Schk.	Cranbrook.

## JUNCACEÆ.

<i>Luzula glabrata</i> Desv.	Whitefoot Creek.
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## LILIACEÆ.

- Zygadenus chloranthus* Rich. Cranbrook.  
*Zygadenus venenosus* Wats. Cranbrook.  
*Allium cernuum* Roth. Cranbrook.  
*Lilium parviflorum* (Hook.) Holtz. St. Mary's Lake and Whitefoot Creek.  
*Fritillaria pudica* (Pursh) Spreng. Cranbrook.  
*Erythronium grandiflorum* Pursh, var. *parviflorum* Wats. St. Mary's Lake.  
*Calochortus elegans* Pursh. St. Mary's Lake.  
*Calochortus macrocarpus* Dougl. Cranbrook.  
*Clintonia uniflora* Kunth. St. Mary's Lake.  
*Smilacina stellata* (L.) Desf. Cranbrook.  
*Disporum trachycarpum* B. & H. St. Mary's Lake.  
*Smilacina amplexicaulis* Nutt. St. Mary's Lake.

## IRIDACEÆ.

- Sisyrinchium angustifolium* Miller. Cranbrook.

## ORCHIDACEÆ.

- Habenaria elegans* Boland. St. Mary's Lake.  
*Habenaria dilatata* Hook. St. Mary's Lake.  
*Spiranthes Romanzoffiana* Cham. Cranbrook.  
*Calypso bulbosa* (L.) Oakes. Whitefoot Creek.

## BETULACEÆ.

- Alnus tenuifolia* Nutt. St. Mary's Lake.

## SANTALACEÆ.

- Comandra pallida* A. DC. Cranbrook.

## POLYGONACEÆ.

- Eriogonum umbellatum* Torr. St. Mary's Lake.  
*Polygonum amphibium* L. Cranbrook.

## CARYOPHYLLACEÆ.

- Arenaria lateriflora* L. Cranbrook.  
*Arenaria serpyllifolia* L. Cranbrook.  
*Stellaria graminea* L. St. Mary's Lake.  
*Stellaria longifolia* Muhl. Cranbrook.  
*Cerastium arvense* L. Cranbrook.  
*Cerastium viscosum* L. St. Mary's Lake.  
*Silene Menziesii* Hook. Cranbrook.

## PORTULACEÆ.

- Claytonia lanceolata* Pursh. Whitefoot Creek.  
*Lewisia rediviva* Pursh. Cranbrook.

## RANUNCULACEÆ.

- Ranunculus Flammula* L., var. *reptans* (L.) Meyer. Cranbrook.  
*Ranunculus glaberrimus* Hook. Cranbrook.  
*Ranunculus Macounii* Britt. Glabrate. St. Mary's Lake.  
*Ranunculus Eschscholtzii* Schlecht. St. Mary's Lake.  
*Anemone patens* L., var. *Wolfgangiana* (Bess.) Koch. Cranbrook.  
*Anemone multifida* Poir. Cranbrook.  
*Anemone occidentalis* Freyn. St. Mary's Lake.  
*Clematis columbiana* Hornem. Cranbrook.  
*Trollius luteus* Salisb. St. Mary's Lake.

*Aquilegia formosa* Fisch., var. *flavescens* (Wats.) Frye & Rigg. St. Mary's Lake.  
*Delphinium columbianum* Greene. Cranbrook.  
*Actaea arguta* Nutt. St. Mary's Lake.

## BERBERIDACEÆ.

*Berberis aquifolium* Pursh. Cranbrook.

## FUMARIACEÆ.

*Corydalis aurea* Willd. St. Mary's Lake.

## CRUCIFERÆ.

*Alyssum calycinum* L. Cranbrook.  
*Lesquerella Douglasii* Wats. St. Mary's Lake.  
*Thlaspi arvense* L. (introduced). Cranbrook.  
*Capsella Bursa-pastoris* (L.) Medic. Cranbrook.  
*Sisymbrium incisum* Engelm. Cranbrook.  
*Sisymbrium incisum* Engelm., var. *Hartwegianum* (Fourn) Wats. Cranbrook.  
*Erysimum asperum* DC. Cranbrook.  
*Erysimum parviflorum* Nutt. Cranbrook.  
*Cardamine pennsylvanica* Muhl. St. Mary's Lake.  
*Arabis hirsuta* (L.) Scop. Whitefoot Creek.

## CRASSULACEÆ.

*Sedum stenopetalum* Pursh. St. Mary's Lake.

## SAXIFRAGACEÆ.

*Saxifraga occidentalis* Wats. Cranbrook.  
*Saxifraga bronchialis* L. St. Mary's Lake.  
*Mitella pentandra* Hook. St. Mary's Lake.  
*Mitella trifida* Graham. St. Mary's Lake.  
*Heuchera glabella* T. & G. Cranbrook.  
*Tellima tenella* (Nutt.) Walp. Cranbrook.  
*Ribes viscosissimum* Pursh. Whitefoot Creek.

## ROSACEÆ.

*Spiraea lucida* Dougl. St. Mary's Lake.  
*Pyrus sitchensis* (Roem.) Piper. St. Mary's Lake.  
*Fragaria platypetala* Rydb. Cranbrook.  
*Potentilla monspeliensis* L. St. Mary's Lake.  
*Potentilla fruticosa* L. Cranbrook.  
*Potentilla anserina* L. Cranbrook.  
*Geum strictum* Ait. Cranbrook.  
*Rubus pedatus* Smith. St. Mary's Lake.  
*Rubus pubescens* Raf. Cranbrook.  
*Rosa* sp. Cranbrook.  
*Prunus demissa* Walp. St. Mary's Lake.  
*Purshia tridentata* DC. Mission.

## LEGUMINOSÆ.

*Lupinus argenteus* Pursh. Cranbrook.  
*Trifolium repens* L. St. Mary's Lake.  
*Trifolium hybridum* L. (introduced). St. Mary's Lake.  
*Astragalus campestris* Gray. Cranbrook.  
*Astragalus spicatus* Nutt. Cranbrook.  
*Oxytropis monticola* Gray. Cranbrook.  
*Vicia americana* Muhl. Cranbrook.  
*Lathyrus ochroleucus* Hook. Cranbrook.

## GERANIACEÆ.

*Geranium viscosissimum* F. & M. St. Mary's Lake.

## ACERACEÆ.

*Acer Douglasii* Hook. St. Mary's Lake.

## RHAMNACEÆ.

*Ceanothus velutinus* Dougl. St. Mary's Lake.

## HYPERICACEÆ.

*Hypericum Scouleri* Hook. St. Mary's Lake.

## VIOLACEÆ.

*Viola* sp.? Cranbrook.

*Viola adunca* Smith, var. Cranbrook.

*Viola nephrophylla* Greene. Cranbrook.

*Viola orbiculata* Geyer. Whitefoot Creek.

*Viola glabella* Nutt. St. Mary's Lake.

*Viola canadensis* L. St. Mary's Lake.

## ONAGRACEÆ.

*Ænothera muricata* L. Cranbrook.

## ARALIACEÆ.

*Aralia nudicaulis* L. Cranbrook.

## UMBELLIFERÆ.

*Lomatium triternatum* (Nutt.) Cranbrook.

*Leptotaenia multifida* Nutt. Whitefoot Creek.

## CORNACEÆ.

*Cornus stolonifera* Michx. Cranbrook.

*Cornus canadensis* L. St. Mary's Lake.

## ERICACEÆ.

*Moneses uniflora* (L.) Gray. Cranbrook.

*Pyrola secunda* L. St. Mary's Lake.

*Pyrola bracteata* Hook. St. Mary's Lake.

*Phyllodoce empetriformis* (Sm.) D. Don. Whitefoot Creek.

*Arctostaphylos Uva-ursi* (L.) Spreng. Cranbrook.

## PRIMULACEÆ.

*Dodecatheon pauciflorum* Greene (?), Cranbrook.

## GENTIANACEÆ.

*Gentiana Amarella* L., var. *acuta* (Michx.) Herder. Cranbrook.

*Gentiana affinis* Griesb. Cranbrook.

*Menyanthes trifoliata* L. Cranbrook.

## POLEMONIACEÆ.

*Phlox diffusa* Benth. Cranbrook.

*Gilia linearis* (Nutt.) Gray. St. Mary's Lake.

## HYDROPHYLLACEÆ.

*Phacelia Menziesii* Torr. (R. Br.). Cranbrook.

*Phacelia leucophylla* Torr. St. Mary's Lake.



## BORAGINACEÆ.

- Lappula occidentalis* (Wats.) Rydb. Cranbrook.  
*Lappula diffusa* (Lehm.) Greene. Whitefoot Creek.  
*Mertensia oblongifolia* Don. Mission.  
*Lithospermum ruderale* Dougl. Cranbrook.

## LABIATÆ.

- Scutellaria galericulata* L. Cranbrook.  
*Prunella vulgaris* L. St. Mary's Lake.  
*Stachys scopulorum* Greene. Cranbrook.  
*Monarda mollis* L. Cranbrook.  
*Mentha canadensis* L. Cranbrook.

## SCROPHULARIACEÆ.

- Collinsia parviflora* Lindl. Cranbrook.  
*Pentstemon* sp. Cranbrook.  
*Pentstemon confertus* Dougl. Cranbrook.  
*Pentstemon scopulorum* Piper. St. Mary's Lake.  
*Pentstemon Scouleri* Dougl. Cranbrook.  
*Mimulus nasutus* Greene. St. Mary's Lake.  
*Veronica americana* Schwein. Cranbrook.  
*Veronica alpina* L. St. Mary's Lake.  
*Veronica humifusa* Dickson. St. Mary's Lake.  
*Castilleja angustifolia* Don., var. *Bradburii* Fernald. St. Mary's Lake.  
*Orthocarpus tenuifolius* Benth. St. Mary's Lake.  
*Pedicularis racemosa* Hook. St. Mary's Lake.

## LENTIBUARIACEÆ.

- Utricularia vulgaris* L. Cranbrook.

## RUBIACEÆ.

- Galium boreale* L. Cranbrook.  
*Galium trifidum* L., var. St. Mary's Lake.

## CAPRIFOLIACEÆ.

- Lonicera involucrata* (Richards.) Banks. Cranbrook.  
*Linnaea borealis* L., var. *americana* (Forbes) Rehder. St. Mary's Lake.  
*Sambucus melanocarpa* Gray. St. Mary's Lake.  
*Sambucus racemosa* L. St. Mary's Lake.

## CAMPANULACEÆ.

- Campanula rotundifolia* L. Cranbrook.

## COMPOSITÆ.

- Chrysopsis villosa* (Pursh) Nutt. St. Mary's Lake.  
*Chrysopsis hirsuta* Nutt. Cranbrook.  
*Solidago decumbens* Greene. St. Mary's Lake.  
*Erigeron acris* L. St. Mary's Lake.  
*Erigeron acris* L. (a form of). Cranbrook.  
*Erigeron corymbosus* Nutt. St. Mary's Lake.  
*Erigeron hispidissimus* (Hook.) Piper. Cranbrook.  
*Erigeron salsuginosus* (Rich.) A. Gray. St. Mary's Lake.  
*Erigeron speciosus* DC. St. Mary's Lake.  
*Aster multiflorus* Ait. Cranbrook.  
*Aster stenomerus* Gray. St. Mary's Lake.  
*Antennaria racemosa* Hook. St. Mary's Lake.

*Antennaria rosea* Greene. Cranbrook.  
*Antennaria anaphaloides* Rydb. St. Mary's Lake.  
*Antennaria Howellii* Greene (small leaves form). Cranbrook.  
*Anaphalis margaritaceæ* (L.) B. & H. Cranbrook.  
*Balsamorhiza sagittata* Nutt. Cranbrook.  
*Gaillardia aristata* Pursh. St. Mary's Lake.  
*Achillea lanulosa* Nutt. Cranbrook.  
*Chrysanthemum leucanthemum* L. Cranbrook.  
*Arnica gracilis* Rydb. St. Mary's Lake.  
*Arnica cordifolia* Hook. St. Mary's Lake.  
*Arnica fulgens* Pursh. Cranbrook.  
*Arnica grandifolia* Greene. Cranbrook.  
*Senecio triangularis* Hook. St. Mary's Lake.  
*Senecio pseudauræus* Rydb. St. Mary's Lake.  
*Senecio canus* Hook. (unusual form with dentate leaves). Cranbrook.  
*Hieracium albiflorum* Hook. Whitefoot Creek.  
*Hieracium* sp. Cranbrook.  
*Crepis intermedia* Gray. St. Mary's Lake.  
*Crepis gracilis* (D. C. Eaton) Rydb. Cranbrook.

PLANTS COLLECTED IN OKANAGAN DISTRICT, 1915.

By J. A. MUNRO.

POLYPODIACEÆ.

*Asplenium Filix-femina* (L.) Bernh.  
*Polypodium vulgare* L.

LILIACEÆ.

*Zygadenus venenosus* S. Watts.  
*Allium cernuum* Roth.  
*Lilium parviflorum* (Hook.) Holz.  
*Fritillaria lanceolata* Pursh.  
*Fritillaria pudica* (Pursh) Spreng.  
*Calochortus macrocarpus* Dougl.  
*Clintonia uniflora* Kunth.  
*Smilacina stellata* (L.) Desf.  
*Smilacina sessilifolia* Nutt.

ORCHIDACEÆ.

*Cypripedium montanum* Dougl.  
*Cypripedium parviflorum* Salisb.  
*Habenaria dilatata* (Pursh) Gray.  
*Habenaria unalascensis* (Spreng.) Wats.  
*Habenaria obtusata* (Pursh) Richards.  
*Habenaria elegans* Lindl.  
*Epipactis decipiens* (Hook.) Ames.  
*Listera convallarioides* Torr.  
*Corallorrhiza multiflora* Nutt.  
*Calypso bulbosa* (L.) Oakes.

SANTALACEÆ.

*Comandra pallida* A. DC.

POLYGONACEÆ.

*Polygonum acre* H. B. K., var. *leptostachyum* Meisn.  
*Polygonum lapathifolium* L.  
*Eriogonum angustifolium* Nutt.

CARYOPHYLLACEÆ.

*Agrostemma Githago* L. (introduced).

## RANUNCULACEÆ.

*Clematis columbiana* (Nutt.) T. & G.  
*Ranunculus glaberrimus* Hook.  
*Delphinium* sp.  
*Actaea arguta* Nutt.

## SAXIFRAGACEÆ.

*Tellima parviflora* Hook.

## ROSACEÆ.

*Spiræa lucida* Dougl.  
*Spiræa discolor* Maxim.  
*Potentilla anserina* L.  
*Potentilla monspeliensis* L.  
*Geum triflorum* Pursh.

## LEGUMINOSÆ.

*Astragalus campestris* Gray.  
*Vicia americana* Muhl.  
*Lathyrus ochroleucus* Hook.

## GERANIACEÆ.

*Erodium cicutarium* (L.) L'Herit.

## MALVACEÆ.

*Sphæralcea acerifolia* Nutt.

## HYPERICACEÆ.

*Hypericum Scouleri* Hook.

## VIOLACEÆ.

*Viola adunca* Smith.  
*Viola canadensis* L.

## ONAGRACEÆ.

*Epilobium angustifolium* L.  
*Epilobium adenocaulon* Haussk.

## ERICACEÆ.

*Arctostaphylos Uva-ursi* L.

## PRIMULACEÆ.

*Dodecatheon Meadia* L., var. *pauciflorum* Durand.  
*Steironema ciliatum* (L.) Raf.

## HYDROPHYLLACEÆ.

*Phacelia Menziesii* (R. Br.) Torr.

## SCROPHULARIACEÆ.

*Pentstemon Scouleri* Lindl.

## OROBANCHACEÆ.

*Orobanche fasciculata* Nutt.  
*Orobanche uniflora* L.

## PLANTAGINACEÆ.

*Plantago Purshii* R. & S.

## RUBIACEÆ.

*Galium boreale* L.

## CAPRIFOLIACEÆ.

*Linnæa borealis* L., var. *americana* Forbes.  
*Lonicera involucrata* (Richards) Banks.

## VALERIANACEÆ.

*Valerianella macrocera* T. & G.

## CAMPANULACEÆ.

*Specularia perfoliata* (L.) A. DC.

## COMPOSITÆ.

*Chrysopsis hispida* (Hook.) Nutt.  
*Chrysopsis villosa* (Pursh) Nutt.  
*Solidago ellngata* Nutt.  
*Erigeron macranthus* Nutt.  
*Erigeron corymbosus* Nutt.  
*Erigeron philadelphicus* L.  
*Antennaria rosea* Greene.  
*Gaillardia aristata* Pursh.  
*Arnica cordifolia* Hook.  
*Agoseris aurantiaca* Hook.  
*Hieracium columbianum* Rydb.  
*Sonchus arvensis* L.  
*Crepis intermedia* A. Gray.

## PLANTS COLLECTED IN CHILCOTIN DISTRICT, 1915.

BY W. A. NEWCOMBE.

(Identified by J. M. Macoun, C.M.G., Curator of Herbarium, Geological Survey, Ottawa.)

## POLYPODIACEÆ.

*Cheilanthes Feei* Moore.  
*Cheilanthes gracillima* D. C. Eaton.  
*Pellæa occidentalis* (Nels.) Rydb. Alexis Creek.  
*Cryptogramma acrostichoides* R. Br. Hell's Gate, Fraser River.  
*Cryopteris fragilis* (L.) Bernh.  
*Woodsia obtusa* (Spreng.) Torr.  
*Woodsia oregana* D. C. Eaton. Hell's Gate, Fraser River.  
*Woodsia scopulina* D. C. Eaton.

## OPHIOGLOSSACEÆ.

*Botrychium Lunaria* L.

## PINACEÆ.

*Juniperus scopulorum* Sarg.  
*Juniperus communis* L., var. *sibirica* (Burgsd.) Rydb.

## NAIADACEÆ.

*Triglochin palustris* L.

## GRAMINEÆ.

*Phragmites communis* Trin.

## CYPERACEÆ.

*Eleocharis palustris* (L.) R. & G.  
*Carex* sp.?  
*Carex vesicaria* L.

## LILIACEÆ.

*Zygadenus venenosus* S. Wats.  
*Allium cernuum* Roth.  
*Lilium parviflorum* (Hook.) Holtz.  
*Fritillaria pudica* (Ph.) Spreng.  
*Smilacina sessilifolia* Nutt.

## IRIDACEÆ.

*Sisyrinchium angustifolium* Miller.

## ORCHIDACEÆ.

- Cypripedium parviflorum* Salisb.  
*Orchis rotundifolia* Banks.  
*Habenaria obtusata* (Ph.) Richards.  
*Habenaria dilatata* (Ph.) Gray.

## SALICACEÆ.

- Salix* ? *myrtilloides* L.  
*Salix melanopsis* Nutt.  
*Salix* sp.  
*Populus tremuloides* Michx.  
*Populus trichocarpa* T. & G.

## BETULACEÆ.

- Betula glandulosa* Michx.  
*Alnus* sp.

## SANTALACEÆ.

- Comandra pallida* A. DC.

## POLYGONACEÆ.

- Eriogonum heracleoides* Nutt.

## CHENOPODIACEÆ.

- Chenopodium capitatum* (L.) Ascher.

## CARYOPHYLLACEÆ.

- Stellaria longipes* Goldie.  
*Cerastium arvense* L.  
*Cerastium* ? *nutans* Raf.  
*Silene Menziesii* Hook.

## RANUNCULACEÆ.

- Ranunculus cymbalaria* Pursh.  
*Ranunculus delphinifolius* Torr.  
*Ranunculus sceleratus* L.  
*Ranunculus Macounii* Britt.  
*Ranunculus pedatifidus* Smith.  
*Ranunculus abortivus* L.  
*Ranunculus glaberrimus* Hook.  
*Thalictrum occidentale* A. Gray.  
*Anemone multifida* Poir.  
*Aquilegia brevistyla* Hook.  
*Delphinium bicolor* Nutt.  
*Actæa arguta* Torr.

## FUMARIACEÆ.

- Corydalis aurea* Willd.

## CURCIFERÆ.

- Draba nemorosa* L., var. *leiocarpa* Lindbl.  
*Sisymbrium incisum* Engelm.  
*Erysimum cheiranthoides* L.  
*Cardamine* probably *pennsylvanica* Muhl.  
*Arabis brachycarpa* (T. & G.) Britt.  
*Arabis lyrata* L., var. *occidentalis* S. Wats.  
*Arabis hirsuta* Scop.

## CRASSULACEÆ.

- Sedum stenopetalum* Pursh.

## SAXIFRAGACEÆ.

- Heuchera columbiana* Rydb.  
*Chrysosplenium alternifolium* L.

*Parnassia palustris* L.  
*Ribes hudsonianum* Richardson.  
*Ribes oxycanthoides* L.

## ROSACEÆ.

*Spiræa lucida* Dougl.  
*Amelanchier florida* Lindl.  
*Fragaria chiloensis* (L.) Duch.  
*Potentilla gracilis* Dougl.  
*Potentilla glandulosa* Lindl.  
*Potentilla anserina* L.  
*Potentilla anserina* L., var. *concolor* Ser.  
*Potentilla pennsylvanica* L.  
*Potentilla strigosa* Pursh.  
*Geum rivale* L.  
*Geum strictum* Ait.  
*Geum triflorum* Pursh.  
*Rubus strigosus* Michx.  
*Rubus triflorus* Richards.  
*Rubus arcticus* L.  
*Rosa acicularis* Lindl.  
*Prunus demissa* Nutt.

## LEGUMINOSÆ.

*Astragalus alpinus* L.  
*Astragalus campestris* Gray.  
*Hedysarum boreale* Nutt.  
*Vicia americana* Muhl.  
*Lathyrus ochroleucus* Hook.  
*Astragalus hypoglottis* L.

## LINACEÆ.

*Linum Lewisii* Pursh.

## GERANIACEÆ.

*Geranium erianthum* DC.

## VIOLACEÆ.

*Viola adunca* Smith.  
*Viola blanda* Willd.  
*Viola canadensis* L.  
*Viola cognata* Greene.

## ELÆAGNACEÆ.

*Elæagnus argentea* Pursh.  
*Shepherdia canadensis* (L.) Nutt.

## ONAGRACEÆ.

*Epilobium angustifolium* L.

## UMBELLIFERÆ.

*Cicuta ? vagans* Greene.  
*Heracleum lanatum* Michx.

## CORNACEÆ.

*Cornus stolonifera* Michx.

## ERICACEÆ.

*Pyrola uliginosa* Torr.  
*Arctostaphylos Uva-ursi* (L.) Spreng.

## PRIMULACEÆ.

*Androsace septentrionalis* L.  
*Lysimachia thyrsiflora* L.

## APOCYNACEÆ.

*Apocynum androsæmifolium* L.

## POLEMONIACEÆ.

*Gilia linearis* (Nutt.) Gray.

*Polemonium elegans* Greene.

## HYDROPHYLLACEÆ.

*Phacelia Menziesii* (R. Br.) Torr.

## BORAGINACEÆ.

*Lappula Redowskii* (Hornem.) Greene, var. *occidentalis* (Wats.) Rydb.

*Lithospermum angustifolium* Michx.

*Lithospermum ruderale* Dougl.

## LABIATÆ.

*Mentha arvensis* L.

## SCROPHULARIACEÆ.

*Pentstemon Scouleri* Lindl.

*Pentstemon procerus* Dougl.

*Mimulus Langsdorffi* Donn.

*Mimulus peduncularis* Dougl.

*Veronica americana* Schwein.

*Castilleja angustifolia* (Nutt.) G. Don.

*Castilleja miniata* Dougl.

*Orthocarpus luteus* Nutt.

## OROBANCHACEÆ.

*Orobanche fasciculata* Nutt.

## RUBIACEÆ.

*Galium boreale* L.

## CAPRIFOLIACEÆ.

*Lonicera involucrata* (Richard.) Banks.

*Symphoricarpos racemosus* Michx.

*Linnæa borealis* L.

*Viburnum pauciflorum* Pylaie.

## VALERIANACEÆ.

*Valeriana sitchensis* Bong.

## COMPOSITÆ.

*Chrysopsis hispida* (Hook.) Nutt.

*Aster multiflorus* Ait.

*Erigeron flagellaris* A. Gray.

*Erigeron philadelphicus* L.

*Erigeron speciosus* DC.

*Erigeron compositus* Pursh.

*Antennaria lanata* (Hook.) Greene.

*Antennaria rosea* Greene.

*Antennaria parvifolia* Nutt.

*Balsamorhiza sagittata* (Pursh) Nutt.

*Gaillardia aristata* Pursh.

*Achillea Millefolium* L.

*Artemisia discolor* Dougl.

*Petasites speciosa* (Nutt.) Piper.

*Arnica alpina* (L.) Ol. & Iad.

*Arnica cordifolia* Hook.

*Senecio canus* Hook.  
*Senecio cymbalarioides* Nutt.  
*Senecio mutabilis* Greene.  
*Cichorium Intybus* L.  
*Agoseris glauca* (Pursh) Steud.  
*Crepis occidentalis* Nutt.

#### PALÆONTOLOGY.

A noteworthy addition to the small collection of Tertiary fossils in the Provincial Museum was acquired in October, 1916. This consists of a fossil tooth of the rare *Desmostylus*, an extinct race of the mammalian group of sirenians, to which the living dugong and the recently extinct Steller's sea-cow belong.

The tooth referred to was found by Miss M. Egerton, of Victoria, in the fossiliferous sandstone cliff near the mouth of Coal Creek, Sooke, in the summer of 1916, and was forwarded by R. E. Gosnell, at the suggestion of the Director, to Lawrence M. Lambe, Dominion Vertebrate Palæontologist, Ottawa, for determination. Mr. Lambe's reply included the following statement:—

“The tooth from Otter Point, in the Sooke District, Vancouver Island, belongs to the sirenian species, *Desmostylus hesperus* Marsh, of Pliocene (? Miocene) age. This tooth is of particular interest as it is the first one of this kind found to our certain knowledge in Canada. Last year Dr. Newcombe, of Victoria, B.C., presented to this Department a large, perfect, unworn tooth which he obtained from a curio-dealer, and was supposed to be from Alaska. Miss Egerton's specimen was happily secured *in situ*, and possibly a further search at the locality may reveal other remains of the species. It appears to be the first right upper molar; Dr. Newcombe's being the second left molar. It is probable that the beds from which the specimen comes are of Miocene age, but the genus may have ranged up into the Pliocene. Remains of *Desmostylus* have been found in Japan, California, and Oregon. The genus is closely related to the existing *Manatus* of Florida and the recently extinct *Rhytina* (Steller's sea-cow) of the North Pacific. The specimen has been broken off at the top of the roots, which have remained in the rock, and may possibly still be recovered to make it complete if a visit is made to the locality and care is exercised in their removal.”

As several finds of *Desmostylus* had been reported from California, from which State the first specimen had been described, it was thought advisable to write to the well-known geologists, Dr. Merriam and Dr. Ralph Arnold, for further information. The former had already taken much interest in the Sooke formations and had published preliminary descriptions of fossils found in them in 1897 and 1899. In the years 1906 and 1911 he had also published notes on the genus *Desmostylus*, with special reference to the remains found on the Pacific Coasts of America and Japan. Dr. Arnold, it was known, had devoted a great deal of time to the Tertiary faunas of the Pacific Coast, and had in view a publication which might continue the work so well commenced by his report on the Marine Pliocene and Pleistocene of San Pedro, California. Dr. Arnold had also sent field parties to our Coast, who had made large collections of fossils at and near Sooke.

Permission was readily given to make use of such conclusions as had been arrived at by the above geologists with regard to the age of the formation from which our *Desmostylus* tooth came.

Quoting from a letter received from Mr. B. L. Clark, of the University of California, who is now examining and describing the Tertiary fossils of this Coast in collaboration with Drs. Merriam and Arnold, the following statements are of interest:—

“After studying the fauna from the Sooke beds and that from the Carmanah Point beds, my conclusion is that they belong to the same period of deposition and, very probably, to the same faunal horizon. A number of species common to the beds of the two localities are distinctive forms, such as, I believe, may be taken as good horizon markers. Some of these species are *Agasoma acuminatum*, *Bullia buccinoides*, *Eudolium petrosu*, *Molopophorus Newcombei*, *Macrocallista vancouverensis*, and *Chione* ? *n. sp.*

This fauna, from both localities, apparently belongs to the same horizon as that found in the Restoration Point beds near Seattle. These were referred to the Seattle formation by Arnold and Hannibal, and to his Blakely horizon by Weaver, the fauna of which he designates as that of the *Acila gettysburgensis* zone.





Fig. 1. View of fossiliferous sandstone cliff near mouth of Coal Creek, Sooke, Vancouver Island.  
Photo by C. F. Newcombe, M.D.

Figs. 2 and 3 Tooth of *Desmostylus hesperus* Marsh. Found in the sandstone cliffs near mouth of  
Coal Creek, Sooke, B.C.





Drainage-basins of British Columbia.  
 Enlarged from Atlas of Canada, Department of the Interior.



"The question as to the exact position of the *Acila gettysburgensis* zone is debatable. Professor Weaver places it as the uppermost faunal zone of the Oligocene.

"My study of the Oligocene fauna of middle California, together with that of Oregon and Washington, appears to me to show that the faunas of the different horizons of the Oligocene of Oregon and Washington, as recognized by Arnold and Hannibal, and by Weaver, are very closely related. Much more work, however, must be done before the sequence and relative importance of the different faunal zones can be established for a certainty."

Plate IX., Fig. 1. View of fossiliferous sandstone cliff near the mouth of Coal Creek, Sooke. The low Tertiary cliff is covered by heavy glacial deposits with heavy growth of timber. Erosion is going on with great rapidity, leaving ice-worn boulders on nearly level rocky beach, which extends far out to sea at low water.

Plate IX., Figs. II. and III. Tooth of *Desmostylus*, believed to be of the species *hesperus* of Marsh. The tooth is formed of several cylindrical pillars, each consisting of a thick layer of enamel enclosing a small body of dentine. The grinding surface shows a circular depression at the end of each of the principal pillars, the lip of which is formed by enamel, and the central pit is excavated by wear into the softer dentine.

Until this tooth was found the *Desmostylus* was only known to occur in America in Oregon and California; outside of America it has also been found in Japan.

A. Side view of tooth showing pillars.

B. Grinding surface, showing circular pits. Height, 22 mm.; length, 35 mm.; width, 24 mm.

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