

PROVINCE OF BRITISH COLUMBIA

REPORT

OF THE

PROVINCIAL MUSEUM

OF

NATURAL HISTORY

FOR THE YEAR 1921



PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C. :

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1922.

To His Honour WALTER CAMERON NICHOL,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned respectfully submits herewith the Annual Report of the Provincial Museum of Natural History for the year 1921.

J. D. MACLEAN,
Provincial Secretary.

Provincial Secretary's Office,
Victoria, February, 1922.

PROVINCIAL MUSEUM OF NATURAL HISTORY,
VICTORIA, B.C., February 1st, 1922.

*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, 1921, covering the activities of the Museum.

I have the honour to be,

Sir,

Your obedient servant,

FRANCIS KERMODE,
Director.

TABLE OF CONTENTS.

	PAGE.
Objects	7
Admission	7
Visitors	7
Activities	7
Loan Collection of Lepidoptera	8
Mammals	8
List of Chipmunks in the Province of British Columbia	8
A Remarkable Case of External Hind Limbs in a Humpback Whale	9
Ornithology	11
Notes on the Occurrence of the White-winged Dove (<i>Melopelia asiatica</i>).....	11
Accessions	11
Botany	13
Entomology	17
The Pterophoridae of British Columbia	34

REPORT of the
PROVINCIAL MUSEUM OF NATURAL HISTORY
FOR THE YEAR 1921.

BY FRANCIS KERMODE, DIRECTOR.

OBJECTS.

- (a.) To secure and preserve specimens illustrating the natural history of the Province.
- (b.) To collect anthropological material relating to the aboriginal races of the Province.
- (c.) To obtain information respecting the natural sciences, relating particularly to the natural history of the Province, and diffuse knowledge regarding the same.

ADMISSION.

The Provincial Museum is open, free, to the public daily throughout the year from 9 a.m. to 5 p.m. (except New Year's Day, Good Friday, and Christmas Day); it is also open on Sunday afternoons from 1 p.m. to 5 p.m. from May 1st until the end of October.

VISITORS.

The actual number of visitors whose names are recorded on the register of the Museum is 22,550. This does not include Mr. and Mrs. and very often several members of a family; teachers and their classes whose attendance has increased materially during the last year in connection with their nature-studies; and it must be understood that these figures do not include Asiatics and others. The following figures will give some idea of those who recorded their names during the months of: January, 1,245; February, 1,567; March, 1,413; April, 1,221; May, 1,604; June, 1,876; July, 4,022; August, 4,614; September, 2,061; October, 1,347; November, 864; December, 716.

ACTIVITIES.

The Public Works Department, having completed the excavation of the basement of the Museum, carried on the work so as to put this portion of the building into shape for exhibition-rooms for anthropology. The floors have been cemented throughout, the walls all plastered, and windows had to be put in through the basement walls so as to give light and air. The Public Works Department also carried on its extensive work in regard to renewing the electric-light system and have it divided into sections, so that it is only necessary to use portions of the lighting system at times, thus practising economy to a great extent.

Since the Public Works Department has finished the alterations, the Director is now in a position to carry out the long-needed want of arranging the valuable anthropological material which has been stored for a number of years. This material has been transferred from the temporary building to the basement of the Museum, and is now practically safe from all danger of fire. All the anthropological exhibition which is now on the first floor of the Museum will be transferred to the basement, so as to arrange all the exhibition of this material according to the different tribes of Indians of this Province. The arrangement will be similar to that which was carried out in the exhibition on the first floor; that is, according to house and house furniture, implements of war and the chase, etc.

A carpenter has been employed for several months making cases for this material; the staff is now busily engaged in arranging the collection for exhibition, and it is hoped to have the exhibition halls of anthropology open to the public not later than May 1st.

The study series of mammals and birds, which were also stored in a temporary building, have now been removed to the study-room on the main floor of the Museum and are available to those visitors who wish to consult them.

A List of "The Flora of Vancouver and Queen Charlotte Islands" has been issued from the press and is now available to those students who are interested in botany, and no doubt will be quite a help in giving the distribution of the flora of Vancouver Island. We know that this list is to a great extent not complete, and hope that it will be the means whereby students will aid the Provincial collections by gathering material that is not represented in the collections from

some of the most outlying portions of Vancouver and Queen Charlotte Islands. In this way we will be able to get a more definite distribution of our Coast flora. Persons requiring the list are requested to make application to the Provincial Museum for the same. Additions and corrections to "The Flora of Vancouver and Queen Charlotte Islands" will be published from time to time in the Annual Reports of the Provincial Museum.

LOAN COLLECTION OF LEPIDOPTERA.

Mr. Frank Williamson in July, 1921, loaned to the Provincial Museum a wonderful collection of tropical Lepidoptera. These represented specimens from India, Australia, Ceylon, South America, Africa, Japan, Europe, and other countries. Mr. Williamson has been studying the Lepidoptera of the world for a number of years with regard to the similarity of species and geographic range, and this was the finest collection of butterflies and moths from different parts of the world that has ever been placed on exhibition in British Columbia. There were 196 specimens all beautifully mounted in Riker mounts, and it filled two large cases on the second floor of the Museum.

Although the Provincial Museum is a museum for the exhibition of the flora and fauna of British Columbia, when this collection was offered by Mr. Williamson as a loan, the Honourable Dr. J. D. MacLean, Provincial Secretary, readily granted permission to have the same put on exhibition. They were admired by thousands of visitors, numbers of them making a special visit to the Museum to see this wonderful display. Others came and made drawings and paintings for their own private collections. These specimens were returned to Mr. Williamson at the end of the calendar year.

MAMMALS.

Mr. E. W. Nelson, Chief of the Biological Survey, United States Department of Agriculture, Washington, D.C., asked that the study series of the chipmunks in the Provincial Museum be loaned to their Department, as Mr. A. H. Howell, a specialist, was working on this group. Seventy-eight skins from different districts on the Mainland of British Columbia were sent for study. The Department at Washington greatly appreciated the loan of these specimens, which proved of great service to Mr. Howell in his study of this group. Upon returning the specimens he wrote his identification on the labels.

The following is a list of the species and subspecies determined by Mr. Howell's examination of these skins. It is very much in evidence that intergrading among the species and subspecies to a very pronounced extent is taking place throughout the geographic range, as the following classification according to the species in the Province will show:—

Eutamias townsendi Bachm. Type locality, mouth of Columbia River. Geographical distribution, Coast region of Oregon, Washington, and British Columbia, from mouth of Columbia River northward, east in northern Cascades to head of Lake Chelan.

Eutamias amoenus felix Rhoads. Type locality, Mount Baker Range, Westminster District, British Columbia. Geographical distribution, Mount Baker Range, British Columbia; extent unknown.

Eutamias amoenus luteiventris Allen. Type locality, Chief Mountain Lake, Montana. Geographical distribution, Rocky Mountains in Montana from Helena northward into British America. Specimens examined: Okanagan, B.C., 9; Shuswap, B.C., 2; Cranbrook, B.C., 2.

Eutamias amoenus affinis Allen. Type locality, Ashcroft, British Columbia. Geographical distribution, Interior of British Columbia, east of the Cascade Mountains. Specimens examined: Okanagan, B.C., 18; Grande Prairie, B.C., 2; Similkameen, B.C., 9.

Eutamias amoenus ludibundus. Specimens examined: Moose Lake, B.C., 4; Lillooet, B.C., 8.

Eutamias amoenus affinis x *luteiventris*. Specimens examined: Okanagan, B.C., 3.

Eutamias amoenus luteiventris x *affinis*. Specimens examined: Okanagan, B.C., 6.

Eutamias amoenus affinis x *ludibundus*. Specimens examined: Similkameen, B.C., 1.

Eutamias amoenus ludibundus x *affinis*. Specimens examined: Lillooet, B.C., 1.

Eutamias minimus caniceps. Specimens examined: Atlin, B.C., 10.

Five black skins from near the headwaters of the Stikine River, two of which have been provisionally identified by Dr. C. Hart-Merriam as melanistic examples of *Eutamias borealis caniceps* in 1909. The other three specimens were sent to the Museum in 1918 by Mr. H. W. Dodd, Government Agent at Telegraph Creek. These three chipmunks were taken by an Indian on Groundhog Mountain, who states that in this particular locality the chipmunks are all black and

PLATE I.

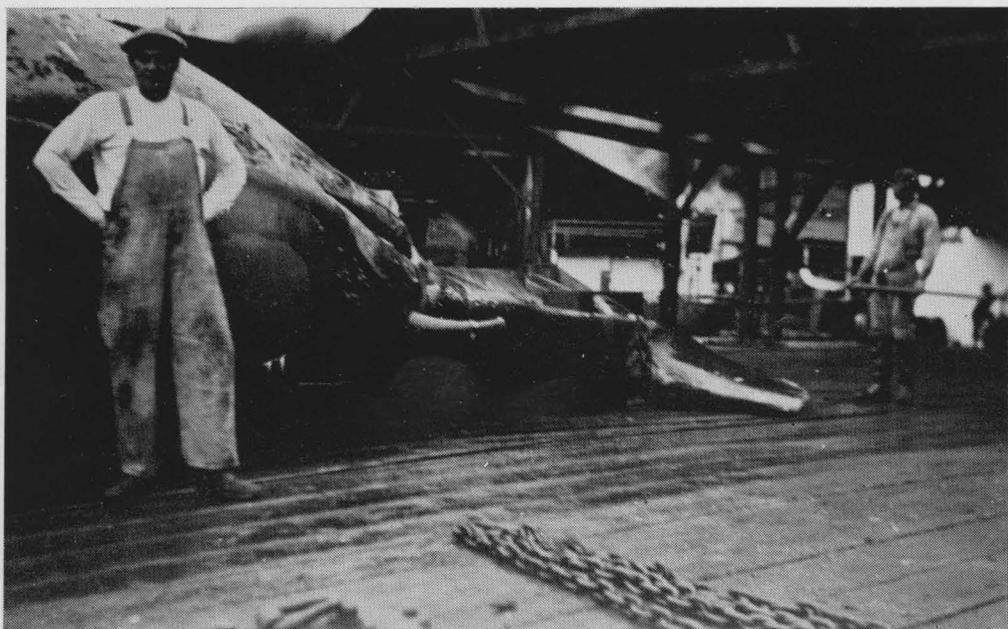


Fig. 1. Caudal part of the whale, showing the hind limb *in situ*.

quite plentiful. From this information it is reasonable to think that upon further research a new subspecies may be recognized. Much more material, however, and in better condition is wanted and very desirable. Dr. Merriam states they have in the collection at Washington one similar specimen from Lake Bennet.

From time to time numerous reports have reached this Department of chipmunks having been seen in various localities on Vancouver Island, but upon close investigation we have been unable to substantiate any proof of their occurrence, and I very much doubt if chipmunks were ever native inhabitants of Vancouver Island, although some time about the year 1898 Mr. Albert H. Maynard, of Victoria, B.C., collected two chipmunks on the beach at Esquimalt. These skins, I understand from Mr. Maynard, were given to the late John Fannin, who was Director of this Museum at that time, but I cannot find any record of these skins in this Department; presumably they must have been sent to some authority for verification and not returned. Until such time as these skins can be located and their identity established, we cannot include them in the local fauna of Vancouver Island. It is possible that these two chipmunks which Mr. Maynard mentions may have been two animals that had been in captivity and liberated. (F. K.)

With further reference to the Notes on Mammals on page 10, Prov. Mus. Rep. 1920, "Notes on the Occurrence of a Humpbacked Whale having Hind Legs," a description of this was published by Mr. Roy Chapman Andrews in the American Museum Novitates No. 9, and is herewith copied, giving further descriptions and conclusions in regard to this remarkable case of external hind limbs in a humpbacked whale.

This is printed with the object that through our Annual Report it may become known to local residents who may be interested in this extraordinary find at Kyuquot Station.

It appears to have made quite a stir with a number of scientists, and the Director is in receipt of correspondence from Dr. Othenis Abel, Professor de Palæontologie an der Wiener Universität, who has published several pamphlets on whales and who wishes further information, if possible, concerning this remarkable find.

A REMARKABLE CASE OF EXTERNAL HIND LIMBS IN A HUMPBACK WHALE.

BY ROY CHAPMAN ANDREWS.

In July, 1919, a female humpback whale (*Megaptera nodosa*) with two remarkable protrusions on the ventral side of the body, posteriorly, was captured by a ship operating from the whaling-station at Kyuquot, on the west coast of Vancouver Island, British Columbia.

One of the protrusions was cut off by the crew of the vessel, but the other was photographed *in situ* by the superintendent of the station. Mr. Sidney Ruck and Mr. Lawson, officials of the Consolidated Whaling Company, appreciated the importance of the discovery and presented the skeletal remains of the attachment to the Provincial Museum, Victoria, B.C.

At my request, Mr. Francis Kermode, Director of the Provincial Museum, very courteously submitted the bones to me with permission to publish upon the result of my examination.

Under date of March 4th, 1920, Mr. Ruck writes to Mr. Kermode as follows:—

"I enclose herewith three photographs showing the unusual development of the pelvic rudiments in a whale captured at the Kyuquot Station last July, of which you have the bones. It is to be regretted that better pictures in evidence of this unprecedented development were not obtained.

"I have been connected with the whaling industry for twenty-two years and during my time have come in contact with prominent naturalists, such as Professor True, of the Smithsonian Institute; Professor Lucas, of the Natural History Museum, Brooklyn;* and Professor Andrews, of the Natural History Museum, New York, and neither in their experience or mine have the protrusion of the pelvic bones beyond the body ever been seen or heard of.

"This particular whale was a female humpback of the average length, with elementary legs protruding from the body about 4 feet 2 inches, covered with blubber about $\frac{1}{2}$ inch thick.

"As shown in the best photograph, these legs protruded on either side of the genital opening; the left leg was cut off by the crew of the vessel and lost, and the point at which it was cut off is clearly shown in the photograph. The end of the leg seen in the picture terminated in a kind of round knob like a man's clenched fist.

"The two bones of the leg which you have are connected by cartilage, which I was informed had shrunk about 10 inches, and possibly more by this time. At any rate, the total length of the

* Then of the U.S. National Museum, now of the American Museum of Natural History.

leg before it was cleaned of the blubber and flesh was, as before stated, about 4 feet 2 inches from the body."

After studying the material and discussing it with various scientists, I have come to the conclusion that the protrusions actually do represent vestigial hind limbs and show a remarkable reversion to the primitive quadrupedal condition.

I am well aware that zoologists are inclined to accept reported instances of reversion with extreme reluctance, and that at first sight the tendency will be to consider this a teratological case of no reversionary significance, but the evidence is so strong that I cannot interpret it that way.

Mr. Ruck reports that the total length of the leg "before it was cleaned of the blubber and flesh" was about 4 feet 2 inches. The skeletal remains in my possession consist of two bones and two heavy cartilages. When placed in position as in Fig. 2, the total length is 31 inches.

Femur.—The larger bone is deeply concave proximally and to it is attached a massive cartilage (Fig. 3) which in its present shrunken condition is $5\frac{1}{4}$ inches in length and $1\frac{5}{8}$ inches wide. I estimate that this cartilage was at least 15 inches long and 3 inches wide when fresh. I believe that this cartilage represents the femur. It probably lay entirely within the body, its proximal end being attached to the pelvic vestiges. Such a massive cartilage must necessarily have had a firm support and leads me to believe that the pelvic elements in this individual were of extraordinary size. The pelvic bones as usually present in the *Megaptera* are slender ossifications about 6 or 8 inches in length and would not furnish a firm enough base for the attachment of a cartilage which in its fresh condition was as large as a man's wrist.

Since the photograph of the limbs *in situ* shows that they were directly below the usual location of the pelvic vestiges, and since there are no other "floating" bones near this region, the conclusion that they were attached to the pelvic elements is entirely justifiable.

Tibia.—The larger of the two bones I identify as the tibia (Fig. 3). It is $14\frac{1}{2}$ inches in greatest length, is well developed, and has a hard smooth outer surface. At the proximal end its greatest width is $3\frac{3}{4}$ inches, it narrows gradually for three-fourths of its length, and then suddenly expands at the distal extremity, where it is $2\frac{1}{2}$ inches wide.

Tarsus.—The distal end of the tibia is convex and gives attachment to a cartilage which in its shrunken state is $4\frac{3}{4}$ inches long and $1\frac{1}{4}$ inches wide (Fig. 4). This cartilage, I believe, represents the tarsus. That it presents no ossifications is by no means surprising, as the carpal bones in the fore limbs of cetaceans are sometimes entirely absent and often in a more or less rudimentary condition. Mr. Ruck says: "The two bones of the leg which you have are connected by cartilage which I was informed had shrunk about 10 inches and possibly more by this time." This would give the tarsal cartilage a length of nearly 15 inches.

Metatarsal.—The distal element in the leg is a hard, well-developed bone which I identify as a metatarsal (Fig. 4). It has the characteristic shape of the metacarpals in the fore limbs of cetaceans, except that it is more slender. It is $6\frac{1}{8}$ inches long, $1\frac{7}{8}$ inches wide proximally, and $1\frac{7}{8}$ inches in distal width; its least width is $\frac{15}{16}$ inch. To the distal end of the metatarsal is attached a heavy cartilage, of which only $\frac{3}{4}$ inch remains intact. This cartilage probably formed the extremity of the limb skeleton.

External Appearance of the Limb.—In reference to the limb as it appeared in the fresh condition, Mr. Ruck says that the end terminated in a "kind of round knob like a man's clenched fist," that the total length was about 4 feet 2 inches, and that it was covered with blubber about $\frac{1}{2}$ inch thick. I infer from Mr. Ruck's description that the connective tissue and blubber were essentially the same as in the flipper, or fore limb, of cetaceans. The photograph of the limb *in situ* (Fig. 1) shows that there are two prominent, truncated tuberosities on the distal half. The proximal "bunch" evidently indicates the distal end of the tibia and the other is at the extremity of the metatarsal. These tuberosities may very properly be homologized with those on the outer, or anterior, edge of the flipper in the *Megaptera*, which indicate the extremities of the radius and the second digit. This is, I believe, a point which has considerable significance.

Since the stalk-like cartilaginous femur probably lay entirely within the body and the remainder of the limb entirely outside, there was undoubtedly a certain flexibility at the point of junction with the body.

In a paper entitled "Untersuchungen an walen,"* Professor W. Kükenthal has described external rudimentary hind limbs in three early embryos of *Megaptera*. These appear as two

* Jenaische Zeitschrift für Naturwissenschaft, LI, 1914, pages 49-52.

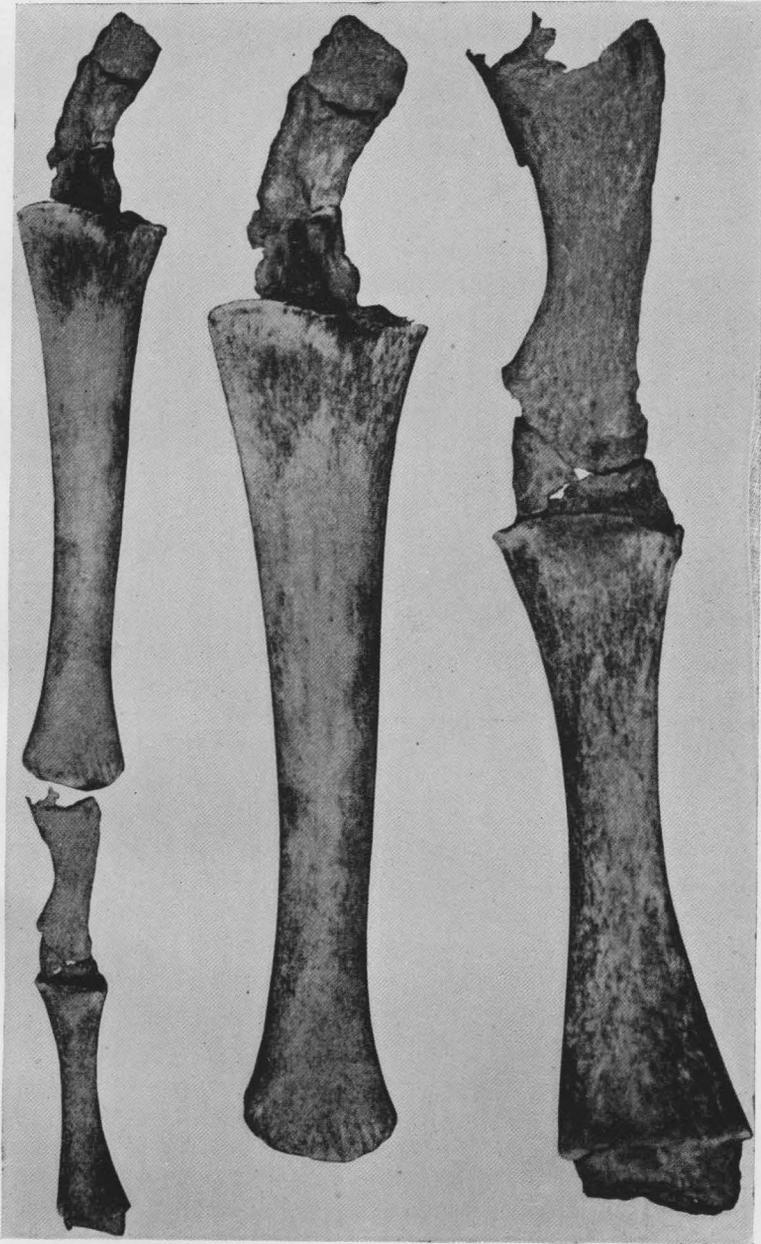


Fig. 2. Skeleton of the hind limb. Fig. 3. Cartilaginous femur and osseous tibia.
Fig. 4. Cartilaginous tarsus and osseous metatarsal.

more or less caudally directed papillæ on either side of the genital organ in the same relative position as the hind limbs which I have described in this paper. In Kükenthal's Stage I. (an embryo 32 mm. in length) the rudiments are best developed and are 1.2 mm. long. In Stage II. (an embryo 28 mm. long) the rudiments are somewhat less distinct, reaching a length of 0.8 mm. In Stage III. (an embryo 30 mm. long) the hind-limb rudiments have still more decreased in size and appear as minute papillæ.

Kükenthal has also discovered hind-limb rudiments in embryos of *Phocæna communis* and *P. dalli*, and Guldberg has recorded them in embryos of *Lagenorhynchus acutus* and *Phocæna communis*.

Kükenthal states that the hind-limb rudiments are found in later embryonic stages of the *Mystacoceti* than in the *Odontoceti*, and concludes that in the evolution of cetaceans the hind limbs lost their functional character in the *Odontoceti* earlier than in the *Mystacoceti*.

Since Kükenthal's and Guldberg's researches have shown that external hind-limb rudiments are still present in some cases in embryonic life, it is by no means impossible that these vestigial organs should continue their growth and persist until the adult stage. I believe that that is exactly what has occurred in the specimen which I have described above, and that we are confronted with a clear case of partial reversion to a primitive quadripedal condition.

The limbs, according to the statements of the whalers, were symmetrical; they are in the exact position in which the hind-limb rudiments have been found in embryonic *Megaptera*; there are strong indications that the cartilaginous femur was attached to the pelvic elements; they are homologous in many respects to the flippers, or fore limbs, and were this a teratological case it is doubtful if these homologies would exist.

Unwilling as are many evolutionists to accept reported cases of reversion, I can see no other explanation for the facts presented here. That this condition is extremely rare must certainly be true, for, so far as I am aware, this is the only recorded case among cetaceans. The presence of rudimentary hind limbs would almost certainly attract the attention of whalers under any condition and eventually be reported to a scientific institution, as was done in the case under consideration. Although hundreds of thousands of whales have been killed, especially in the last fifty years since the beginning of shore-whaling, no other instance has been reported. We are greatly indebted to Mr. Ruck and Mr. Lawson for their quick appreciation of the importance of their discovery, and I wish again to express my thanks to Mr. Kermode for giving me the privilege of describing it.

ORNITHOLOGY.

While no field-work has been done by the Department in the branch of ornithology, several persons who are very much interested in bird-life of this Province have made presentations of specimens to the Museum. One of the most rare specimens taken was presented by Mr. J. G. French, of Sooke, a white-winged dove (*Melopelia asiatica*), A.O.U. No. 319. This is the farthest northern record of this dove. The range of this bird in Lower California, Southern Arizona, Texas, Florida, south to Cuba, Jamaica, and Costa Rica. Accidental in Washington, one specimen being taken by Mr. J. H. Bowles, of Tacoma, November 7th, 1907. Concerning the specimen collected by Mr. J. G. French at Sherringham Point, Renfrew District, Vancouver Island, in July, 1918, he informs me that there were two of the birds together on that occasion, and without doubt this is now the most northerly record for this accidental visitor.

Other birds and specimens collected by several persons and presented to the Museum are herewith listed below.

ACCESSIONS.

Black Merlin (*Falco columbarius suckleyi*). Presented by Mr. W. Long, Mount Douglas, Victoria, B.C., January 18th, 1921.

Killdeer Plover (*Egialitis vocifera*). Two specimens presented by Mr. Arthur Trill, Errington, B.C., April 19th, 1921.

North-western Red-wing (*Agelaius phoeniceus caurinus*). Presented by Mr. Arthur Trill, Errington, B.C., April 19th, 1921.

North-western Red-wing (*Agelaius phoeniceus caurinus*). Presented by Mr. H. Rawlings, Parksville, B.C., April 19th, 1921.

Killdeer Plover (*Egialitis vocifera*). Presented by Mr. H. Rawlings, Parksville, B.C., April 19th, 1921.

Red-backed Rufous Hummingbird (*Selasphorus rufus*). Presented by Lizzie and John Dool, Ladysmith, B.C., April 22nd, 1921.

Bonaparte's Gull (*Larus philadelphia*). Two specimens presented by Miss Doreen Dodd, Telegraph Creek, B.C., June 8th, 1921.

Black-headed Grosbeak (*Zamelodia melanocephala*). Presented by Mr. H. Rawlings, Parksville, B.C., June 18th, 1921.

Black-headed Grosbeak (*Zamelodia melanocephala*). Presented by Mr. Arthur Trill, Errington, B.C., June 20th, 1921.

Cooper's Hawk (*Accipiter cooperii*). Two specimens presented by Mr. R. Gidley, Victoria, B.C., July 8th, 1921.

Western Robin (albino) (*Merula migratoria propinqua*). Presented by Mr. G. H. Cavin, Cedar, B.C., November 11th, 1921.

Snowy Owl (*Nyctea nyctea*) killed at Victoria, B.C. Two specimens presented by Provincial Police Department.

White-winged Crossbill (*Loxia leucoptera*). Presented by Mr. Dennis Ashby, Duncan, B.C., January 6th, 1922.

Lumpfish (*Eumicrotremus orbis*). Presented by Mr. Theodore Sebring, Victoria, B.C., April 1st, 1921.

Broad-finned Cod (*Zaniolepis latipinnis*) caught near Crofton, B.C. Presented by Mr. H. F. Prevost, Duncan, B.C., June 20th, 1921.

Crab (*Phyllolithodes papillosus*). Presented by Mr. A. McMurtrie, Ladysmith, B.C., September, 1921.

Chiton (*Cryptochiton Stelleri*). Presented by Mr. John Ead, Fanny Bay, B.C., October 3rd, 1921.

Blue-tailed Lizard (*Eumeces skiltonianus*) found at North Shore, Kootenay Lake, September, 1921. Presented by Master J. G. H. Dicken Spurway.

Blue-tailed Lizard (*Eumeces skiltonianus*) found at Edgewood, B.C. Presented by Mr. C. P. Coates, October, 1921.

Indian arrow-points presented by Mr. O. H. Brown, Victoria, B.C.

Indian spear-point and chisel presented by Mr. Joseph Tracey, Gordon Head, B.C.

Fossil shell presented by Mr. Nelson Smith, Nanaimo, B.C., August 1st, 1921.

Fossil shells and leaf presented by Mr. Pete Pasqual, Nanaimo, B.C., February 28th, 1921.

Black Bear skull found at Namu, B.C. Presented by Mr. W. A. Newcombe, September, 1921.

Marten-skin presented by Mr. J. W. Cockle, Kaslo, B.C., April 7th, 1921.

Black Squirrel skin presented by Mr. Carl Wihtksne, South Fork, Bridge River, Lilloet, B.C., June 10th, 1921. This mammal is a melanistic form of the Red Squirrel (*Sciurus hudsonicus*).

Black-tailed Deer (albino) (*Odocoileus columbianus columbianus*) killed at Chilliwack by E. S. Thornton, November 16th, 1921.

Collection of *Sciurus*, *Eutamias*, and *Peromyscus*, collected at Bella Coola and presented by Mr. Harlan Smith, July 30th, 1921.

Entomological collection presented by Mr. Bryant, Ladysmith, B.C.

Collections of plants presented by several persons, of which further mention is made in the Botanical section.

PUBLICATIONS OF OTHER INSTITUTIONS.

(Alphabetically arranged.)

Art Institute of Chicago, Illinois	1
Art, Historical and Scientific Journal, Vancouver, B.C.	1
Archæological Society of Ontario, Toronto, Ont.	1
Berñice Pauahi Bishop Museum, Honolulu, Hawaii	12
Boston Society of Natural History, Boston, Mass.	1
Bristol Museum and Art Gallery, Bristol, England	1
Brooklyn Institute of Arts and Sciences, Brooklyn, N.Y.	1
California Academy of Sciences, San Francisco, Cal.	13
California University, Berkeley, Cal	6

Carried forward 37

PUBLICATIONS OF OTHER INSTITUTIONS—*Continued.*

<i>Brought forward</i>	37
Cardiff Museum, Cardiff, Wales	1
Carnegie Museum, Pittsburgh, Pa.	2
Charleston Museum, Charleston, S.C.	2
Children's Museum of Boston, Boston, Mass.	1
City Art Museum, St. Louis, Mo.	5
Colorado Museum of Natural History, Denver, Col.	1
Cornell University, Ithaca, N.Y.	6
Dominion Government Publications, Ottawa	51
Detroit Institute of Arts, Detroit, Mich.	7
Field Museum, Chicago, Ill.	1
Gray Herbarium, Harvard University	5
Illinois State Natural History Survey, Urbana, Ill.	5
Instituto General y Tecnico de Valencia, Valencia, Spain	1
John Crerar Library, Chicago, Ill.	1
Library of Congress, Washington, D.C.	2
Manchester Museum, Manchester, England	1
Minneapolis Institute of Arts, Minn.	8
Minnesota University, Minn.	4
Museum American Indian Heye Foundation	1
Museum of Fine Arts, Boston, Mass.	4
National Museum, Philadelphia, Pa.	1
Newark Museum Association, Newark, N.J.	3
Nebraska University, Lincoln, Neb.	2
New York Botanical Garden, N.Y.	2
Ohio Agricultural Experimental Station, Wooster, Ohio	6
Oklahoma University, Norman, Okla.	1
Peabody Museum, Salem, Mass.	1
Peabody Museum, Yale University, New Haven, Conn.	22
Pennsylvania Museum and University	7
Philadelphia Academy of Natural Sciences, Pa.	2
Roger Williams Park Museum, Providence, R.I.	7
Royal Scottish Museum, Edinburgh, Scotland	1
Smithsonian Institution, Washington, D.C.	32
Staten Island Institute, New Brighton, N.Y.	3
Sydney Museum, Australia	9
United States Department of Agriculture, Washington, D.C.	6
University of Washington, Seattle, Wash.	4
Wagner Free Institute of Science, Philadelphia, Pa.	2
Zoological Society, New York, N.Y.	2
Zoological Society, Philadelphia, Pa.	1

260

BOTANY.

BY W. R. CARTER.

Considerable activity has been prevalent among collectors in several portions of the Province, and from these sources much desirable material has been added to the collection in the Herbarium of the Provincial Museum.

Our gratitude must be extended to the following gentlemen for their kindness in contributing a large amount of material which not only has added to the collection, but has increased our knowledge of the distribution of a number of plants, or, in other words, their known range has been extended: Dr. C. F. Newcombe; Mr. W. B. Anderson; Mr. W. A. Newcombe; Professor J. K. Henry; Mr. T. P. Mackenzie and Mr. G. V. Copley, of the Grazing Commission; Mr. J. R. Anderson; Mr. A. R. Sherwood; Mr. Dennis Ashby; and Dr. M. O. Malte.

Mr. E. B. Webster, of Port Angeles, Washington, very kindly donated specimens of *Senecio Websteri* n. sp., a rare plant which he collected on the talus-slopes of Mount Angeles, Clallam

County, Washington. These specimens are very desirable, as there is a possibility that this and some of the other plants at present only known to the Olympic Range may eventually be found on some of the higher mountains on the west coast of Vancouver Island.

Mr. George Fraser, of Ucluelet, Vancouver Island, presented a number of specimens of hybridization, chiefly among *Rubus*, upon which he has been working since 1912, in order to find out if he could throw any light on the parentage of the loganberry. He is to be congratulated for his marked strides of success in producing many interesting variations between well-known cultivated varieties and our native species, which should prove of much scientific value to horticulturists; the following list represents the results of his research:—

- English raspberry x *Rubus nutkanus*.
- Rubus nutkanus* x English raspberry.
- English raspberry x *Rubus spectabilis*.
- English raspberry x *Rubus leucodermis*.
- Rubus macropetalus* x English raspberry.
- Rubus macropetalus* x Mongrel raspberry, the result of crossing *Rubus spectabilis* with raspberry.
- Rubus macropetalus* x Erie blackberry (*Rubus canadensis*).
- Rubus macropetalus* x Lucretia dewberry (*Rubus villirus* var.).
- Rubus macropetalus* x Loganberry.
- Upright seedling from *Rubus macropetalus* x Loganberry.
- Loganberry x English raspberry (infertile).
- Loganberry x *Rubus nutkanus* (fertile).
- Loganberry x *Rubus nutkanus* (infertile).
- Loganberry x *Rubus spectabilis* (fertile).
- Loganberry x *Rubus laciniatus* (infertile).

In the above list Mr. Fraser states the first named is the seed parent.

Another consignment of hybridization received from Mr. Fraser included the following plants:—

- Rubus parviflorus* x *R. odoratus*.
- Fruit and foliage of *Rubus ursinus* x Loganberry.
- Fruit of *Pyrus diversifolia* x cultivated variety of *P. malus*.
- Myosotis laxa* x *Myosotis palustris semperflorens*.
- Lonicera Perclymeum* x *Lonicera ciliosa* (fertile).
- Knight's hybrid *ribes*.
- Campanula rotundifolia* var.
- Aster?

Mr. Fraser states the following plants, of which he also very kindly donated specimens, with the exception of *Vaccinium macrocarpum* Ait., have established themselves by seeding unassisted on ground which has been cleared and burned but never has been cultivated:—

- | | |
|-----------------------------------|--|
| <i>Rhododendron ponticum</i> . | <i>Erica vagans</i> . |
| <i>Calluna vulgaris</i> . | <i>Erica vagans</i> var. <i>alba</i> . |
| <i>Calluna vulgaris alporti</i> . | <i>Spiræa Bumalda</i> . |
| <i>Calluna vulgaris alba</i> . | <i>Pernethya mucronata</i> . |
| <i>Daböccia polifolia</i> . | <i>Vaccinium macrocarpum</i> . |
| <i>Daböccia polifolia alba</i> . | |

It will be interesting to note whether any of these plants later become distributed and established throughout the Ucluelet District.

There has been an increase in the number of visitors seeking information about our native flora, and a large increase over previous years in the quantity of plants sent in for identification, Mr. T. P. Mackenzie and Mr. G. V. Copley, of the Grazing Commission, sending in approximately 300 specimens, many of them plants from the dry interior of the Province, and wherever possible duplicate specimens have been donated for the Herbarium collection.

Among these plants, the following are of special interest:—

- | | |
|---|-----------------------------------|
| <i>Agropyron dasystachyum</i> (Hook.) Scribn. | <i>Panicum capillare</i> L. |
| <i>Bromus Porteri</i> (Coul.) Nash. | <i>Poa brachyglossa</i> Piper. |
| <i>Danthonia intermedia</i> Vasey. | <i>Poa nervosa</i> (Hook.) Vasey. |
| <i>Elymus dasystachys</i> Trin. | <i>Poa Sandbergii</i> Vasey. |

<i>Sporobolus asperifolius</i> Thurber.	<i>Monolepis Nuttalliana</i> (Schultes) Engelm.
<i>Stipa comata</i> Trin. & Rupr.	<i>Salicornia europaea</i> L.
<i>Carex? atrata</i> L. var. <i>ovata</i> Boott.	<i>Suaeda depressa</i> (Pursh.) Wats.
<i>Carex sychnocephala</i> Carey.	<i>Amaranthus paniculatus</i> L.
<i>Juncus Mertensianus</i> Bong.	<i>Silene Douglasii</i> Hook. var. <i>multicaulis</i> Rob.
<i>Luzula spicata</i> (L.) DC.	<i>Sisymbrium canescens</i> Nutt.
<i>Eriogonum niveum</i> Dougl.	<i>Asclepias speciosa</i> Torr.
<i>Polygonum acre leptostachyum</i> Meisn.	<i>Mertensia paniculata</i> Don.
<i>Polygonum Douglasii</i> Greene var. <i>montanum</i> Small.	<i>Salvia pratensis</i> L.
<i>Atriplex argentea</i> Nutt.	<i>Chenactis Douglasii</i> H. & A.
<i>Chenopodium leptophyllum</i> Nutt.	<i>Iva xanthifolia</i> Nutt.

Mr. W. B. Anderson, as is his usual custom, brought in a number of plants collected over a large portion of the Province, including Prince Rupert, Anahim, and Fort George in the north, the Columbia River Valley in the east, Southern Okanagan to the south, Chilliwack and Lytton to the west, besides a small series from Vancouver Island.

Specimens mounted and placed in the collection include:—

<i>Sisyrinchium Macounii</i> Bickn.	<i>Mimulus peduncularis</i> Dougl.
<i>Urtica urens</i> L.	<i>Pentstemon Richardsonii</i> Dougl.
<i>Silene Douglasii</i> Hook. var. <i>Macounii</i> Rob.	<i>Cynoglossum? grande</i> Dougl.
<i>Arabis? Macounii</i> S. Wats.	<i>Antennaria? aprica</i> Greene.
<i>Sisymbrium linifolium</i> Nutt.	<i>Anthemis tinctoria</i> L.
<i>Thelypodium laciniatum</i> Endl.	<i>Crepis occidentalis</i> Nutt.
<i>Saxifraga nivalis</i> L.	<i>Gnaphalium Macounii</i> Greene.
<i>Astragalus Purshii</i> Dougl.	<i>Helianthus Nuttallii</i> T. & G.
<i>Geranium Robertianum</i> L.	

Besides these, there are a number of Compositeæ as yet undetermined.

The following additions to the Herbarium are also recorded:—

Aristida purpurea Nutt; *Hemicarpha aristulata* (Coville) Smyth. Presented by Dr. M. O. Malte.

Orthocarpus purpurascens Benth. Presented by Dr. C. F. Newcombe.

Phyllospadix Scouleri Hook.; *Cakile edulenta* Hook. Presented by Mr. W. A. Newcombe. Collected on the west coast of Calvert Island, extending their previously known range.

Portulaca oleracea L. Presented by Mr. A. R. Sherwood. This plant appears to be spreading in the vicinity of Victoria and may become a troublesome weed.

An *Epipactes* as yet unidentified, presented by Mr. W. Burton.

Iris (introduced), not yet identified; *Lupinus micranthus* Dougl., a pink flowering form; *Plantago lanceolata* L., an uncommon form. Presented by Professor J. K. Henry.

Poa bulbosa L.; *Euphorbia glyptosperma* Engelm.; *Zizia cordifolia* (Walt.) DC. Presented by Mr. W. R. Carter.

Allium sp. *Moly* L. This *Allium* with its handsome yellow flowers and strong scent has escaped from cultivation and is now spreading and growing in a wild state in portions of the Cowichan District. Presented by Mr. Dennis Ashby.

The following are additions to our Canadian and Provincial flora:—

Cephalanthera oregana Reich. A single specimen collected and retained by Mr. R. Glendinning at Agassiz, July, 1918, and identified by Professor C. V. Piper, of Washington, D.C. New to Canada.

Hemicarpha aristulata (Coville) Smith. Collected at Cadboro Bay, V.I., July 7th, 1921, by Dr. M. O. Malte. • New to Canada.

Silene Douglasii Hook. var. *Macounii* Rob. Collected at Comox, V.I., by Mr. W. B. Anderson. New to Vancouver Island.

Poa bulbosa L. Collected Beacon Hill Park, Victoria, B.C., May 17th, 1921, and identified by Mrs. Agnes Chase, Washington, D.C.

Euphorbia glyptosperma Engelm. Fitzgerald, V.I., August 7th, 1921; *Zizia cordifolia* (Walt.) DC., Fitzgerald, V.I., July 31st, 1921. Collected by Mr. W. R. Carter. New to Vancouver Island.

Other plants identified included a mounted series of over 100 species from South Park School. These specimens, while not of full herbarium size, were exceedingly well prepared and reflect great credit on those pupils and teachers responsible for the work. A large series of unmounted plants were identified for Happy Valley, Kingston Street, and other schools.

Again this past season Miss M. Lawson, of the *Colonist* staff, undertook, for the benefit of the children, the task of editing a Flower Calendar in the Sunday edition of the *Daily Colonist* of plants collected by children from various schools and districts. A large number of plants were identified weekly, and a marked improvement in the condition of specimens sent in was noticeable over last year, especially among a few of those who were consistent in sending a series in every week.

Mrs. Agnes Chase, Acting Systematic Agrostologist of the Bureau of Plant Industry, United States Department of Agriculture, Washington, D.C., very kindly examined and determined our collection of grasses, which is now revised under present nomenclature. This revision has added several species to the list of Vancouver Island flora. *

In the latter part of the summer a "Preliminary Catalogue of the Flora of Vancouver and Queen Charlotte Islands" was received from the hands of the printers, and copies have been distributed to most of the scientific institutes and colleges in America and other countries, and up to the present time we have received numerous applications for copies from teachers and others interested in botany, residing in many portions of this Province.

"The following list of plants are supplementary additions to "The Flora of Vancouver and Queen Charlotte Islands, 1921" (introduced plants being printed in italics in conformity with the printing of the Check-list):—

- Lycopodium annotinum* L. Mountains, V.I.
Potamogeton amplifolius Tuckerm. Henry's "Flora of Southern British Columbia."
Agrostis hyemalis var. *geminata* (Trin.) Hitchc. Mount Arrowsmith, V.I.
Agrostis idahoensis Nash. Victoria, Macoun.
Agrostis palustris Hitchc. Sidney, V.I., Macoun.
Danthonia Macounii Hitchc. Macoun, No. 78823, Mount Benson, V.I.
Elymus arenarius compositus (Abronsit) St. John. Beacon Hill Park, Victoria, J. R. Anderson.
Glyceria scabra Malte sp nov. Macoun's List, 1918.
Pucinellia nutkensis (Presl.) Fern & Weath. Sidney, V.I., Macoun.
Pucinellia nuttalliana (Schult.) Hitchc. Nanaimo, V.I., Macoun.
Poa bulbosa L. Beacon Hill Park, Victoria, W. R. Carter.
Stipa minor (Vasey) Scribn. Macoun's List, 1918.
Carex sterilis cephalantha Bailey. Port Renfrew, Rosendahl.
Juncus columbianus Coville. Macoun's List, 1918.
Hemicarpha aristulata (Coville) Smyth. Cadboro Bay, V.I., Malte.
Polygonum erectum L. Macoun's List, 1918.
Chenopodium leptophyllum Nutt. Macoun's List, 1918.
Sagina saginoides (L.) Brit. Nanaimo, Hardy Bay, V.I.
Silene Douglasii var. *Macounii* Rob. Comox, V.I., W. B. Anderson.
Lepidium oxycarpum T. & G. Cadboro Bay, V.I., Macoun.
Lathyrus nevadensis S. Wats. Cowichan Lake, V.I., J. R. Anderson.
Euphorbia glyptosperma Engelm. Fitzgerald, V.I., W. R. Carter.
Callitriche palustris L. Port Renfrew, V.I., Rosendahl.
Zizia cordata (Walt.) DC. Fitzgerald, V.I., W. R. Carter.
Plagiobothrys tenellus Gray. Generally distributed, southern end of Vancouver Island.
Castilleja acuminata (Pursh.) Spreng. Port Renfrew, V.I., Rosendahl. •
Orthocarpus purpurascens Benth. Mount Finlayson, V.I., Dr. C. F. Newcombe.
Galium cymosum Wiegand. Henderson Lake, V.I., W. A. Newcombe. Cowichan Lake, Thetis Lake.
Centaurea vo-chinensis Bernh. Victoria, V.I., J. R. Anderson.
Cotula australis Hook. Nanaimo, V.I., Macoun.
Solidago caurina Piper. Prospect Lake, V.I., J. R. Anderson.
Solidago lanceolata L. Ucluelet, V.I., Macoun.

ENTOMOLOGY.

By E. H. BLACKMORE, F.E.S.

Collecting during the past season has not been at all good, although, taken on the whole, it has been somewhat better than the three preceding years.

We had an exceedingly wet winter, which continued, with the exception of a few short dry spells, until late in the spring. Reports from various parts of the Province all speak of poor collecting weather. However, a number of rare and uncommon species were obtained by various collectors, which will be noted under their respective localities.

Early in the year Mr. Theodore Bryant, of Ladysmith, offered to donate to the Provincial Museum a large number of his duplicate Lepidoptera. Arrangements were made whereby the writer was enabled to visit Mr. Bryant in the latter part of May and thereby enabled to select the most desirable of the material offered. In addition, Mr. Bryant kindly loaned the writer his entire collection of Microlepidoptera to work over during the winter months. We are especially glad to have the use of this collection, as it contains most of the identical specimens recorded from Wellington in the 1906 Check-list of British Columbia Lepidoptera; as was mentioned in last year's Museum report, page 23, the large majority of species listed in this group were either from Mr. Cockle, of Kaslo (168), or Mr. Bryant, of Wellington (94). I hope to start work on this collection early in the New Year, as the greater number are simply pinned and need relaxing and mounting. Many of the species are erroneously named and many need verification.

Mr. A. W. Hanham, of Duncan, B.C., has also generously placed at my disposal a large number of unidentified specimens in this group.

The European satin-moth (*Stilpnotis salicis* Linn.) has spread rather rapidly and has been reported from several localities other than New Westminster, where it was first noticed. It was found in Vancouver occupying an area several blocks square. Mr. L. E. Marmont, of Maillardville, reported a heavy infestation in his district, and it has also been found at Cowichan Bay, on Vancouver Island. I have recently identified specimens of this species for Mr. J. F. Clarke, who took them at Bellingham, Wash. It is to be regretted that it is spreading so rapidly, as it is likely to become a serious pest to our native poplars.

BRITISH COLUMBIA INSECTS NEW TO SCIENCE.

Owing to the strike in the printing trade in Eastern Canada early in the spring a number of entomological magazines were held up, with the result that even now many of them are from two to three months behind in their issues. Consequently, we can only list those species the descriptions of which have appeared up to the time of writing this article (December 31st). Any species that may be described in the belated issues will be included in next year's Provincial Museum Report. Up to date there have been forty-five insects from British Columbia described as new to science during the present year. They include eight species of Lepidoptera, one species of Hymenoptera (parasitic), thirty-two species of Diptera, and four species of Hemiptera.

LEPIDOPTERA.

Of the eight species of Lepidoptera, one belongs to the Lycaenidæ, one to the Noctuidæ, one to the Lymantriidæ, four to the Pyralidæ, and one to the Pterophoridæ. They are as follows:—

Lycaenidæ (Theclinae).

Strymon melinus race *atrofasciata* McDunnough. Described in the Can. Ent., Vol. 53, page 47, Feb., 1921, from specimens taken at Wellington, B.C. (Taylor); Duncan, B.C. (Livingstone); Royal Oak, B.C. (Treherne); and Victoria, B.C. (Cameron). The above race differs from typical *melinus* in its deep steely-grey ground colour and the heavy black spotting on the underside. The lack of orange margin to spots alluded to in the description is not a constant character, as out of a long series in my own collection there are several which have the orange margins strongly pronounced. Dr. McDunnough was of the opinion that this race was confined to Vancouver Island, but I have specimens from many points on the Mainland which are typical of this new race, and it can safely be assumed that *atrofasciata* occurs throughout the whole of Southern British Columbia. It is double-brooded, occurring in May and again in July.

Noctuidæ.

Anomogyna partita McDunnough. Described in the Can. Ent., Vol. 53, page 179, Aug., 1921, from five specimens. The type taken at Banff, Alta. (Wallis); two paratypes from Kaslo, B.C. (Cockle); and two paratypes from Nordegg, Alta. (McDunnough).

Lymantriidæ.

Hemerocampa pseudotsugata McDunnough. Described in the Can. Ent., Vol. 53, page 53, March, 1921. This is the tussock-moth which I had previously determined (*vide* Rep. Prov. Mus., 1918, page 12) as *Hemerocampa vetusta gulosa* Hy. Edw. It was originally discovered by Mr. W. B. Anderson at Chase, B.C., who found it doing considerable damage to Douglas fir. Upon the receipt of a number of egg-masses from Mr. Anderson in the spring of 1920, Dr. McDunnough was enabled to breed it from the egg to the adult. From his observations on the larval stages he came to the conclusion that the species was distinct and undescribed.

Pyralidæ (Scopariinæ).

Scoparia basalis race *pacificalis* Dyar. Described in Ins. Ins. Mens., Vol. IX., page 66, April-June, 1921, from four specimens taken at Victoria, B.C. (Blackmore); Mount Newton, near Saanichton, B.C. (Blackmore); and Grayland, Wash.

Scoparia commortalis Dyar. Described in Ins. Ins. Mens., Vol. IX., page 67, April-June, 1921, from three specimens taken by the writer at Victoria, B.C. This species is close to *rectilinea* Zeller, but is much browner and the paler areas more contrasting.

Pyralidæ (Crambinae).

Crambus tutillus McDunnough. Described in Can. Ent., Vol. 53, page 160, July, 1921, from six specimens taken at Victoria, B.C. The type and four paratypes were taken by W. Downes; the other paratype was taken by the writer, mention of which was accidentally omitted from the original description. A note on this species will be found under the heading of "Illustrated Lepidoptera," together with a figure of the paratype on Plate IV.

Pyralidæ (Phycitinæ).

Pyla blackmorella Dyar. Described Ins. Ins. Mens., page 68, April-June, 1921, from two specimens taken by the writer on Mount Tzouhalem, near Duncan, B.C., on June 24th, 1913. A figure of the paratype will be found on Plate IV. and further remarks on the species under the heading of "Illustrated Lepidoptera."

Pterophoridae.

Platyptilia alberta B. & L. Described by Barnes and Lindsey in Cont. Lep. No. Amer., Vol. IV., No. 4, page 346, from four specimens. Holotype female, Laggan, Alta.; allotype male, Mount Cheam, B.C. (R. V. Harvey); and two paratype females, Laggan, Alta., and Olympic Mountains, Wash.

HYMENOPTERA (PARASITIC).

Ichneumonidæ.

Myersia grandis Cushman. Described in Proc. Ent. Soc. Wash., Vol. 23, page 110, May, 1921, from one female taken June 5th by Dr. H. G. Dyar at Kaslo, B.C. This specimen was found by Mr. Cushman among some undetermined Ichneumonidæ in the U.S. National Museum, and was probably taken by Dr. Dyar when he made his large collection of Lepidoptera at Kaslo, B.C., in 1903.

DIPTERA.

Mycetophilidæ (Fungus-gnats).

In the Proc. Brit. Col. Ent. Socy., Feb., 1920 (issued Nov., 1921), page 16 *et seq.*, Mr. R. S. Sherman described the following sixteen species of this family:—

Mycoma mutabilis. Savary Island, April.

Platyura intermedia. Savary Island, July.

Dziedzickia vernalis. Vancouver, May.

Dziedzickia rutila. Vancouver, November.

- Dziedzickia johannseni*. Savary Island, April.
Dziedzickia columbiana. Vancouver, May.
Dziedzickia occidentalis. Savary Island, April.
Rhymosia proluxa. Savary Island, July.
Rhymosia faceta. Vancouver, February.
Rhymosia seminigra. Vancouver; Savary Island, March and October.
Rhymosia pectinata. Savary Island, April.
Rhymosia brevicornis. Vancouver, April.
Tetragoneura atra. Vancouver, May and June.
Tetragoneura marceda. Savary Island; Vancouver, April and May.
Tetragoneura fallax. Savary Island; Vancouver, April, May, and December.
Tetragoneura arcuata. Vancouver, May and June.

Mr. Sherman has made a special study of this family for a number of years and has greatly added to our knowledge of the species occurring within the Province.

These small flies or fungus-gnats, as they are called, resemble mosquitoes or midges to a great degree, but can at once be distinguished by the antennæ not being furnished with whorls of hair.

The abdomen of the male ends in a forceps-like process and in the female in a pointed ovipositor. The larvæ feed in fungi and in decaying vegetation and are not injurious, except when they attack cultivated mushrooms.

Tabanidæ (Horse-flies).

In a recent "Revision of the Canadian species of the *affinis* group of the genus *Tabanus*" by Dr. J. McDunnough, Can. Ent., Vol. 53, page 13 *et seq.*, he has recorded four new species, three of which are described from material wholly or partly collected in British Columbia.

Tabanus trepidus McD. This species occurs throughout the Dominion, the type lot containing specimens taken in Ontario; New Brunswick; Nova Scotia; Quebec; Manitoba; and Peachland, B.C.

Tabanus nudus McD. This species also has the same general range, specimens having been taken in Ontario; New Brunswick; Manitoba; Saskatchewan; and Mount Lehman (Lower Fraser Valley), B.C.

Tabanus atrobasis McD. The type material of this species is entirely confined to British Columbia, although Dr. McDunnough states that it extends south into Oregon. The holotype is from Mount Lehman, B.C. (S. Hadwen), and the paratypes are from Victoria, Royal Oak, Duncan, and Courtenay.

Bombyliidæ (Bee-flies).

Calopelta fallax Greene. Described in Proc. Ent. Soc. Wash., Vol. 23, page 23, Jan., 1921, from five specimens. Holotype, allotype, and one female paratype from Colorado, and one male and one female paratype from Royal Oak, B.C., taken on May 19th, 1917, by R. C. Treherne. *Calopelta* is also a new genus erected by Mr. Greene for the reception of this new species; it differs from the genus *Ploas*, which it most nearly resembles, by having only two submarginal cells in the wing instead of three, a feature which was pointed out by Dr. McDunnough.

Syrphidæ (Flower-flies).

Spharophoria cranbrookensis Curran. Described in Can. Ent., Vol. 53, page 173, Aug., 1921, from a single male specimen taken by Mr. C. Garrett at Cranbrook, B.C., on May 25th, 1919.

Helomyzidæ.

In an article entitled "Notes on Helomyzidæ and Descriptions of New Species," which appeared in Ins. Ins. Mens., Vol. IX., page 119 *et seq.*, July-Sept., 1921, Mr. C. B. D. Garrett describes eleven new species of this family, ten of which are from British Columbia. They are as follows:—

- Leria aldrichi*. Cranbrook, March.
Barbastoma barbatus. Sheep Creek, October.
Postleria fuscolinea. Cranbrook; Michel, May-June-August.
Amabaleria scutellata. Cranbrook, May.
Amabaleria gigas. Cranbrook; Michel, March to August.

Morpholeria melaneura. Cranbrook, April–May–October.

Pseudoleria pectinerata. Cranbrook, June.

Ecotocha canadensis. Cranbrook; Michel, April–July.

Acantholeria ædiemus. Cranbrook; Michel, April–August.

Acantholeria abnormalis. Michel, July.

A new scheme of classification for this family has been proposed by Mr. Garrett, based chiefly on the length of the foremost fronto-orbital bristle, and six new genera have been erected, viz.: *Barbastoma*, *Postleria*, *Amæbalaria*, *Morpholeria*, *Pseudoleria*, and *Acantholeria*.

The species of this family are small dark-coloured flies looking something like dung-flies. They are found in damp shady places and fly in the twilight. The larvæ feed in fungi, decaying wood, and the dung of small animals, such as dogs, rabbits, and bats.

HEMIPTERA.

The following four species were described by Dr. H. M. Parshley in the Proc. Brit. Col. Ent. Soc., Feb., 1921, page 16 *et seq.*:—

Tingidæ.

Acalypta modesta. From three specimens taken at Royal Oak, B.C., by R. C. Treherne on May 14th, 1917.

Miridæ.

Daceria formicina. This species was described from several specimens taken by Mr. W. Downes in the Saanich District, B.C., and at Shawnigan Lake, B.C., in July and August, 1918.

Saldidæ.

Saldula comata. Holotype male and allotype female taken at Beaver Lake, Saanich District, B.C., by W. Downes, June 17th, 1919, and paratype female at Vernon, B.C. (Downes), September 26th, 1918.

Saldula nigrita. Described from specimens taken by Mr. Downes at Duncan, B.C., on September 17th, 1919.

LEPIDOPTERA NOT PREVIOUSLY RECORDED FROM BRITISH COLUMBIA.

The following annotated list contains those species of Lepidoptera which have been taken during the past two seasons and of which we have had no previous record. It does not include the Microlepidoptera, which are treated of under a separate heading, neither does it include the names of species recently determined as new to the Province, but which have stood as uniques in the cabinets of various collectors for a number of years. The numbers preceding the names are the same as those contained in Barnes & McDunnough's Check-list of North American Lepidoptera, 1917.

Noctuidæ.

1226. *Orosagrotis incognita* Sm. Mount McLean, near Lillooet, B.C., August 21st, 1920 (A. W. Hanham). Further remarks on this species will be found under the heading of "Illustrated Lepidoptera."

1256. *Euxoa floramina* Sm. A single specimen taken by A. W. Phair at Lillooet, B.C., on September 5th, has been determined by Dr. A. W. Lindsey as agreeing with specimens of *floramina* Sm. in the Barnes collection.

1274. *Euxoa rufula* Sm. Mount McLean, B.C., August 22nd, 1920. (See "Illustrated Lepidoptera.")

1288. *Euxoa exulta* Sm. A single specimen taken at Vavenby, B.C., by T. A. Moilliet on August 26th has been determined as this species by Dr. H. G. Dyar, who compared it with Smith's unique type. In Proc. U.S. N.M., Vol. XXII., page 424, Smith gives "North-west British Columbia" as the locality for the single male from which the species was described. It is more likely that "North-west Territory" was meant, as most of Smith's species described from this general locality have turned out to be from Northern Alberta. I believe that this Vavenby specimen is the first authentic record that we have of this species from British Columbia.

1364A. *Euxoa excellens* race *infelix* Sm. Fort Steele, B.C., August 15th, 1921 (W. B. Anderson). (See "Illustrated Lepidoptera.")

1388. *Rhizagrotis flavicollis* Sm. Vavenby, B.C., August 26th, 1921 (T. A. Moilliet). This species is listed in the 1906 B.C. Check-list from Wellington and Kaslo, but all the specimens that I have seen under this name (about fifty from a dozen different localities) have been *Euxoa ridingsiana* Grt. The two species are very much alike superficially, but *flavicollis* has a more yellow costa and the collar is yellow also. I have the species from Nordegg, Alta., and the Vavenby specimen agrees with these.

1584. *Lampra (Rhynchagrotis) nefascia* Sm. Goldstream, B.C., September 6th, 1920 (E. H. Blackmore). (See "Illustrated Lepidoptera.")

1642. *Anarta hampa* Sm. A single specimen taken on Mount McLean at 7,500 feet altitude by A. W. Hanham on August 21st, 1920.

2201A. *Sympistis zetterstedti* race *labradoris* Staud. Mount McLean, B.C., August 21st, 1921 (A. W. Hanham). (See "Illustrated Lepidoptera.")

2275A. *Trachea inordinata* race *montana* Sm. Chilcotin, B.C., May 30th, 1920 (E. R. Buckell). (See "Illustrated Lepidoptera.")

2364. *Teniosea discivaria* Walk. Vavenby, B.C., July 18th, 1921 (T. A. Moilliet). (See "Illustrated Lepidoptera.")

2470. *Acronycta radcliffei* Harv. Quamichan Lake, near Duncan, B.C., June, 1921 (G. O. Day). (See "Illustrated Lepidoptera.")

2965. *Tarachidia semiflavana* Gue. Taken by J. W. Wynne at Enderby, B.C.

3222. *Syngrapha alticola* Wlk. A single specimen taken on Mount McLean, B.C., by A. W. Hanham on August 22nd, 1921. This was at one time believed to be a synonym of *devergens* Hubner, but is now regarded as a distinct species.

3509. *Zanclognatha jacchusalis* Wlk. Taken by T. A. Moilliet at Vavenby, B.C., on July 18th, 1921.

Geometridæ.

4009E. *Hydriomena nubilofasciata* race *vulnerata* Swett. Sluggett's, B.C., March 1st, 1921 (W. Downes). (See "Illustrated Lepidoptera.")

4129. *Nasusina leucata* Hulst. A single specimen taken by A. W. Phair at Lillooet, B.C., on July 16th, 1920.

4316-1. *Drepanulatrix secundaria* B. & McD. Kaslo, B.C., July, 1920 (J. W. Cockle). (See "Illustrated Lepidoptera.")

4453. *Dysmigia loricaria* Evers. Vavenby, B.C., July 18th, 1921 (T. A. Moilliet). (See "Illustrated Lepidoptera.")

4467. *Caripeta angustiorata* Wlk. Several specimens taken at Kaslo, B.C., by J. W. Cockle in 1920. This species is an inhabitant of the Atlantic States, but is recorded from Blairmore, Alta.

RARE AND UNCOMMON LEPIDOPTERA TAKEN IN BRITISH COLUMBIA DURING 1921.

Victoria.—Mr. Martin Brinkman took the following noctuids during the present season, all of which are new records for Victoria: *Graptolitha torrida* Sm.; *Acronycta funeralis* G. & R.; and *Autographa speciosa* Ottol. They were all taken "at rest" on electric-light poles. He also took a specimen of that rather rare geometer *Gabriola dyari* Tayl.

Master Lewis Clark, who has recently become an enthusiastic collector, captured a fine specimen of *Autographa octoscripta* Grt. This is the first record of this species for Vancouver Island. It is a very rare species in British Columbia, as only three specimens have been recorded to my knowledge. He also bred from a pupa found in his father's garden a female specimen of that very rare geometer *Cleora excelsaria* Streck. It emerged on June 22nd. It is four years since I have had a record of this species, when I took a specimen at Goldstream on June 4th, 1917. A figure of this specimen was given in Rep. Prov. Mus., 1917, Plate II.

Mr. W. B. Anderson took specimens of *Polia restora* Sm. and *Septis alia* race *rorulenta* Sm. The former species is apparently increasing, as it has been taken by several local collectors during the past two or three years. It was at one time comparatively rare in collections.

Mr. W. R. Carter, who has collected assiduously during the season, has captured several very interesting species, amongst them being a nice series of *Ipimorpha nanaimo* Barnes. This species has been a comparative rarity for many years, but from certain conclusions reached last year an exhaustive search of certain localities resulted in an increased number of specimens being taken this season. As the specimens taken have always been in the vicinity of Lombardy

poplar, I am inclined to the belief that this is its food-plant. There are two distinct colour forms of this species, the predominating form being of an even light-buff colour and the other is of a light olivaceous shade. Mr. Carter also took a couple of specimens of *Cerma cuerva* Barnes, both "at rest." This small noctuid seems to be of very retiring habits, as very few specimens have been captured. I have only taken two in eleven years' collecting in this vicinity. It was described from Victoria in 1907 (Can. Ent., Vol. 39, page 10), and with the exception of a couple of specimens taken by Mr. Cockle at Kaslo, I have not seen it from any other locality. A figure of this species was given in the Rep. Prov. Mus., 1919, Plate II.

Showing the extreme mildness of the Victoria winter climate, Mr. Carter took a freshly emerged specimen of *Coniodes plumogeraria* Hulst. on January 6th of this year. This is about two months earlier than it normally appears. A single specimen of *Erannis vancouverensis* Hulst. was taken on December 7th. A nice series of the wingless females of both *Paraptera danbyi* Hulst. and *Rachela occidentalis* Hulst. were taken by Mrs. Carter in the early part of December.

Goldstream.—The writer spent part of his vacation as well as a number of week-ends in this locality. The collection of "Micros" was the principal object in view, but several interesting species of other families were also taken. The most desirable of them being *Polia tacoma* Streck.; this is the first record from Goldstream, the other known localities being Duncan, Kaslo, and Rossland; *Graptolitha ferrealis* Grt., a perfect specimen "at rest"; *Euxoa obeliscoides* Gue.; *Trachea cincta* Grt.; *Alypia ridingsi* Grt.; this was the first specimen that I have any record of since I took a solitary individual in the same locality in July, 1912. They have a habit of settling on the railway-track in the hot sunshine of a July afternoon and slowly waving their wings up and down. They are extremely wary and very difficult to capture, as once they are disturbed their flight is exceedingly rapid. Later, Mr. Carter while collecting at Fitzgerald, some 12 miles north of Goldstream on a hillside about 700 feet elevation, saw a number of this species flying about a bed of *Valerianella congesta* (sea-blush). He managed to net some twelve specimens on three different dates. It is evident that it is a species that frequents higher altitudes and only occasionally comes down to the low levels, thus accounting for its apparent rarity. In the Geometridæ the writer took a single specimen of *Lobophora simsata* Swett.; a single *Spodolepsis substriataria* race *danbyi* Hulst.; this is the first record from this district. It apparently occurs sparingly throughout the whole of Southern British Columbia; a single specimen of *Entephria multivagata* Hulst. in beautiful condition; *Dysstroma ethela* Tayl., a perfect specimen (see "Illustrated Lepidoptera"); *Eupithecia mutata* Pears.; this rare species I have also figured on Plate IV.; and two fine male specimens of *Sabulodes cervinaria* Pack.; these were taken "at light" about 11 p.m. on June 2nd and are the first of this species that I have captured.

Fitzgerald.—Mr. Carter, who collected regularly every week-end in this locality, took many desirable species during the season, chief of which were a single *Gortyna pallescens* Sm. (new locality); *Annaphila decia* Grt.; this pretty little noctuid is rather uncommon in the southern part of the Island, though I believe it occurs a little more frequently at Duncan. Amongst the geometers, *Drepanulatrix rectifascia* Hulst. and *D. falcataria* Pack. were the best captures.

Alberni.—Mr. John Redford collected a large number of specimens during the past season, the most interesting of which are the following: *Euxoa costata* Grt. (uncommon); *Agrotis esurialis* Grt. (uncommon); *A. oblata* Morr.; *Euretagrotis perattenta* Grt.; this record extends the known range of this species considerably, my previous records being from Vernon and Chilliwack. It is rare in British Columbia collections. *Trachea indocilis* Walk.; *Papaipema insulidens* Bird, one specimen taken "at light." Previous to this specimen I have only seen the species from Duncan (Day). It is very uncommon, a few odd specimens being taken "at light" occasionally; if its food-plant was known it could doubtless be obtained in greater numbers. It was described from Vancouver Island. *Eosporopteryx thyathroides* Gue.; two specimens of this very handsome and uncommon noctuid were taken "at light."

Mr. W. R. J. Piggott, a new collector in this district, did considerable collecting "at light" in the late summer and early fall and obtained many good things, amongst them being *Polia lubens* race *glaucopis* Hamp.; *Graptolitha dilatoecula* Sm.; *Eumichtis versuta* Sm.; *Eremobia claudens* race *albertina* Hamp. (not common); *Pyrrhia umbra* race *exprimens* Walk. (very uncommon on Vancouver Island); *Melipotis versabilis* Harv. (rather rare on the Island); *Ianassa pallida* Streck.; *Tolyte dayi* Blackmore, a single male specimen. The distribution of this species is greater than I at first supposed, as, in addition to the Vancouver Island localities,

I have seen a specimen taken by Mr. Cockle at Kaslo, and I have also found a rather poor male among some papered material taken by the late W. H. Danby at Rossland many years ago.

Maillardville.—Mr. L. E. Marmont, besides collecting a large number of "Micros," took the following desirable species: *Feralia columbiana* Sm.; *Graptolitha thaxteri* Grt., a very uncommon species; *Trachea indocilis* Wlk., a single specimen. This is a good capture as the species seems rather rare in British Columbia collections. The other recorded localities that I know of are Duncan (Day), Alberni (Redford), Kaslo (Cockle), Rossland (Danby), and Upper Columbia River (Dod). It may be more common than supposed, as it is probably confused in collections with *Trachea divesta* Grt., which it very much resembles, especially if the specimens are somewhat worn. *Autographa nichollae* Hamp.; several specimens of this species were taken in May and again in September, thus indicating it to be double-brooded. There is no apparent difference between the two broods. It is also reported from Duncan (Day & Hanham) as having two broods in the season. *Euthyatira pudens* Gn. (peach-blossom moth); a single specimen of this handsome species was taken and a fine specimen of *Drepana bilineata* Pack. was bred ex pupa.

Amongst the Geometridæ, Mr. Marmont captured a nice specimen of that rare species *Cleora albescens* Hulst., and another specimen of *Lygris harveyata* Tayl. A short series of *Æthaloptera anticaria* race *fumata* B. & McD. was taken. The specimens taken by Mr. Marmont are considerably paler than those taken by Mr. Cockle at Kaslo, from which locality the species was described. A most peculiar incident of a butterfly being taken "at light" was related to me by Mr. Marmont. At 11.30 p.m. on the night of August 6th, while out collecting noctuids, he noticed a peculiar-looking moth (?) flying around an electric-light pole. Upon capturing it, it proved to be a specimen of *Phycodes mylitta* Edw. This is the first instance I have heard of a butterfly being taken in this manner.

Lillooet.—Mr. A. W. Phair, who generally sends in some very desirable material, has not collected as much as usual this season, the cares of an increasing business having prevented him getting into the field as often as he has done in previous years. However, amongst the material sent in was a specimen of *Acronycta mansueta* Sm.; this is the first authentic specimen of this species that I have seen. It agrees perfectly with the description and figure (Proc. U.S.N.M., Vol. 21, page 100, and Plate XII., Fig. 7). Dyar in his "Kootenai List" records one specimen from Kaslo (Cockle), but a specimen sent to me by Mr. Cockle as this species is *A. grisea* race *revelleta* Sm.; *Acronycta strigulata* Sm., a rather worn specimen. This species was figured in Rep. Prov. Mus., 1920, Plate I.

Amongst the geometers was a specimen of *Dysstroma formosa* Hulst., a rather rare species. I have seen one other specimen previously from the same locality and one from Vavenby. During the second week of August Messrs. Day and Hanham spent six days camping on Mount McLean at an elevation of 5,000 feet. Several trips were made to an altitude of 7,500 feet, at which elevation many alpine insects were taken. The most noteworthy of the diurnals were: *Eurymus nastes* race *streckeri* Gr.; *Erebia vidleri* Elwes; *Strymon saepium* Bdv.; *Heodes cupreus* Edw.; and *H. heteronea* Bdv. A single specimen of *Euxoa colata* Grt. was taken. This is a most interesting record, as the species must be exceedingly rare. Dyar records one from Sandon, B.C., and a specimen is recorded from Mount Cheam, B.C. Two specimens of *Oncocnemis hayesi* Grt. were captured; this is a new locality for this species, Kaslo being the only previous record. Curiously enough, a specimen of *Autographa alta* Ottol. was taken, to which the same remark applies.

Princeton.—Mr. A. S. Thomson, who was with a surveying party in the mountains in this district, managed to pick up a few specimens, which included *Brenthis chariclea* Schneid and *Euphydryas anicia* D. & H. among the diurnals; *Diacrisia vagans* Bdv. and *Parasemia plantaginis* form *geometrica* Grt. in the arctiids. The only noctuid taken was a rather rubbed specimen of *Zale benesignata* race *largera* Sm. The species was described by Smith (Proc. U.S.N.M., Vol. 35, page 257, 1908) from two specimens, a male from Winnipeg, Man., and a female from Wellington, B.C. (G. W. Taylor). I have no record of any specimen of this species having been captured in the Province since the type was taken until Mr. Thomson secured this specimen, which was kindly identified for me by Dr. J. McDunnough. A single geometer was taken, *Macaria denticulata* race *seppunctata* Bates. This is rather an uncommon species; it has been recorded from Chilcotin and Penticton.

Chilcotin.—Mr. E. R. Buckell, who has been studying the grasshopper situation in this district for the past two years under the direction of the Provincial Department of Agriculture,

made a small collection of Lepidoptera which contained some very interesting species. The following are worthy of special notice: *Apantesis blakei* race *superba* Stretch; a single, rather faded *Schinia separata* Grt.; this species was recorded for the first time in Rep. Prov. Mus., 1920, page 19, from Spences Bridge, B.C. (Newcombe), as being new to the Province and a figure of it was given on Plate I. *Euxoa quadridentata* race *flutea* Sm.; this is a good record as it is a very rare species in the Province. *Graptolitha petulca* Grt.; this record extends the known range of this species, as it has hitherto only been recorded from the southern part of British Columbia (Vancouver Island to Kaslo); *Septis barnesi* Sm., a worn specimen; *Oligia tensa* Grt. (see "Illustrated Lepidoptera"); *Andropolia contacta* Wlk., a rare species, only previously known from Kaslo; and *Euclidimera annexa* Hy. Edw. Amongst the Geometridæ was a nice specimen of *Phasiene hebetata* Hulst. (see "Illustrated Lepidoptera"); *Lygris atrifasciata* Hulst., an uncommon species which occurs very sparingly in various localities; and *Platea trilinearia* Pack.; this exceedingly handsome geometer is more widely distributed than is generally supposed. For a number of years a single specimen taken by Mr. E. M. Skinner at Keremeos in May, 1894, was the only known record for British Columbia. During the last three or four years specimens have been recorded from Lillooet (Phair), Penticton (W. B. Anderson), and now from Chilcotin.

Barkerville.—During the middle of August a short time was spent in this district by Mr. Buckell, but owing to the extremely wet weather very few insects were taken; the most interesting amongst the geometers being *Itame brunneata* Thun., one specimen in nice condition being taken. This is a very rare species in British Columbia. I have one other specimen taken by the late R. V. Harvey from Similkameen in July, 1906. In Rep. Can. Arct. Exped., Vol. III., Pt. 1, page 44, Gibson records one specimen from Burwash Creek, Yukon Territory, taken in August, 1914 (D. D. Cairns), rather darker in colour than the Eastern specimens. I have also a single specimen from the Yukon-Alaska boundary taken by Theo. Bryant in 1908. This specimen is also much darker in ground colour than the two British Columbia examples I have mentioned; *Lygris destinata* Moesch (not common); *Eupithicia cretacea* Pack.; this species has a very wide range in the Province, from Victoria in the south to Atlin in the far north and across the Province to West Kootenay. I am not at all sure but what they embrace one or two well-defined races; and *Xanthorhæ abrasaria* race *congregata* Walk.

Mr. Buckell also collected a short series of *Oenecis beani* Elwes on Mount Bowman (7,500 feet) on July 9th. This species has been taken on a number of mountain ranges in the Province and probably occurs on every mountain of over 7,000 feet altitude. Mount Bowman is a high limestone ridge some 20 miles north-west of Clinton.

Enderby.—Mr. Downes has handed us a list of species identified by Dr. J. McDunnough which were taken by Mr. J. Wynne in the vicinity of Enderby. They include several good records, the best of them being *Tarache areli* Streck.; this pretty little noctuid is extremely rare. I have one specimen from Rossland (Danby) and it has been taken at Kaslo by Mr. Cockle. *Syneda ochracea* Behr.; this is another somewhat rare species, odd specimens having been taken at Vaseaux Lake (Treherne), Kaslo (Cockle), and Rossland (Danby). Amongst the geometers, *Trichodesia albovittata* race *tenuifasciata* B. & McD. is the most interesting. It was described (Cont. Lep. No. Amer., Vol. 3, No. 4, page 225) from Spirit Lake, Idaho. It differs from typical *albovittata* in having the white band of the primaries very much reduced in width. I have one specimen from Rossland (Danby).

Vavenby.—This locality is situated about 80 miles north of Kamloops in the valley of the Upper Thompson River. Mr. T. A. Moilliet and his son Ted, who is an enthusiastic collector, sent us a considerable quantity of material during the past season. As we had not previously received any material from this district, we were especially glad to get this, as it has extended our knowledge of the range of many common species, as well as furnishing us with specimens of rare species of which we had no previous representatives, including several new to the Province. Amongst the diurnals were specimens of *Basilarchia arthemis* race *rubrofasciata* B. & McD.; this species must be extremely isolated, as this makes only the third locality from which it has been recorded in eighteen years. The first was a single specimen taken by Mr. Dashwood-Jones at Halcyon Hot Springs, Kootenay Lake, in 1903, and then no further specimens were recorded until Mr. W. A. Newcombe took five in the Chilcotin District in 1915. *Incisalia polias* C. & W.; *Lycanopsis pseudargiolus* form *lucia* Kirby, and form *marginata* Edw.; these are the first specimens of these two forms that I have seen from this Province, although

I have two or three rather poor specimens taken in the Yukon by Mr. T. Bryant which are referable to the form *lucia*. In the Rep. Can. Arc. Exped., Vol. III., page 30, Mr. A. Gibson refers to specimens taken by G. M. Dawson at Dease Lake, B.C., in 1887, which Dr. Fletcher determined as representing the forms *lucia* Kby., *marginata* Edw., and *violacea* Edw. Dease Lake is situated some 60 miles north-east of Telegraph Creek.

In the SpHINGIDÆ, *Smerinthus jamaicensis* f. *norm geminatus* Say. and *Hæmorrhagia thysbe* form *cimbiciformis* Steph. were the best. *Apantesis michabo* Grt. was the most desirable of the aretids, while in the Noctuidæ the following are worthy of special mention:—

Euxoa plagigera Morr.; *Scotogramma trifolii* Rott., a single specimen which is the first I have seen of the typical form; it may occur at Kaslo, but I have not seen a specimen from there. Anyway, it is quite rare, as is also the race *albifusa* Walk., which occurs on Vancouver Island. A figure of the latter was given in Rep. Prov. Mus., 1916, Plate VII. *Polia farnhami* Grt.; *Bombycia rectifascia* Sm. (see "Illustrated Lepidoptera"); *Agroperina morna* Streck.; this is another rare species; the only other one I have seen was collected by Mr. G. O. Day at Cowichan Bay. *Andropolia wdon* Grt.; *Namangana præacuta* Sm.; and *Autographa flagellum* Walk.; this is rather an uncommon *Autographa* in British Columbia, as our previous records are from Agassiz and Kaslo. Amongst the geometers are *Lobophora montanata* race *magnoliatoidata* Dyar., previously taken at Kaslo (Cockle) and Rossland (Danby); *Dysstroma formosa* Hulst.; *Lygris destinata* race *schistacea* Warr.; a single specimen taken on August 30th matches exactly a specimen from Kaslo (Cockle), which was identified by Dr. McDunnough some years ago as this species. I have no other record of it. *Isturgia truncataria* Wlk.; *Itame sulphurea* Pack.; *I. plumosata* B. & McD.; *Euchlæna astylusaria* Wlk.; and one *Eulype hastata* race *subhastata* Nolc.; this race is rather rare in British Columbia collections, although it is rather widely distributed. We have specimens from Atlin, Prince Rupert, and Grouse Mountain, near Vancouver.

Mr. W. B. Anderson, Dominion Inspector of Indian Orchards, who has collected in many different localities during the season, reports that collecting on the whole was decidedly poor, although several good days were experienced, notably May 24th at Penticton and August 15th at Fort Steele. The following are the best of his captures:—

Powell River.—*Eriopyga perbrunnea* Grt.; *Autographa mappa* G. & R.; and *Diactinia silaccata* race *albolineata* Pack.

Seechelt.—Several specimens of *Epargyreus tityrus* Fabr. were taken, but they were all badly worn as it was rather late for this species—August 6th, to be exact. This species has previously been recorded from Vancouver and Savary Island (R. S. Sherman), where it appears about the latter part of June. A specimen of *Selenia alcipheararia* form *ornata* B. & McD. was also taken.

Penticton.—*Smerinthus cerisyi ophthalmicus* form *pallidulus* Edw.; a single specimen of this uncommon form was taken; *Diacrisia pteridis (danbyi)* race *rubra* Neum; *Scotogramma oregonica* Grt.; and *Spodolepsis substriataria* race *danbyi* Hulst.

Fort Steele.—*Euxoa satiens* Sm.; a short series of this rare noctuid was taken in good condition "at light." In our local lists it is simply recorded from "B.C." I have one specimen from Lillooet (Phair) which is referable to this species. *Euxoa quadridentata* race *flutea* Sm.; *Oncocnemis albifasciata* Hamp.; this is also a rare species. A single specimen was taken some years ago by Mr. Anderson at Chilcotin (see "Illustrated Lepidoptera"); and *Zenophleps lignicolorata* Pack.

MICROLEPIDOPTERA.

We have continued our work in this group during the present season and have obtained a number of new records, including several new species. We have also extended our knowledge of the known range of a number of species that have been previously recorded.

Collections have been made at Victoria, Goldstream, Fitzgerald, Mount Tzouhalem, Maillardville, Mount McLean, Chilcotin, and Vavenby, which have resulted in the addition of much desirable material.

As a result of this activity the writer has been enabled to mount about 1,800 of these small moths during the past season, a great many of which have not previously been recorded.

In the Ann. Rep. Prov. Mus., 1920, pages 23 and 24, I gave a list of species taken in that year which were additional to those recorded in the 1906 B.C. Check-list. I am appending a further additional list of species taken during the present year, together with a few taken in 1920, the determinations of which were not to hand when the previous list was printed. Some

of the species have been described since the 1906 Check-list was published; the majority are, however, new records for the Province and a few are new to science.

It is well to state here that this season's captures in the *Tineina* are not included, as they have not yet been worked up owing to the absence from Washington of Mr. August Busck, who is the foremost authority on this group in North America.

The numbers and arrangement are in accord with Messrs. Barnes & McDunnough's Check-list. Those marked with a star have been described since the "List" was published.

Collectors: W. B. Anderson, E. H. Blackmore, E. R. Buckell, W. R. Carter, G. O. Day, A. W. Hanham, L. E. Marmont, and T. A. Moilliet, whose initials only are used in the following records.

Pyralidæ (Pyraustinae).

4994. *Evergestis subterminalis* B. & McD. Mount McLean (G. O. D.); Vavenby (T. A. M.).
4996. *Evergestis simulatalis* Grt. Fort Steele (W. B. A.); Mount McLean (G. O. D.).

Pyralidæ (Scopariinae).

- * *Scoparia basalis pacificulis* Dyar. Victoria (E. H. B.); Mount Newton (E. H. B.).
* *Scoparia commortalis* Dyar. Victoria (E. H. B.).

Pyralidæ (Schænobiinae).

- 5311B. *Schænobius melinellus albicostellus* Fern. Alberni (J. Redford).

Pyralidæ (Crambinae).

- * *Crambus tutillus* McD. Victoria (W. R. C.; E. H. B.).

Pyralidæ (Phycitinae).

5591. *Ambesa latella* Grt. Chilcotin (E. R. B.).
5631. *Salebria virgatella subcasiella* Clem. Goldstream (E. H. B.).
* *Pyla blackmorella* Dyar. Mount Tzouhalem (G. O. D.).

Pterophoridae.

5862. *Platyptilia edwardsi* Fish. Mount McLean (G. O. D.; A. W. H.).
5881. *Platyptilia pallidactyla* Haw. Victoria (W. R. C.); Goldstream (E. H. B.).
Alucita montana declivis Meyr. Fort Fraser (W. B. A.).
5899. *Oidamatophorus cineraceus* Fish. Mount McLean (G. O. D.); Vavenby (T. A. M.).
5907. *Oidamatophorus homodactylus* Wlk. Mount McLean (G. O. D.; A. W. H.); Vavenby (T. A. M.).
Oidamatophorus occidentalis Wlsh. Fort Steele (W. B. A.); Vavenby, (T. A. M.).
* *Oidamatophorus corvus* B. & L. Goldstream (E. H. B.); Maillardville (L. E. M.).
5944. *Stenoptilia mengeli* Fern. Mount McLean (A. W. H.).

Gelechiidæ.

6021. *Metzneria lappella* Linn. Victoria (E. H. B.).

Oecophoridae.

6486. *Semioscopis aurorella* Dyar. Maillardville (L. E. M.).
6488. *Semioscopis inornata* Wlsh. Victoria (L. Clarke).

Aegeriidae.

6758. *Paranthrene perlucida* Busck. Victoria (L. Clarke).

Eucosmidæ.

6770. *Evetria colfaxiana* Kearf. Fitzgerald (W. R. C.).
6803. *Exartema versicoloranum* Clem. Maillardville (L. E. M.).
6840. *Argyroploce mengelana* Fern. Vavenby (T. A. M.).
6842. *Argyroploce urticana* Hub. Maillardville (L. E. M.).
6869. *Argyroploce bipartitana* Clem. Maillardville (L. E. M.).
6885. *Eucosma argenteana* Wlsh. Chilcotin (E. R. B.).

6894. *Eucosma ridingsana* Rob. Vavenby (T. A. M.).
 6948. *Eucosma radicana* Wlsh. Victoria (W. R. C.; E. H. B.).
 6964. *Eucosma rectiplicana* Wlsh. Victoria (W. R. C.).
 7013. *Eucosma illotana* Wlsh. Vavenby (T. A. M.).
 7046. *Eucosma medoistriata* Wlsh. Chilcotin (E. R. B.).
 7093. *Eucosma tarandana* Moesch. Chilcotin (E. R. B.).
 7100. *Eucosma montanana* Wlsh. Chilcotin (E. R. B.).
 7144. *Enarmonia pinicolana* Zell. Victoria (W. R. C.).
 7146. *Enarmonia fasciolana* Clem. Goldstream (E. H. B.).
 7152. *Enarmonia crispiana* Clem. Vavenby (T. A. M.).
 7182. *Ancylis intermedia* Kearf. Fitzgerald (W. R. C.); Ladysmith (E. H. B.); Maillardville (L. E. M.).
 7193. *Ancylis apicana* Wlk. Fitzgerald (W. R. C.).
 7204. *Ancylis kincaidiana* Fern. Maillardville (L. E. M.).
 7212. *Laspeyresia vancouverana* Kearf. Fitzgerald (W. R. C.); Goldstream (E. H. B.).
 7223. *Laspeyresia conversana* Wlsh. Fitzgerald (W. R. C.); Goldstream (E. H. B.).
 7225. *Laspeyresia lunatana* Wlsh. Victoria (E. H. B.).
 7228. *Laspeyresia zana* Kearf. Mount Tzouhalem (E. H. B.).
 7237. *Laspeyresia trossulana* Wlsh. Victoria (W. R. C.).
 7244. *Laspeyresia americana* Kearf. Ladysmith (E. H. B.).
 7247. *Laspeyresia prosperana* Kearf. Goldstream (E. H. B.).
 7260. *Hemimene sedatana* Busck. Mount Tzouhalem (E. H. B.).

Tortricidæ.

- * *Cacacia dimorphana* B. & B. Victoria (W. R. C.).
 7405. *Tortricodes horariana* Wlsh. Victoria (W. R. C.).

Phaloniidæ.

7540. *Hysterosia aurcoalbida* Wlsh. Chilcotin (E. R. B.).

Glyphipterygidæ.

7619. *Choreutis balsamorrhizella* Busck. Chilcotin (E. R. B.).

Plutellidæ.

7638. *Eucercatia securella* Wlsh. Victoria (W. R. C.).
 7674. *Plutella vanella* Wlsh. Victoria (E. H. B.).

Incurvariidæ.

8428. *Incurvaria oregonella* Wlsh. Fitzgerald (W. R. C.); Chilcotin (E. R. B.); Cheakamus (W. B. A.).

Hepialidæ.

8483. *Sthenopsis purpurascens* Peck. Vavenby (T. A. M.).

Among those species which have been previously listed, the following, with notes thereon, may prove of interest:—

5087. *Perispasta caculalis* Zell. Two specimens of this rather uncommon pyraustid were taken by Mr. W. R. Carter at Fitzgerald on June 12th and July 3rd respectively, and a single specimen was taken by Mr. W. B. Anderson at Chase on June 18th.

5093. *Phylctenia itysalis* Walk. This species has a much wider distribution in British Columbia than was at one time supposed. A short series was taken on Mount McLean (A. W. H.) at an altitude of 5,000 feet and a few specimens were taken at Vavenby (T. A. M.). It has been taken at Kaslo (J. W. C.) and we have specimens taken at Atlin (E. M. Anderson).

5143. *Pyrausta semirubralis* Pack. A long series of this pretty ruby and fawn coloured species was taken by Mr. W. R. Carter at Fitzgerald on various dates in June. It occurs at many points on Vancouver Island and has been recorded from Vancouver (R. V. Harvey), but we do not possess any records of its occurrence in the Interior.

5361. *Crambus hortuellus* Hubn. Previous to this season we have only had odd specimens of this species—Victoria (E. H. B.); Vancouver (R. V. Harvey); Lillooet (A. W. Phair)—but

on June 15th Mr. W. R. Carter took a long series in good condition on Gonzales Hill. The majority were of the dark form (*vachellellus* Kearf.), but two or three were as light as Zeller's *topiarius*. It seems to me that *vachellellus* and *topiarius* should be regarded as "forms" and not "races," as the dark, light, and typical forms all occur together.

5369. *Crambus plumbifimbriellus* Dyar. This species was described from sixteen specimens taken by Dyar at Kaslo in 1903. We have had no other record of it until Mr. Buckell took a single specimen at Chilcotin on July 15th, 1920. During the present season two specimens were taken at West Summerland by Mr. J. W. Richmond on June 20th, and a single specimen was taken by Mr. L. E. Marmont at Fraser Mills on July 27th. The latter is rather an unexpected locality for this species.

5583. *Promylea lunigerella* Rag. This is apparently a rather rare species. One specimen was taken by the writer at Victoria on July 17th, 1917; another specimen on Mount Newton, August 1st, 1920; and I took a third specimen on August 22nd of this year. I have not seen any others. It was described from "Vancouver Island" by Ragonot in 1887.

* *Carcina quercana* Fab. In last year's Report, page 31, this species was recorded by the writer as being new to North America. Meyrick (Handb. Brit. Lep., 1905) gives apple as one of its food-plants, and a sharp look-out was kept on the apple-trees in my garden for both larvae and pupæ, but none was found. On July 15th, about 8 p.m., I noticed a newly emerged adult resting on the leaf of a large spreading shrub which is trained up the front of the house. An extended search for further specimens resulted in finding several pupæ spun up on the leaves of this shrub which turned out to be *Cotoneaster pyracantha* Linn., commonly known as fire-thorn or Christ's-thorn. (Upon investigation I found that this particular shrub was purchased from a local nurseryman and planted in the garden about seventeen years ago). A further search was made the next evening and altogether some twenty pupæ were obtained. Meyrick (*ibid.*, page 613) states that the pupæ spin a flat web beneath the leaves; I found that they spun their webs both on the upper and the lower surface of the leaves in about equal proportions. The pupa is of a bright golden-brown and the web is of thick white silk. The moths began to emerge about the 20th and continued to do so for several days. Several of the pupæ were parasitized and two hymenopterous species were bred out. These have been determined by Mr. R. A. Cushman, of the U.S. National Museum, as *Ephialtes sanguinipes* Cress. and *Itoplectis pacificus* Cush.

6448. *Agnopteryx rosaciliella* Busck. Two specimens of this uncommon œcophorid were taken at Fraser Mills by Mr. Marmont on April 17th.

6459. *Agnopteryx argillacea* Wlsh. A single specimen was taken by Mr. W. R. Carter at Fitzgerald on March 28th.

6836. *Argyroploce galaxana* Kearf. The writer took a long series of this pretty little moth on Mount Tzouhalem on May 24th. It was described (Trans. Am. Ent. Soc., XXXIII., 9, 1907) from two specimens taken at Vernon, B.C., and one from Victoria, B.C.

6864. *Argyroploce campestrana* Zell. Four specimens were taken by Mr. Hanham on Mount McLean in August, and Mr. Moilliet took two at Vavenby on July 3rd. Dr. Dyar records taking it at Kaslo and states that the larvae occurred on the common thimble-berry (*Rubus nutkanus*).

7263. *Hemimene britana* Busck. The writer took a long series of this species at Goldstream on June 1st to 3rd. It was easily started up in the evenings from patches of red clover alongside the railway-track. A peculiar feature was that during the daytime no amount of beating would disturb them, only one individual being taken in two attempts, although an hour before sunset the slightest tap would start four or five up immediately. The species was described (Proc. Biol. Soc. Wash., XIX., 178, 1906) from specimens taken by Dr. Dyar at Kaslo in 1903. Dyar in his "Kootenai List," page 929, recorded it under the name of *alpinana* Treitschke, but Mr. Busck states in his description that it is quite distinct from the European species.

7342. *Cacœcia persicana* Fitch. Of this handsome dark-red and ochre species the writer took a single specimen at Goldstream on July 2nd, and Mr. Marmont took another individual at Fraser Mills on June 16th. We have specimens from Wellington (Bryant) and Rossland (Danby). The species is apparently more plentiful at Kaslo.

7426. *Peronea variana* Fern. This exceedingly variable species seems rather uncommon in British Columbia. Mr. Marmont took two specimens at Fraser Mills on September 26th. It is recorded from Kaslo (Cockle); Field (Dyar); and Mr. Hanham has taken two or three specimens at Duncan.

PLATE III.
NOCTUIDÆ.

Euxoa excellens infelix Sm.
Fort Steele, B.C. (W. B. Anderson).
(New to British Columbia.)

Acronycta radcliffei Harvey.
Duncan, B.C. (G. O. Day).
(Rather rare.)

Oligia tonsa Grt.
Kaslo, B.C. (J. W. Cockle).
(Rather rare.)

Lampra nefascia Sm.
Victoria, B.C. (E. H. Blackmore).
(Previously misidentified.)

Eriopyga bostura Sm.
Kaslo, B.C. (J. W. Cockle).
(New to British Columbia.)

Sympistis zetterstedti labradoris Staud.
Mount McLean, B.C. (A. W. Hanham).
(New to British Columbia.)

Taniosea discivaria Wlk.
Vavenby, B.C. (T. A. Moilliet).
(New to British Columbia.)

Trachea inordinata montana Sm.
Chilcotin, B.C. (E. R. Buckell).
(New to British Columbia.)

Oligia tonsa subjuncta Sm.
Chilcotin, B.C. (E. R. Buckell).
(Very rare.)

Bombycia rectifascia Sm.
Vavenby, B.C. (T. A. Moilliet).
(Rather rare.)

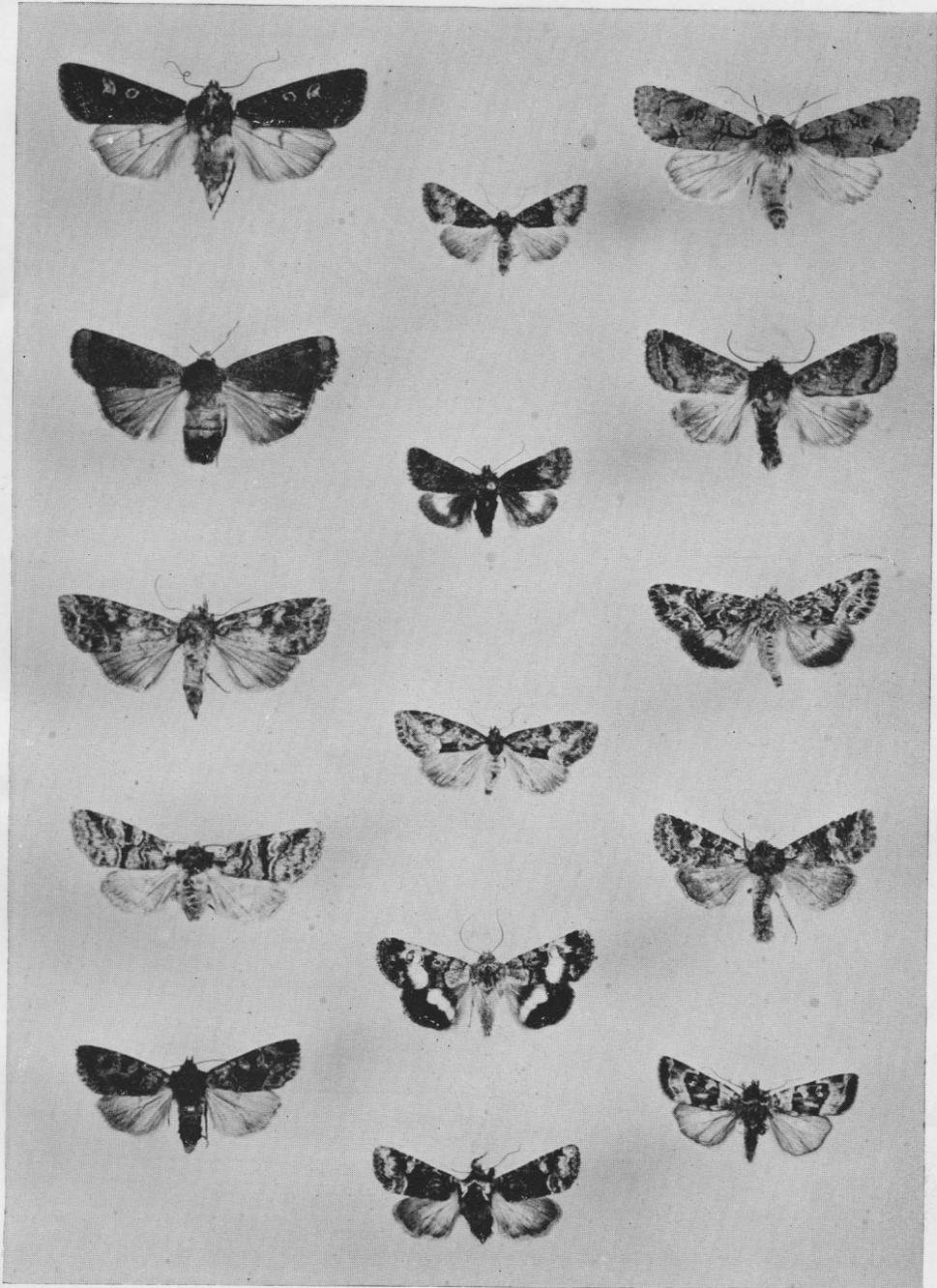
Bombycia curvifascia Sm.
Fraser Mills, B.C. (L. E. Marmont).
(New to British Columbia.)

Oncocnemis albifasciata Hamp.
Chilcotin, B.C. (W. B. Anderson).
(Very rare.)

Euxoa rufula Sm.
Mount McLean, B.C. (A. W. Hanham).
(New to British Columbia.)

Orosagrotis incognita Sm.
Mount McLean, B.C. (A. W. Hanham).
(New to British Columbia.)

Polia olivacca davena Sm.
Kaslo, B.C. (J. W. Cockle).
(New to British Columbia.)



7604. *Allononyma vicarialis* Zell. The writer took two specimens in beautiful condition on April 17th at Fitzgerald and two specimens at Goldstream on May 30th, the latter being rather worn. This is the same insect which Dr. Dyar described as *A. diana* var. *betuliperda* and which is listed in our 1906 Check-list from Kaslo. An examination of Zeller's type in Lord Walsingham's collection by Mr. Busck (Pro. Ent. Soc. Wash., XI., 97, 1909) in 1908 proved that *vicarialis* and *betuliperda* were conspecific.

ILLUSTRATED LEPIDOPTERA.

Noctuidæ (Plate III.).

1226. *Orosagrotis incognita* Sm. The specimen illustrated was taken on Mount McLean, near Lillooet, B.C., at an altitude of 5,000 feet by Mr. A. W. Hanham on August 21st, 1920. It was described (Trans. Am. Ent. Socy., Vol. XXI., page 52, 1894) from two males taken at Laggan, Alta., by Bean at an altitude of 7,000 feet. In Smith's description he gives the locality as Laggan, British Columbia. It is as well to note here that the majority of Smith's earlier references to British Columbia and to "North-west B.C." really refer to Northern Alberta. That is the reason why so many of his species still stand in our local lists as "B.C." without any further specific localities. Mr. Hanham says that the species was not at all uncommon, but unfortunately most of the specimens taken were somewhat worn.

1274. *Euxoa rufula* Sm. This species was also taken by Mr. Hanham at the same time and place, but was much more scarce than the preceding. It was described (Pro. U.S.N.M., X., 461, 1887) from a single male taken by Professor Snow in New Mexico at an altitude of 7,000 feet. Dr. A. W. Lindsey, who kindly identified it, states that the Mount McLean specimen is darker than specimens from Wyoming in the Barnes collection.

1364A. *Euxoa excellens* race *infelix* Sm. Taken by Mr. W. B. Anderson at Fort Steele on August 15th, 1921. It was described (Trans. Amer. Ent. Socy., XVII., page 57, 1890) from California as a distinct species, but later (Cat. Noct., 1893) Smith placed it as a synonym of *excellens*. It has been rescued from the synonymy by Barnes & McDunnough, who have placed it as a race of *excellens*. The maculation is practically the same, but *infelix* is of an even dark colour in contradistinction to the contrasting shades of the typical form. Mr. Cockle has also taken a single specimen at Kaslo.

1584. *Lampra* (*Rhynchagrotis*) *nefascia* Sm. (not *negascia* as listed, vide Benjamin, Bull. So. Calif. Acad. Sci., XX., 100, Dec., 1921). This species has never been properly placed in British Columbia collections. It has generally been placed under the name of *anchocelioides* Gue.; sometimes under *alternata* Grt. The majority of the specimens that I have seen are of a very even brownish-grey, with the terminal area distinctly paler. The species comes commonly to "sugar" at Duncan and I have taken it "at light" at Victoria and Goldstream in September. Mr. Foster H. Benjamin, who has recently revised this difficult genus, has kindly gone over my material in this group, and our British Columbia species are now more accurately placed than was previously the case.

1755c. *Polia olivacea* race *davena* Sm. Taken by Mr. J. W. Cockle at Kaslo on June 22nd, 1910. Amongst some material sent to us for examination by Mr. Cockle was this specimen, which seemed distinct from any of the five named varieties which are in the Museum collection. It was submitted to Dr. Lindsey, who identified it as *davena* Sm. It seems closer to *comis* Grt. than to any other named form, but the pale areas are not so light or so well defined, so that *davena* is not so contrasty in appearance as *comis*.

1828. *Eriopyga bostura* Sm. The specimen figured was taken by Mr. Cockle at Kaslo on August 21st, 1913. It does not appear to have been taken in any other locality in British Columbia. The only reference that I can find of this species in the literature that I have at hand is a note by Wolley-Dod in Bull. B.C. Ent. Soc., No. 10, June, 1908. Under the heading of "Additions" he lists *Graphipora bostura* Sm. (Ann. N.Y. Ac. Sci., XVIII., 103). Type from Kaslo.

2022. *Oncocnemis albifasciata* Hamp. This is the most striking of the British Columbia species of this genus. The specimen figured was taken by Mr. W. B. Anderson at Chilcotin on August 26th, 1918. The same collector took the species again at Fort Steele on August 15th, 1921. Sir George Hampson lists it "from North-west British Columbia."

2117. *Bombycia curvifascia* Sm. Taken by Mr. L. E. Marmont at Maillardville, B.C., on August 10th, 1920. This is the first specimen of this species that I have any record of from

British Columbia. It was described from California (Trans. Am. Ent. Soc., XVIII., 109, 1891). Dr. Lindsey, who kindly determined this specimen, states that there is one specimen in the Barnes collection from Victoria, B.C., which has been identified as *B. thula* Strecker.

2120. *Bombycia rectificascia* Sm. The specimen figured was taken at Vavenby, B.C., by Mr. T. A. Moilliet on August 14th, 1921. The species has been taken at Kaslo by Mr. Cockle, and Mr. Day has taken a specimen at Duncan, which was determined by Wolley-Dod as this species with a question-mark. I have not had an opportunity to compare Mr. Day's specimen with the one from Vavenby.

2201A. *Sympistis zetterstedti* race *labradoris* Staud. Taken by Mr. Hanham on Mount McLean on August 21st, 1920. This is a fine record as the species is arctic. It was described from Labrador. It is very rare in North American collections.

2275A. *Trachea inordinata* race *montana* Sm. This specimen was taken by Mr. E. R. Buckell at Chilcotin, B.C., on May 30th, 1920. This is another good record and adds another name to our list. It was described (Proc. U.S.N.M., XIII., 444, 1890) from Colorado.

2342. *Oligia tonsa* Grt. Taken by Mr. Cockle at Kaslo, B.C., on August 1st, 1907.

2342A. *Oligia tonsa* race *subjuncta* Sm. Taken by Mr. Buckell at Chilcotin, B.C., on August 1st, 1920. I have taken these two forms together, as there has been considerable doubt expressed at different times as to their specific identity. The former was described by Grote (Can. Ent., XII., 214, Oct., 1880) from Nevada as *Hadena tonsa*. The latter by Smith (Can. Ent., XXX., 323, Dec., 1898) from Colorado and Calgary, Alta. (Dod), as *Hadenella subjuncta*. In Bull. 52, U.S.N.M., 1902, Dyar sinks *subjuncta* as a synonym of *minuscula* Morr., but Dr. Smith, in Trans. Am. Ent. Soc., XXIX., 194, states that it has nothing to do with *minuscula*, but it is really a synonym of *tonsa* Grt. Dyar, in Proc. U.S.N.M., XXVII., 809, apparently agrees with this and records *tonsa* from Kaslo, B.C., and states that the specimens agree with the type of *subjuncta*. Wolley-Dod, in Can. Ent., XLIII., 152, May, 1911, discusses the matter at some length, but believes that *tonsa* and *subjuncta* are distinct. Barnes & McDunnough have listed (Check-list, Lep. Bor. Amer., 1917) *subjuncta* as a race of *tonsa*, a proceeding which seems a far more satisfactory solution.

I submitted the Kaslo specimen to Dr. Lindsey as *tonsa* Grt., and he kindly verified my determination. I have carefully compared Mr. Buckell's specimen with the description and it agrees in all essential particulars. It also agrees fairly well with Holland's figure on Plate XIX., Fig. 25. I have specimens from Nordegg, Alta. (Bowman), which match exactly the Chilcotin specimen. They were sent to me as *tonsa*.

2364. *Taniosea discivaria* Walk. Taken by Mr. Moilliet at Vavenby on July 28th, 1921. As far as I know, this is a new record for British Columbia. It varies considerably in depth of colouring, one specimen showing considerable red shading.

2470. *Acronycta radcliffei* Harv. The specimen figured was taken at Quamichan Lake, near Duncan, by Mr. G. O. Day on June 12th, 1908. This is a rare species in British Columbia. It is very close in general habitus to *A. grisea revellata* Sm. Mr. Day's specimen agrees with the description (Proc. U.S.N.M., XXI., 107, 1899) and with the figure given on Plate XII., Fig. 4. It was listed in the 1904 B.C. Check-list from Kaslo, B.C., but Dyar did not record the species in his "Kootenai List," and it was omitted, probably intentionally, from the 1906 B.C. Check-list. Mr. Cockle has a specimen which has been identified by Dr. McDunnough as this species. I have no other records of it, although it may be confused with *revellata* in some collections. *Radcliffei* is a much narrower-winged species and the course of the t.p. and s.t. lines are different. In *radcliffei* the t.p. line is broadly outcurved from costa, while in *revellata* it is only slightly oblique, with the s.t. line parallel, at least superiorly.

Geometridæ (Plate IV.).

3997. *Dysstroma ethela* Hulst. The specimen figured was taken by the writer at Goldstream, B.C., on July 3rd, 1921. It is rather a rare species and this is the first specimen that I have taken; it is the most perfect specimen I have seen of this species. It is closely allied to *D. casloata* Tayl., but can generally be separated from the latter by the narrower median band and the absence of the extra-basal bar. It has been taken at Wellington (Bryant), Duncan (Day & Hanham), and I have seen one specimen taken at Victoria (Meugens, 29, VI., 20). Described by Hulst (Trans. Am. Ent. Socy., XXIII., 283, 1896) from a single male taken at Sierra Nevada, Cal.

4009E. *Hydriomena nubilofasciata* form *vulnerata* Swett. This species is new to the Province and was taken by Mr. W. Downes at Sluggett's, V.I., on March 1st, 1921. Some years previously Mr. Downes, who was then living in that locality, noticed a species of *Hydriomena* occurring in February which was apparently different from any of our known spring species in that genus. Owing to various causes no opportunity offered until this spring to investigate the matter, when a nice series was taken with the aid of a lantern. *Nubilofasciata* Pack. has six described forms or races, all of which are colour forms (*vide* Swett, Can. Ent., XLIII., 79, 1911); this species can at once be differentiated from any other British Columbia species by the dark marginal band of primaries. Mr. Swett in his notes states that he has the species from British Columbia amongst a number of widely spread localities, but he does not give any specific locality, neither does he refer to any particular form.

4192. *Eupithecia interruptofasciata* Pack. The specimen figured was taken by Mr. G. O. Day at Maple Bay, near Duncan, B.C., in August, 1913. This species has not been hitherto recorded from British Columbia. It is an inhabitant of the Atlantic States and was described in Fifth Rept. Peab. Acad. Sci., 59, 1873. Mr. Day states that it is rather rare and very local; he has not taken it in any other locality in the vicinity, excepting Maple Bay.

4209. *Eupithecia mutata* Pears. Taken by the writer at Goldstream on July 2nd, 1921. This is one of the rarer species of this genus. The only other specimen that I have seen is a rather worn individual taken by myself in a pine woods near Victoria on July 18th, 1913. The specimen figured is in good condition and was obtained by "beating" in a heavily wooded (chiefly Douglas fir) district. It agrees with Pearsall's description (Journ. N.Y. Ent. Soc., XVI., 98, June, 1908). The species was described from the Catskill Mountains, New York State. It is closely allied to *albicapitata* Pack., which is also a rare species in the Province, our only records being Cowichan Lake (Day) and Kaslo (Cockle).

4223. *Eupithecia scabrogata* Pears. This is another new record to add to the already long list of *Eupithecias* (about fifty) recorded from British Columbia. It was taken by Mr. Theo. Bryant at Wellington, B.C., on April 16th, 1903. One other specimen taken on March 24th of the same year is not in such good condition. It is quite distinct from any other species that we have. The determination was made for us by Mr. L. W. Swett.

4316-1. *Drepanulatrix secundaria* B. & McD. Taken by Mr. Cockle at Kaslo, B.C., on June 14th, 1910. At first thought to be a new species. It, however, agrees with the description (Cont. Lep. No. Amer., Vol. III., No. 1, page 25, Nov., 1916) of *secundaria*, and Dr. Lindsey, who compared it with the types, believes it to be this species, although it is rather far north. The species was described from Mineral King, Cal.

4374. *Phasiane hebetata* Hulst. Taken at Chilcotin, B.C., by Mr. E. R. Buckell on July 16th, 1921. This is the first specimen of this species in good condition that I have seen. We have had two specimens previously—one from Atlin (E. M. Anderson) and the other from Chilcotin (W. A. Newcombe)—that were referable to this species, but were so denuded of scales as to make accurate identification impossible. The course of the extra and intra-discal lines are exactly the same as Barnes & McDunnough's figure (Cont. Lep. No. Amer., Vol. III., No. 4, Plate XXII., Fig. 9) of *demaculata*, which the authors later (*ibid.*, Vol. IV., No. 2, page 149) sunk as a synonym of *hebatata*. Mr. Buckell's specimen agrees with the description and the figure mentioned. The type material of *demaculata* also included a specimen from Field, B.C. The species has a wide range, but is rare in British Columbia.

4425. *Itame pustularia* Hub. This is another very rare species in British Columbia. The specimen figured was taken by Mr. A. W. Phair at Lillooet, B.C., on June 29th, 1920. The only other specimen that I know of in the Province is a specimen taken at Kaslo by Mr. Cockle many years ago. It occurs throughout the Atlantic States and I have specimens from Manitoba. It has not been recorded from Alberta.

4453. *Dysmigia loricaria* Evers. This species is new to the Province. A nice series was taken by Mr. T. A. Moilliet at Vavenby, B.C., during the middle of July, 1921. It was recorded in the 1904 B.C. Check-list under the name of *Sympherta Julia* Hulst., and the localities given are Rocky Mountains and Kaslo (?). I have seen all Mr. Cockle's species and he has not taken it. The species was left out in the 1906 List. Some specimens, especially if a little rubbed, closely resemble *Itame exauspicata* Wlk., which also occurs in the same district. The females are wingless.

Pyralidæ (Pyraustinæ).

4994. *Evergestis subterminalis* B. & McD. Taken on Mount McLean by Mr. G. O. Day on August 8th, 1921. Very close to *funalis* Grt., which also occurs in British Columbia. The latter is taken at Kaslo and I have a specimen from Vavenby (T. A. Moilliet). It is recorded in the 1906 Check-list from Vancouver Island, but this is an error. A specimen from Wellington (Bryant) labelled *funalis* is undoubtedly *insulalis* B. & McD., which occurs at several points on the Island.

4996. *Evergestis simulatalis* Grt. This pretty species was taken by Mr. W. B. Anderson at Fort Steele, B.C., on August 15th, 1921. Mr. Day also took a single specimen on Mount McLean on August 10th. Dyar lists the species from Arizona and Colorado.

Pyralidæ (Scopariinæ).

**Scoparia basalis* race *pacificalis* Dyar. Described (Ins. Ins. Mens., LX., 66, 1921) as a new race from specimens, three taken by the writer at Victoria and Mount Newton and one taken at Grayland, Wash. (H. K. Plank); it occurs from mid-July to mid-August. The specimen figured is one of the co-types and was taken on Mount Newton on August 1st, 1920. *Fernaldalis* Dyar is now placed as a race of *basalis*. Dyar in his "Kootenai List" records taking a long series of *fernalidalis* at Shawnigan Lake, B.C. It is also recorded from Kaslo, B.C.

**Scoparia commortalis* Dyar. This new species was described (*Ibid.*, page 67) from specimens taken by the writer at Victoria, B.C., July 15th to 17th, 1920. This species is quite distinct from any other of our British Columbia scoparids and is easily recognizable by its generally brown appearance and the presence of a broad dark-brown band which follows the pale outer line. One of the male co-types is figured.

5248. *Scoparia tricoloralis* Dyar. Taken by Mr. L. E. Marmont at Maillardville, B.C., on July 13th, 1921. This does not appear to be a common species by any means, although it is recorded from several points—Wellington (Bryant), Duncan (Skinner), Ainsworth (Dyar), and Kaslo (Cockle). It is the most brightly coloured of the British Columbia species and is rather a pretty insect. Mr. Marmont took three specimens on the 13th and one on the 26th, but it was not observed between those dates, although it was searched for. He did not take any the previous year.

Pyralidæ (Crambinae).

**Crambus tutillus* McDun. The specimen figured is a male paratype kindly returned to me by Dr. McDunnough. It was taken by the writer on May 28th, 1918. This species is very common in Victoria, generally occurring about the middle of May. It is very close to *dissectus* Grt. and had previously been determined for me as this species, under which name it was listed on page 24, Prov. Mus. Rep., 1920. This is the same insect that was listed in the 1904 B.C. Check-list as "*dumetellus* Hub. Generally distributed (common)." I have seen specimens in the Bryant collection labelled *dumetellus* which are undoubtedly McDunnough's new species. Dr. McDunnough in his description states that "It (*tutillus*) is probably closest to *dumetellus* Hub., differing in the much shorter and less distinct white costal line." Dr. Fernald in his "Crambidae of North America," 1896, gives a coloured figure of *dissectus* (Plate II., Fig. 12) and one of *dumetellus* (Plate III., Fig. 2), and a comparison of these figures with specimens of *tutillus* shows that the latter is closer to *dumetellus* than it is to *dissectus*.

Pyralidæ (Phycitinæ).

**Pyla blackmorella* Dyar. Described by Dr. Dyar (Ins. Ins. Mens., 68, 1921) from two specimens taken by the writer on Mount Tzouhalem, near Duncan, B.C., on June 24th, 1913. A figure of the male paratype is given. The writer in company with Mr. G. O. Day climbed Mount Tzouhalem on May 24th of the present year, but we were about three weeks too soon for this species. Mr. Day, however, secured a nice series on June 13th. It has not been recorded from any other locality.

Oecophoridæ.

6486. *Semioscopis aurorella* Dyar. The specimen figured was taken by Mr. L. E. Marmont at Maillardville, B.C., on March 4th, 1921. Another specimen was taken on the 14th of the same month. These two specimens are the only records that we have of this species in the Province.

PLATE IV.
GEOMETRIDÆ.

*Hydriomena nubilofasciata vul-
nerata* Swett.
Sluggett, B.C. (W. Downes).
(New to British Columbia.)

Eupithecia interruptofasciata
Pack.
Maple Bay, B.C. (G. O. Day).
(New to British Columbia.)

Dysmigia loricaria Evers.
Vavenby, B.C. (T. A. Moilliet).
(New to British Columbia.)

Drepanulatrix secundaria B. &
McD.
Kaslo, B.C. (J. W. Cockle).
(New to British Columbia.)

Eupithecia mutata Pears.
Goldstream, B.C. (E. H. Black-
more).
(Very rare.)

Phasiane hebetata Hulst.
Chilcotin, B.C. (E. R. Buckell).
(Rather rare.)

Dysstroma ethela Hulst.
Goldstream, B.C. (E. H. Black-
more).
(Rather rare.)

Eupithecia scabrogata Pears.
Wellington, B.C. (T. Bryant).
(New to British Columbia.)

Itame pustularia Hubn.
Lillooet, B.C. (A. W. Phair).
(Very rare.)

MICROLEPIDOPTERA.

Evergestis simulatalis Grt.
Fort Steele, B.C. (W. B. Ander-
son).
(New to British Columbia.)

Evetria colfaxiana Kearf.
Fitzgerald, B.C. (W. R. Carter).
(New to British Columbia.)

Evergestis subterminalis B. &
McD.
Mount McLean, B.C. (G. O. Day).
(New to British Columbia.)

Scoparia commortalis Dyar.
(Male co-type.)
Victoria, B.C. (E. H. Blackmore).
(New to science.)

Scoparia basalis pacificalis Dyar.
(Male co-type.)
Mount Newton, B.C. (E. H. Blackmore).
(New to science.)

Semioscopis aurorella Dyar.
Fraser Mills, B.C. (L. E. Mar-
mont).
(New to British Columbia.)

Enarmonia pinicolana Zell.
Victoria, B.C. (W. R. Carter).
(New to British Columbia.)

Pyla blackmorella Dyar.
(Male paratype.)
Mount Tzouhalem, B.C. (E. H.
Blackmore).
(New to science.)

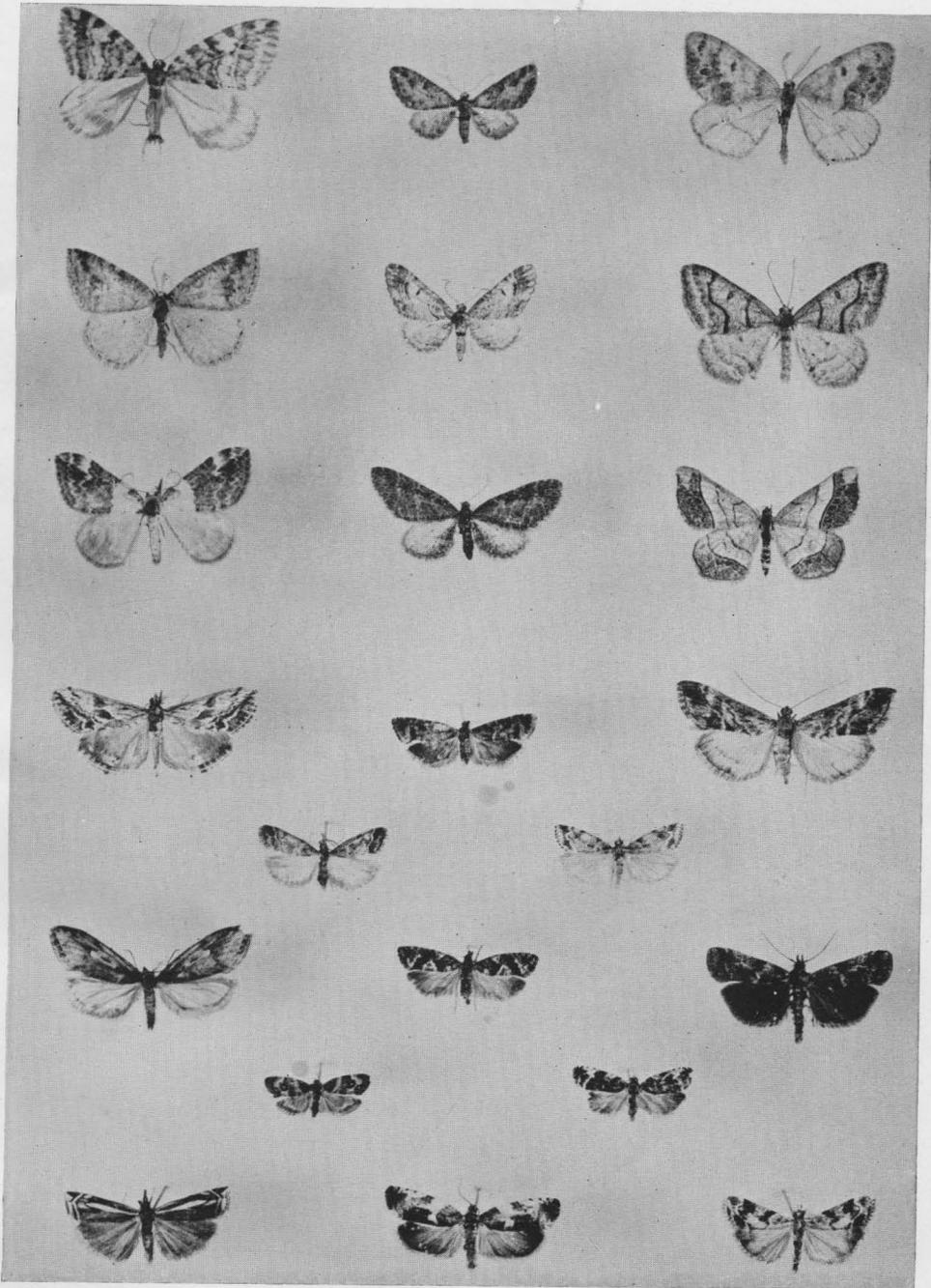
Choreutis balsamorhizella Busck.
Chilcotin, B.C. (E. R. Buckell).
(New to British Columbia.)

Argyroploce mengelana Fern.
Vavenby, B.C. (T. A. Moilliet).
(New to British Columbia.)

Crambus tutillus McD.
(Male paratype.)
Victoria, B.C. (E. H. Blackmore).
(New to science.)

Argyroploce duplex Wlsm.
Victoria, B.C. (W. R. Carter).
(Very local.)

Scoparia tricoloralis Dyar.
Fraser Mills, B.C. (L. E. Mar-
mont).
(Rather uncommon.)



Eucosmidae.

6770. *Evetria colfaxiana* Kearf. Taken by Mr. W. R. Carter at Fitzgerald, B.C., on April 17th, 1921. A short series of five specimens was taken on this date and a single specimen on May 8th. This species has not hitherto been recorded from the Province. Kearfott (Trans. Am. Ent. Soc., XXXIII., 3, 1907) described the species from a single male taken at Colfax, Cal.

6840. *Argyroploce mengelana* Fern. This is a good record and is new to British Columbia. A single specimen, luckily in good condition, was taken at Vavenby, B.C., by Mr. T. A. Moilliet on July 12th, 1921. It was described (Ent. News. V., 131, 1894) from ten specimens in poor condition taken by Mr. L. W. Mengel in North Greenland in 1891.

6859. *Argyroploce duplex* Wlsh. A nice series of this handsome eucosmid was taken by Mr. W. R. Carter from June 21st to 23rd, 1921. It is exceedingly local and was only taken in a very small area. They were all taken "at rest" on a board fence bordering a small grove of aspen, which is undoubtedly their food-plant. Dr. Dyar in his "Kootenai List" records finding the larvæ of this species on aspen at Kaslo. It has not been recorded from any other locality in the Province. I have seen one other specimen taken by Mr. Hanham at Victoria, B.C., many years ago. It was described (Trans. Ent. Soc., Lond., 501, 1895) from Colorado.

7144. *Enarmonia pinicolana* Zell. The specimen illustrated was taken at Victoria, B.C., by W. R. Carter on July 20th, 1921. It is rather uncommon. Mr. Carter has taken two specimens and the writer took one in July, 1918. It bears a close superficial resemblance to some forms of *Eucosma solandriana* Linn. The species was described by Zeller in 1846 and is widely distributed. Meyrick (Handb. Brit. Lep., 474, 1895) gives its distribution as Great Britain, North and Central Europe, and North Asia, and its food-plant as larch.

Glyphipterygidae:

7619. *Chorentis balsamorhizella* Busck. Taken by Mr. E. R. Buckell at Chilcotin, B.C., on May 20th, 1920. This pretty little species, with its sprinkling of iridescent scales, is a new record for the Province. Four specimens were taken, but they were not in the most perfect condition, the one figured being the best. It has also been taken at Vernon (Ruhmann).

Our sincere thanks are due to the following specialists for identifying material during the past season: Dr. J. M. Aldrich, Dr. W. Barnes, Foster H. Benjamin, August Busck, R. A. Cushman, Dr. H. G. Dyar, Carl Heinrich, Dr. A. W. Lindsey, Dr. J. McDunnough, S. A. Rohwer, and L. W. Swett.

THE PTEROPHORIDÆ OF BRITISH COLUMBIA.

BY E. H. BLACKMORE, F.E.S.

The recent publication of "The Pterophoridae of America, North of Mexico," by Drs. Barnes and Lindsey (Cont. Lep. No. Amer., Vol. IV., No. 4, Aug. 1921) has so altered our conception of many of the species, and also of some of the genera in this family, that I have thought it advisable to write this short paper on the species occurring in British Columbia, and to bring them up to date as regards correct determination and nomenclature.

In the Check-list of British Columbia Lepidoptera published in 1906 there are naturally a number of misidentifications, many species to be eliminated, and there are also a considerable number of additions.

The species of this family are for the greater part very difficult to determine correctly, and I wish to express my sincere thanks to Dr. A. W. Lindsey for his willing and kindly help in determining a large number of specimens of doubtful and little-known species. I am also grateful for his kind permission to make use of any part of the "Revision" that is applicable to our British Columbia species.

My thanks are also due to Messrs. Bryant, Cockle, Day, Hanham, and Ruhmann for the loan of material, without which this paper would have been incomplete.

The Pterophoridae can be distinguished primarily from any other family by the presence of a series of black spine-like scales on the under-surface of the secondaries.

In all the North American species, with one exception, the primaries are bifid and the secondaries are trifid. The exception noted is *Agdistis americana* B. & L., which has both fore and hind wings entire. Two other exotic genera have the same characteristic, while another one has the primaries quadrifid and a third has them trifid.

The following general remarks on the family as a whole, taken from Genera Insectorum Fasc., 100 (Pterophoridae by E. Meyrick), will prove of interest:—

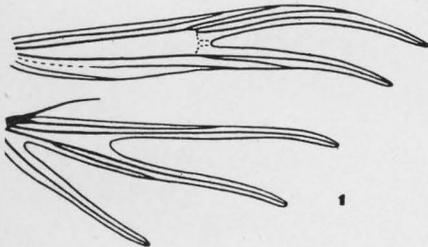
"Ovum more or less oval, smooth. Larva rather short, with more or less developed fascicles of hairs; usually feeding exposed on flowers or leaves, but sometimes internally in stems or seed-vessels. Pupa sometimes hairy, attached by tail, or in a slight cocoon above ground. The majority of those species whose food-plants are known are attached to the Compositæ, which are the most highly organized group of dicotyledonous plants, and this is especially true of the two largest genera, *Platyptilia* and *Pterophorus* (*Oidematophorus*), where the association with this order is very marked, probably nine-tenths of the species being attached to it.

"The fore wings of the imago are very elongate, narrow, dilated posteriorly, and the legs are very long and unusually slender. The general structure seems adapted to secure extreme lightness, thus enabling distribution to be effected by the wind without much effort on the part of the insect; hence the species need and possess very little muscular power, and are quite unable to fly against even a moderate breeze. The method of distribution has been effective, for the species have spread over the whole globe, including the principal oceanic islands; though the wide distribution of some cosmopolitan species is due to artificial introduction with the cultivated shrubs and trees on which the larvæ feed.

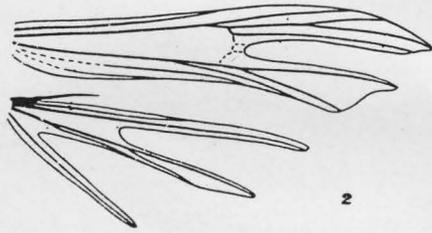
"Probably all the principal genera originated in Asia, which shows much the greatest diversity of generic forms; the great specific development of *Platyptilia* and *Pterophorus* (*Oidematophorus*) in America would seem to be due to the large variety of abundant suitable food-plants (Compositæ) offered, whilst the relatively insignificant generic modification indicates that the family did not find its way to America until long after its first origin. I infer, therefore, that it originated not only late in time, but at a period when Asia was comparatively isolated from other regions by wide seas, and that on eventually gaining access to the other continents it found them already well-stocked with a large lepidopterous fauna."

In North America eleven genera are listed, embracing some 116 species, of which British Columbia is represented by six genera with a total of 30 species, being slightly over 25 per cent. of the whole. The synonyms of genera and species are not given in their entirety, but only so far as they represent names previously given in former B.C. Check-lists. The descriptions of genera are given with the venation omitted, but sufficient structural characters are given that with the additional aid of the plate, no difficulty should be experienced in placing any specimen in its proper genus. The descriptions of species are not given in full detail, but all the essential characters necessary for the identification of our British Columbia species are included.

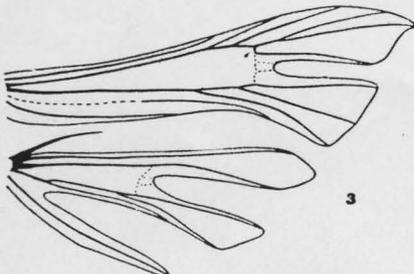
PLATE V.
PTEROPHORIDÆ.
WING OUTLINES OF BRITISH COLUMBIA GENERA.



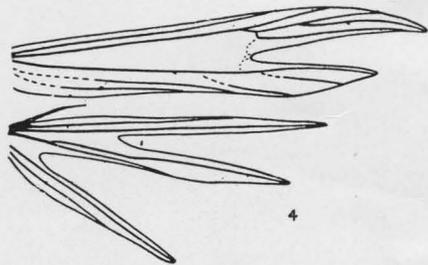
1. TRICHOPTILUS.



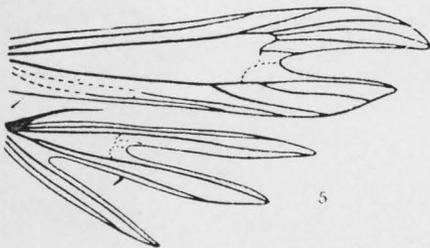
2. PTEROPHORUS.



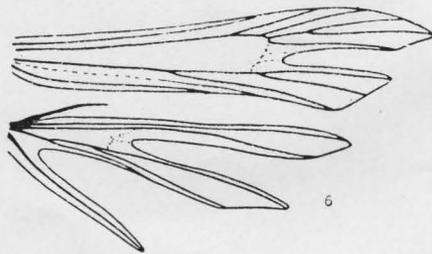
3. PLATYPTILIA.



4. STENOPTILIA.



5. ADAINA.



6. OIDEMATOPHORUS.

NOTE.—The above figures were photographed from the original plate in Messrs. Barnes and Lindsey's "Pterophoridae of America, North of Mexico," by the kind permission of Dr. A. W. Lindsey.

FAMILY PTEROPHORIDAE.

Genus TRICHOPTILUS Walsingham.

Trichoptilus Walsingham, Pteroph. Cal., Ore., 62, 1880. Characters: Forehead without tuft; ocelli obsolete. Labial palpi moderate, ascending. Fore wings cleft from before middle, both lobes slender, tapering, without anal angle.

1. *TRICHOPTILUS PYGMÆUS* Walsingham, Pter. Cal., Ore., 64, 1880. A very small species measuring about 10 mm. in expanse. Fore wings very pale fawn, barred with white on both lobes.

Two specimens taken at Wellington, B.C. (Bryant), on 30-VI-03 and 11-VII-03 respectively. One specimen is without head or body and the other is simply pinned. There is no record of any other specimens having been taken since. An exceedingly rare species. The type series included three specimens taken near Millville, Cal., on July 11th, 1871. Two of them are in the British Museum, the remaining one being in the Fernald collection at Amherst, Mass. One other specimen is in the U.S. National Museum. I believe that these six specimens are all that are known.

Genus PTEROPHORUS Geoffroy.

Pterophorus Geoffroy, Hist. Nat. Ins., II., page 90, 1762.

Oxyptilus Zeller, Isis X., page 765, 1841.

Characters: Forehead smooth without tuft; ocelli obsolete. Labial palpi moderate, oblique; second joint with a ventral apical tuft in one British Columbian species; third joint moderate. Tibiæ thickened with scales at base of spurs. Primaries bifid, cleft from about middle. Secondaries trifid, third feather with a well-developed tuft of black scales in the fringes of the inner margin.

1. *PTEROPHORUS TENUIDACTYLUS* Fitch. Trans. N.Y. Agr. Soc., XIV., 848, 1854. Primaries dark brown with a coppery tinge, with a fine transverse white line across outer half of both lobes. First lobe with a broader stripe basad of this; second lobe with this stripe reduced to a small white patch. Palpi white with lateral brown stripes. Thorax white behind. Abdomen brown with diverging pairs of white stripes on the third segment. Fourth segment entirely brown above; fifth mostly white. Beneath the abdomen is more heavily marked with white. Expanse, 13-17 mm.

Dyar in his "Kootenai List" records two specimens of this species as having been bred from the thimble-berry (*Rubus nutkanus*). Specimens sent to me by Mr. J. W. Cockle from Kaslo as *tenuidactylus* turn out to be *Pterophorus delawareicus* Zell. The only authentic specimen that I have seen is a unique taken by Mr. G. O. Day at Quamichan Lake, near Duncan, on July 14th, 1907. Dr. Lindsey tells me that the species is widely distributed and is quite common in some localities.

2. *PTEROPHORUS NINGORIS* Walsingham, Pter. Cal., Ore., 26, 1880. Fore wings dull brown with a greyish cast caused by the presence of white and fuscous scales. Both lobes crossed by two white lines; the outer one slender, the inner one broad. The lobes are somewhat narrower than in our other two species of this genus. Secondaries brown; third lobe paler, white beyond middle, with large tuft of blackish scales in fringes at outer third. Palpi rather long and slender, oblique, dark brown, with both joints white-tipped. First spurs attached about three-fifths from base of tibia and reaching its tip. Expanse, 18-20 mm.

Dyar records it from Kaslo and states that the larvæ were found feeding on a herbaceous plant with milky juice, *Hieracium albiflorum*. In our 1906 B.C. Check-list it is also recorded from Wellington, but the specimens labelled *ningoris* in the Bryant collection and from which the record was taken all prove upon examination to be *delawareicus*. Mr. Day took one female specimen at Cowichan Lake on June 18th, 1913.

3. *PTEROPHORUS DELAWAREICUS* Zeller, Verh z-b Ges. Wien., XXIII., 320, 1873. Fore wings bright golden-brown, with both lobes crossed by two inwardly oblique white stripes; the outer one slender, the inner one broader. Palpi brown at the sides; the vestiture of the second joint produced into a point below, which almost reaches tip of third. Abdomen with diverging white dashes above. Expanse, 18-20 mm.

This species is far more common than the other two. I have it from Victoria (Blackmore); Fitzgerald (Carter); Goldstream (Blackmore); Wellington (Bryant); Fraser Mills (Marmont); Kaslo (Cockle); and Rossland (Danby); the dates ranging from June 16th to July 26th.

The three species are superficially very close, but *delawaricus* can be separated from *tenuidactylus* and *ningoris* by the second joint of the labial palpi having a projecting ventral tuft which nearly reaches the tip of the third, and *tenuidactylus* can be distinguished from *ningoris* by the position of the median spurs on the hind tibiae. In *tenuidactylus* these spurs are attached to about the middle of the tibiae, while in *ningoris* they are attached three-fifths or more of length of joint from its base.

Genus PLATYPTILIA Huebner.

Platyptilia Hübner, Verz. bek. Schmett., 429, 1826. Characters: Front with a prominent scale tuft in some species, usually with at least a moderate tuft. Palpi short, scarcely exceeding front, to long; second joint oblique; third porrect. Tibiæ sometimes with slight scale-tufts. Fore wings cleft not more than one-third their length, anal angle evident on both lobes, in some species prominent and in some retreating. Hind wings trifold, third feather with black scales or scale-tuft in fringes of inner margin in most species.

1. PLATYPTILIA PUNCTIDACTYLA Haworth, Lep. Brit., 479, 1812.

Alucita cosmodactyla Hübner, Samml. Eur. Schmett., 35, 1823.

Primaries brownish-grey to olive-black, with a very variable superficial white irroration. Costa with white dots on a blackish ground running from base of wing to cleft. A black triangle, paler on the costa, reaches just beyond base of cleft. Third feather of secondaries with black scales along inner margin, a large triangular scale-tooth just beyond middle and a small tuft at apex. Expanse, 20-23 mm.

This is the *cosmodactyla* of our previous lists, which Meyrick places as a synonym of *punctidactyla*. Although only previously recorded from Kaslo, it is widely distributed, as I have it from Victoria (Blackmore); Fitzgerald (Carter); Goldstream (Blackmore); Duncan (Day); Wellington (Bryant); Fraser Mills (Marmont); Lillooet (Phair); Mount McLean (Hanham); Fort Fraser (Anderson); Kaslo (Cockle); and Chilcotin (Buckell). The species extends as far east as Manitoba, south to Illinois, Colorado, and South California. It also occurs in Europe and Japan. It feeds on a number of food-plants; Meyrick (Handb. Brit. Lep., 433, 1895) gives *Stachys*, *Aquilegia* and *Geranium* as the European food-plants. Dyar records it from Kaslo as feeding in the red bracts of the high-bush honeysuckle (*Lonicera involucrata*). Mr. Cockle bred specimens from the Indian paint-brush (*Castilleja*) in 1907.

2. PLATYPTILIA PICA Walsingham, Pter. Cal., Ore., 21, 1880.

Primaries white to well beyond base of cleft, followed by a black shade which terminates at the usual transverse white lines on the two lobes. Costa black with white spots and a heavy black triangle before cleft. Terminal area brownish with white scales which sometimes cover the darker colour. Third lobe of secondaries much as in the preceding species. The abdomen offers the only constant distinguishing feature. Its upper surface is marked with a large white triangle on each segment, apex forward, and the last few segments are almost entirely white. Beneath it is broadly white in its distal half. Expanse, 18-24 mm.

This species is rather uncommon, the specific localities being Victoria (Carter); Fitzgerald (Blackmore); Duncan (Day); and Wellington (Bryant). It has not been recorded from the Mainland as yet. The types were taken at Crescent City, North California, and it has been taken at Seattle and Mount Rainier, Wash.

The species varies considerably and in some cases closely approaches *punctidactyla*. The two species, however, can always be separated by the white triangles on the abdomen as noted above.

3. PLATYPTILIA TESSERADACTYLA Linnæus, Faun. Suec., 370, 1761.

Primaries rather evenly greyish, the markings produced by variation in the mixture of white scales, and therefore powdery and indefinite. Costa darker, dotted with white, with the usual dark triangle before cleft, sometimes very vague. Outer transverse white line present, incomplete on second lobe. Secondaries with dark scales at tip of each lobe and a weak tuft of approximately equal dark scales just beyond middle of inner margin of third lobe. Palpi small, scarcely exceeding front. Thorax white behind. Expanse, 16-20 mm.

This is apparently a rare species in the Province. In Dyars "Kootenai List" he records two specimens—Bear Lake Mountain (July 29th) and Kokanee Mountain (August 11th). None have been recorded since until this year. Mr. R. S. Thomson, who was with a surveying party in the mountains some 10 miles from Princeton, captured a single pterophorid which was deter-

mined by Dr. Lindsey as this species. In Mr. M. Ruhmann's material there is a single specimen labelled Vernon, but without date. The species occurs in Eastern Canada and the Atlantic States, extending west to Pennsylvania and Colorado. It also occurs in Europe and West Central Asia.

4. *PLATYPTILIA CARUIDACTYLA* Riley, Rept. Ins. Mo., 180, 1869. Primaries brownish-buff, with the costa dark brown dotted with white as far as the usual brown triangle, which is much the darkest part of the wing. The heavy triangle contains a dark transverse dash before cleft which is visible only in pale specimens; both lobes pale brown crossed by a vague light line toward outer margin. Fringes grey-buff with a row of brown scales in base along outer margin, grey tufts at apices and anal angles, and two dark-brown scale-tufts on inner margin. Secondaries grey-brown, fringes slightly paler, with short dark scales at apices of first two lobes. Fringes of inner margin of third lobe with a prominent triangular tooth of dark-brown scales at middle. This tooth is preceded and followed by a variably complete row of short, dark scales and the lobe is whitish before it. Frontal tuft moderate, blunt, surpassed by third joint of oblique palpi. Expanse, 20-27 mm.

This is one of our commonest species and is widely distributed. I have specimens from a large number of localities; from Vancouver Island to Rossland and from Prince Rupert to Vavenby. It occurs all throughout the United States and has been taken at Labrador. According to Riley, the larvæ are gregarious, living in webbed heads of common thistles.

5. *PLATYPTILIA PERCNOACTYLA* Walsingham, Pter. Cal., Ore., 8, 1880. The general appearance of this species is substantially the same as the preceding, differing chiefly in the greatly reduced scale-tuft on the third lobe of secondaries.

In *carduidactyla* this scale-tooth is distinctly triangular; in *percnodactyla* it is often very weak and made up of scales of approximately equal length. They may be forms of one species, but the early stages of *percnodactyla* are unknown. Careful breeding may clear up the standing of the species. Specimens which have been definitely determined as this species are from Victoria (Carter); Goldstream (Blackmore); Wellington (Bryant); and Mount McLean (Day and Hanham).

6. *PLATYPTILIA EDWARDSII* Fish. Can. Ent., XIII., 72, 1881. Primaries buff, frequently tinged with brown and hoary with whitish scales, the buff appearing only in the pale markings and along the inner margin. The usual dark triangle is blackish-brown. Brown shade continued along costa to base, towards which it becomes faint. Brown spot in cell is usually connected with costa. Inner margin frequently with brown shades. Both lobes with pale outer line, incomplete on second, preceded by a heavy brown shade which blends into buff or greyish towards triangle. Terminal area hoary with whitish scales over brown. Secondaries grey-brown, third lobe having scattered brown scales on inner margin and a variable but always weak tuft of slender, almost equal brown scales within outer third of feather. Thorax somewhat hoary, whitish behind. Palpi moderate, oblique, scarcely exceeding the short, conical frontal tuft. Expanse, 19-29 mm.

This is apparently a high-altitude species in British Columbia and has only been taken in a few localities—Hope Mountains (Day); Mount McLean (Hanham and Day); Kaslo (Cockle); Rossland (Danby); and Mount Cheam (Harvey). The types were taken at Boston and Amherst, Mass., and it also occurs on Mount Rainier, Wash.

Edwardsii can always be separated from the two preceding species by the scale-tooth on the inner margin of the third feather of secondaries being always placed at the outer third, while in *carduidactyla* and *percnodactyla* it is in the middle of the lobe. In addition, the species is considerably darker in appearance and generally larger, although all three species vary considerably in size.

7. *PLATYPTILIA ORTHOCARPI* Walsingham, Pter. Cal., Ore., II., 1880. Primaries ochreous along inner margin, mixed brown and white with a few ochreous scales toward costa. Costa itself narrowly blackish-brown with white dots. Dark triangle before cleft. Terminal area brown, hoary with white scales, preceded by a faint transverse pale line, less complete on second lobe. Spaces between this and triangle ochreous irrorate with white, with an elongate triangular brown dash and costal shade on first lobe and two dashes on second. Cleft margined with a few dark scales. Secondaries brown, third lobe more ochreous. Fringes greyish with white bases along inner margins and at apices of first two lobes; containing a few brown scales in basal half of third lobe. Palpi brownish ochreous, moderate, oblique, touched with white above

and below. Thorax mostly whitish in front and behind, brownish ochreous across tips of patagia. Expanse, 20-26 mm.

A very rare species. There is only one record from British Columbia—a single specimen taken by Mr. G. O. Day in June. The type came from Northern Oregon, where they were reared from a species of *Orthocarpus*. Writing of *orthocarpi*, Barnes and Lindsey state that "Together with *fragilis*, *shaste*, and *albida*, they make up an extremely difficult group which we are inclined to believe in a state of evolution. The named forms can be recognized, but whether to regard them as forms and races of one species or as distinct species is a question which we are unable to decide."

8. *PLATYPTILIA FRAGILIS* Walsingham, Pter. Cal., Ore., 16, 1880. In this species the characters are much the same as in the preceding, except that the general colour is more or less buff or light brown. Expanse, 20-24 mm.

In the Bryant collection several specimens stood under the name of *fragilis*, but upon examination they all proved to be *albiciliata* Wals., with the exception of one specimen, which Dr. Lindsey agrees is *fragilis*. The specimen is a little undersized, barely measuring 18 mm. It lacks antennae and abdomen, but is otherwise in good condition. It was taken by Mr. Bryant at Wellington on July 13th, 1903. The species occurs in Washington, California, Arizona, and Colorado.

9. *PLATYPTILIA ALBICILIATA* Walsingham, Pter. Cal., Ore., 17, 1880. Fore wings even dull brown, dark triangle faintly indicated. Fringes greyish with pale bases which bear a row of dark scales on the outer margin. Secondaries are concolorous, their fringes with pale bases, sometimes conspicuous, and a few scattered brown scales along the inner margin of the third lobe. Expanse, 21 mm. Thorax somewhat lighter behind. Palpi are moderate, oblique, and the frontal tuft very short and blunt.

British Columbia examples differ from the above abbreviated description, in having the dark triangle well marked and the outer pale line discernible on the first lobe in most specimens. There is also some irroration of bluish-white scales on the disk and along the costal edge; in some specimens this irroration is extended to the terminal area of both lobes of the primaries. The species has been taken at Wellington (Bryant); Mount McLean (Day); and at Barker-ville (Buckell). The single specimen taken by Mr. Buckell is a darker brown than the other British Columbia specimens and of a more even colour. The species was described from North California. There is a specimen from Montana in the Barnes collection which is doubtfully referred to this species. The early stages are unknown.

10. *PLATYPTILIA ALBICANS* Fish, Can. Ent., XIII., 71, 1881. Primaries creamy white with white-irrorate brown areas, the colours about equally extensive. Both lobes with a terminal brown band and one just before middle which fades out toward inner margin. Costa brown as far as base of cleft and inward to a transverse dash before cleft. Fringes white with grey tips; brown and white scales in bases along outer margin. Secondaries grey-brown with a faint tuft of slender scales, not visible without lens, near middle of inner margin of third lobe. Expanse 17-24 mm. Frontal tuft lacking. Palpi small and slender, but projecting well beyond front; brownish on sides.

The only records for British Columbia are specimens taken by Mr. G. O. Day. One taken at Hope Mountains in July, 1908, and another one taken on Stokers Mountain, near Cowichan Lake, on July 23rd, 1909. Writing on the species, Barnes and Lindsey remark "that the Stoker Mountain specimen is anomalous. We place it here with little hesitation, though it is so much darker than the typical form that a casual examination discloses little resemblance. It corresponds in essential features with our series, but differs in having the brown areas darker and more extended, the pale areas consequently narrow and somewhat tinged with brown."

The species was described from Nevada and has been taken at Wyoming and Colorado. The early stages are unknown.

11. *PLATYPTILIA PALLIDACTYLA* Haworth, Lep. Brit., 478, 1812. Primaries with nebulous bright-brown and whitish markings. Cleft preceded by two brown dots. Pale areas a blotch in cell, preceded by a brown dot, one near inner margin about one-third from base, and a broader area below base of cleft. Lobes paler brown, crossed by a pale line outwardly and with a pale area on costa above base of cleft, before which costa is narrowly dark brown, dotted with white. All brown areas slightly irrorate with white. Secondaries brown. Fringes of inner margin of third lobe with pale bases and usually with a faint cluster of slender dark scales just beyond

middle. Expanse 21-26 mm. Frontal tuft about as long as head, sharply pointed. Palpi long, slender, porrect, noticeably surpassing tuft.

Our British Columbia specimens agree with the above description, excepting in the faint cluster of slender dark scales on the inner margin of third lobe. In all the specimens I have examined the cluster is absent, but in most of the specimens there are a few scattered dark scales, mostly in the basal half. I have it from Victoria (Carter); Goldstream (Day and Blackmore); Vernon (Ruhmann); and Kaslo (Cockle). I found it not uncommon at Goldstream in June. It apparently ranges over the entire North American Continent north of 37° latitude, and also occurs in Europe.

12. *PLATYPTILIA ALBERTÆ* Barnes and Lindsey, Cont. Lep. No. Amer., Vol. IV., No. 4, 346, Aug., 1921. Primaries white. Costa narrowly brownish-grey to cleft. Cleft preceded by two dark dots; a third similar dot in middle of cell. Lobes with terminal and median greyish shades defining the broad outer white line. Fringes white, basal scales on outer margin white. Secondaries very light brownish-grey, fringes and third lobe paler. Expanse 24-27 mm.

The shape of the primaries is distinctive. Towards the apex the costa is abruptly rounded, the apex is very blunt, and the outer margin of the first lobe almost straight. The first lobe and consequently the entire wing looks very wide and blunt. Frontal tuft as long as head, sharply pointed. Palpi moderate, oblique surpassing front, but not reaching end of tuft.

The species was described from four specimens, as follows: Holotype female, Laggan, Alta., August 16th to 23rd, and one paratype female, Olympic Mountains, Wash., in Coll. Barnes. Allotype male, Mount Cheam, B.C., August, in Coll. Blackmore. Paratype female, Laggan, Alta., August 16th to 23rd, in U.S. National Museum.

The Mount Cheam specimen was taken by the late Captain R. V. Harvey in August, 1903. Among some material sent by Mr. Cockle, of Kaslo, for examination were two specimens of this new species. Both of them are rather worn and one is without abdomen; the latter, presumably taken at Kaslo, is without date. The other specimen was taken at Sandon on August 9th, 1904.

Unfortunately the wings have a tendency to stain easily and in the allotype they are more or less tawny. It is evidently a high-altitude species.

Genus *STENOPTILIA* Huebner.

Stenoptilia Hübner, Verz. bek. Schmett., 430, 1826. Front with a rounded or conical prominence or a scale-tuft. Ocelli present. Palpi various. Primaries bifid, cleft from about two-thirds. Secondaries trifid, third feather without dark scales in fringes of inner margin. Anal angles of both lobes of primaries very retreating. Very closely allied to the preceding genus, but can be separated from the greater part of *Platyptilia* by the lack of dark scales in the fringes of the secondaries and from the remainder by the retreating anal angles.

1. *STENOPTILIA MENGELI* Fernald, Pter. No. Amer., 60, 1898. Primaries ashy-grey and glistening; a few dark fuscous scales on the first lobe form an ill-defined longitudinal stripe on the middle; a fuscous spot at the end of the cleft. Hind wings ashy-grey. Expanse 20 mm. Thorax and palpi dark ashy-grey. A fine white line occurs over each eye.

A single specimen taken by Mr. A. W. Hanham on Mount McLean in August constitutes our only record. It is a rather surprising capture, as very few specimens are known. It was described from ten poor specimens taken by Mr. W. L. Mengel at McCormack's Bay, North Greenland in 1891. Barnes and Lindsey record a single specimen from Colorado which is slightly paler than the types. The latter specimen is in the U.S. National Museum. This is apparently all that are known.

2. *STENOPTILIA EXCLAMATIONIS* Walsingham, Pter. Cal., Ore., 32, 1880.

Stenoptilia coloradensis Fernald, Pter. No. Amer., 61, 1898.

Primaries dark brownish-grey on costa, blending into ochreous or pale grey on inner margin, and irrorate with white in most specimens. The white scales are heaviest on the terminal area of both lobes. Cleft preceded by two blackish dots, usually fused. First lobe with a heavy blackish shade, margined outwardly with white and preceded on costa by a white dash. There is usually a blackish dot near middle of cell. Fringes white in cleft, with greyish clusters before outer margin, elsewhere grey, white below apices of both lobes. Secondaries brownish-grey with concolorous fringes. Expanses, 18-24 mm. (British Columbia examples are more consistent in size, measuring 22 mm.) Palpi moderate, whitish above; third joint small; a white line over each eye.

A rather uncommon species in the Province. I have it from Fitzgerald (Carter) and Fraser Mills (Marmont), and have seen a specimen from Kaslo (Cockle). The species occurs in Manitoba and Ontario. The types of *exclamationis* came from the Siskiyou Mountains, North California, and the types of *colorandensis* were taken in Colorado. Barnes and Lindsey, who have examined the types, consider them conspecific. The early stages are unknown.

Genus ADAINA Tutt.

Adaina Tutt, Ent. Rec., XVII., 37, 1905. Ocelli obsolete. Palpi moderate, ascending, slender. Primaries cleft from two-thirds or before. Secondaries trifold, third feather without black scales in fringes. Very close to *Oidaematophorus*, but differs chiefly in venation of primaries, as a reference to the figures on Plate V. will show. The cleft in primaries is also cut more deeply, thus making the lobes longer in proportion.

1. ADAINA MONTANA Wals. form DECLIVIS Meyrick, Exot. Microlep., I., 112, 1913. Primaries cleft to three-fifths, lobes rather narrow, equal, pointed; white, sometimes mixed with light-brownish suffusion; basal half with a few scattered dark fuscous scales; a moderate oblique fascia of dark fuscous irroration from costa beyond base of cleft to middle of inner margin. Both lobes more or less sprinkled with dark fuscous. Fringes white on inner margins of both lobes, brownish towards apices. Secondaries rather dark grey with fringes paler. Expanse 16 mm. Thorax white, posterior half sometimes light brownish, abdomen white, sometimes with faint brownish dorsal lines. (The British Columbia example has the posterior half of the thorax and the abdomen a light ochreous.)

One specimen in fair condition taken by Mr. W. B. Anderson at Fort Fraser on September 16th, 1921.

The species was described from two specimens taken at Toronto, Ont., in August. It also occurs in Manitoba. It has been reared in Colorado by Dyar and Caudell in the heads of *Helianthus pumilus*.

Genus OIDAEMATOPHORUS Wallengren.

Oidaematophorus Wallengren, Skand. F.jiid., 19, 1859.

Pterophorus Wallengren (not Geoff.), *ibidem*, 20, 1859.

Front rarely with tuft. Ocelli obsolete. Palpi short to long, usually slender, and more or less oblique. Tibia with or without conspicuous scale-tufts. Primaries cleft two-fifths or less. Secondaries trifold, fringes without black scales.

Writing of this genus, Barnes and Lindsey state, in part, that "The species of *Oidaematophorus* are not at all difficult to identify when one has gained some familiarity with them. Usually some one or two characters suffice, but we have found that very nearly all characters of colour and pattern are subject to such variation that the construction of a key is very difficult."

As there are sixty species of this genus in North America, many of which are closely allied, the authors prepared a key combining structural characters together with those of coloration and maculation. A number of species were inserted under two categories so as to make use of the most salient features.

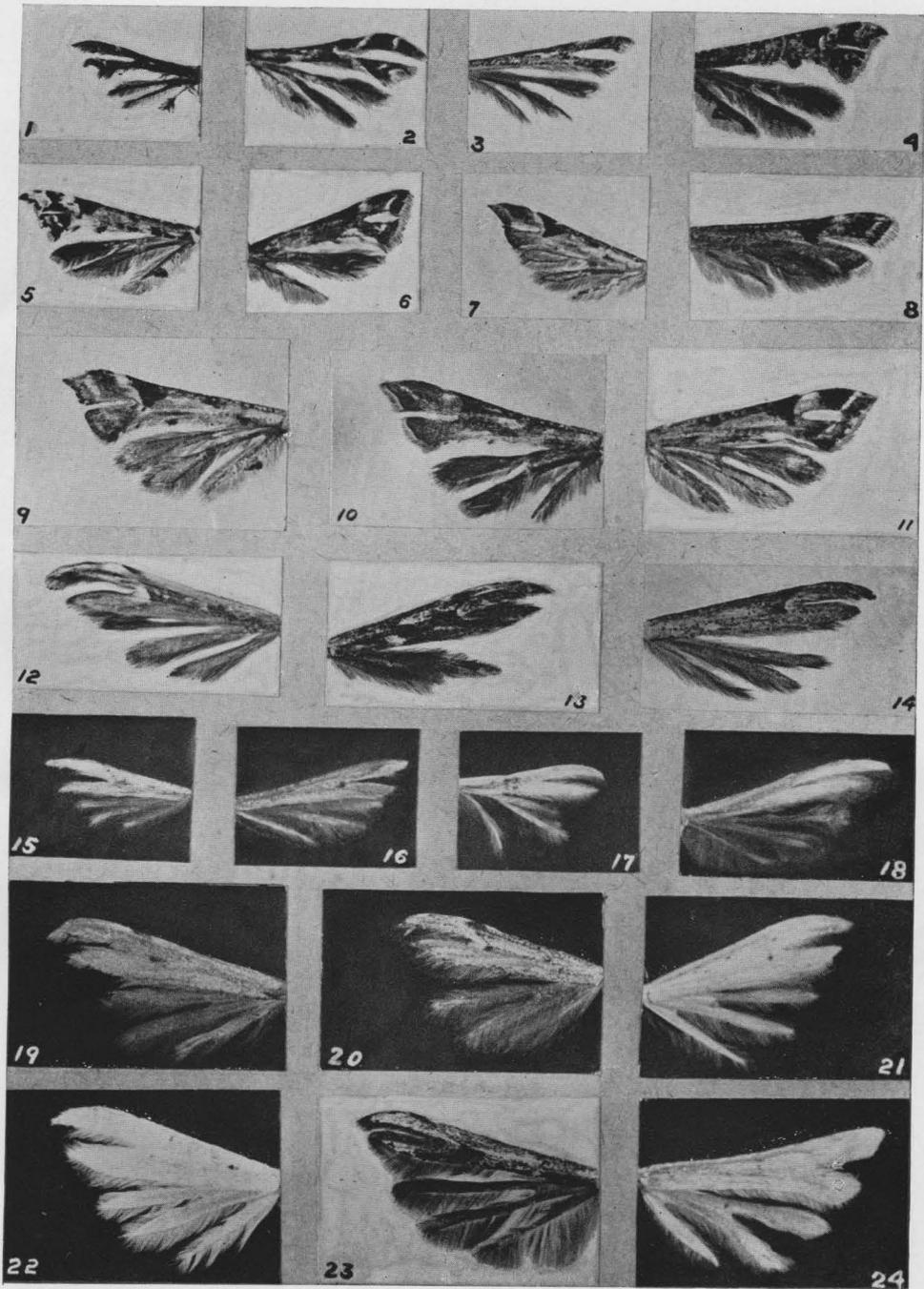
As only eleven of these species occur in the Province, I have constructed a key based (with the exception of *monodactylus* Linn.) on the colour and pattern of the wings alone, which I think will suffice for the identification of most of our British Columbia species of this genus.

Key to the Species.

- | | |
|---|-----------------------|
| 1. Primaries white or whitish | 2 |
| Primaries light ochreous to tawny | 4 |
| 2. Primaries white with scattered dark-brown irroration; a dark-brown costal patch over base of cleft | 2 <i>mathewianus</i> |
| Primaries whitish | 3 |
| 3. With a wide dark-brown diskal streak from base to cleft; oblique costal patch over base of cleft | 5 <i>feldi</i> |
| With wide tawny streak on costal margin of first lobe; fringes on primaries brown, contrastingly darker than wing. No costal patch | 6 <i>phaebus</i> |
| 4. Primaries tawny with heavy brown costal mark over base of cleft; small brown shade before cleft | 1 <i>occidentalis</i> |
| Primaries light ochreous; a blackish-brown rounded spot a short distance before cleft and another fainter one above it, sometimes connected by a faint line | 7 <i>helianthi</i> |

PLATE VI.
PTEROPHORIDÆ.

1. *Pterophorus tenuidactylus* Fitch. Quamichan Lake, B.C.
2. *Pterophorus delawaricus* Zell. Fraser Mills, B.C.
3. *Stenoptilia exclamationis* Wlsm. Fraser Mills, B.C.
4. *Platyptilia punctidactyla* Haw. Kaslo, B.C.
5. *Platyptilia pica* Wlsm. Victoria, B.C.
6. *Platyptilia tesseradactyla* Linn. Vernon, B.C.
7. *Platyptilia fragilis* Wlsm. Wellington, B.C.
8. *Platyptilia albiciliata* Wlsm. Wellington, B.C.
9. *Platyptilia carduidactyla* Riley. Victoria, B.C.
10. *Platyptilia pallidactyla* Haw. Goldstream, B.C.
11. *Platyptilia edwardsii* Fish. Mount McLean, B.C.
12. *Oidamatophorus fieldi* Wright. Atlin, B.C.
13. *Oidamatophorus griseescens* Wlsm. Kaslo, B.C.
14. *Oidamatophorus cineraceus* Fish. Alberni, B.C.
15. *Adaina montana declivis* Meyr. Fort Fraser, B.C.
16. *Stenoptilia mengeli* Fern. Mount McLean, B.C.
17. *Oidamatophorus corvus* B. & L. Goldstream, B.C.
18. *Oidamatophorus stramineus* Wlsm. Kaslo, B.C.
19. *Oidamatophorus occidentalis* Wlsm. Vavenby, B.C.
20. *Oidamatophorus mathewianus* Zell. Kaslo, B.C.
21. *Oidamatophorus helianthi* Wlsm. Kaslo, B.C.
22. *Oidamatophorus homodactylus* Wik. Mount McLean, B.C.
23. *Oidamatophorus monodactylus* Linn. Victoria, B.C.
24. *Platyptilia albertæ* B. & L. Kaslo, B.C.



5. Species smaller. Primaries pale yellow or yellow-tinged 6
 Not such species 7
6. Primaries definitely yellowish; generally with a heavy tawny shade from base to first lobe. Expanse, 15-21 mm.9 *stramineus*
 Primaries pale greyish-yellow; a greyish-brown shade generally present in first lobe. Secondaries conspicuously darker. Expanse 17-20 mm.10 *corvus*
7. Entirely snowy white8 *homodactylus*
 Primaries grey, powdered with blackish-brown and white scales; inner margin conspicuously brownish3 *griseescens*
 Primaries ash-brown to ash-grey, generally heavily irrorated with blackish scales. Base of cleft white preceded by a blackish triangular mark connecting with a dark costal dash4 *cineraceus*
 Primaries variable; from tawny to red-brown and grey; anal angle of second lobe with extremely long fringes. Hind tarsi with a conspicuous dorsal crest on upper surface 11 *monodactylus*

1. *OIDEMATOPHORUS OCCIDENTALIS* Walsingham, Pter. Cal., Ore., 37, 1880. Primaries creamy white to deep ochreous, normally with a heavy brown costal mark over base of cleft, preceded and followed by a few whitish scales. This patch is connected with a small brown triangular shade before cleft. The wing is marked with cloudy brown areas and the first lobe is light brown. Fringes even tawny-grey. Secondaries brownish, shining with paler fringes. Expanse 26-29 mm. Head with a pale patch between antennae, otherwise the darkest part. Thorax concolorous with primaries, paler behind. Palpi rather small, oblique; second joint thickened, white-tipped. Front tibiae with a heavy double tuft of brown scales in terminal half, mid-tibiae with heavy median and terminal tufts of the same colour. Inner spur of median pair on hind tibiae almost twice as long as outer. A very variable species.

The records in British Columbia are from Kaslo (Cockle); Rossland (Danby); Vavenby (Moilliet); and a rather worn specimen from Fort Steele (W. B. Anderson). The type series was taken in California and it occurs in Arizona and Utah.

2. *OIDEMATOPHORUS MATHEWIANUS* Zeller. Verh. Zoot.-bot. Ges. Wien., 445, 1874. Primaries white with variably extensive tawny brown shades, usually confined to inner half, but sometimes encroaching on first lobe. Costa with scattered dark-brown scales forming a long spot over base of cleft and two white dots beyond. Cleft preceded by a white area, and this by a dark-brown dash continued obliquely to costal spot by a light-brown shade. Sometimes a dark dot near middle of cell and some scattered patches of dark-brown irroration. Inner margin of first lobe with a brown dot before apex, followed by a white pencil in the fringe. Fringes light brownish-grey with some white hairs. Secondaries brownish-grey. Expanse 21-27 mm. Head, thorax, and abdomen white. Palpi short, oblique, brown-speckled. Front tibiae with a large brown scale tuft; mid-tibiae with two heavy brown tufts; hind legs white.

Described from Vancouver Island. I have not seen any specimens from the Island, although extensive collecting has been done on the southern portion of the Island, neither are there any specimens in the Bryant collection from Wellington. A short series was taken in August by Messrs. Day and Hanham on Mount McLean, and three specimens sent to me by Mr. Cockle, of Kaslo, as *Petrophorus brucei* Fern. turn out to be this species. Mr. Day records a specimen of this species taken by his son at Dawson, Yukon Territory, in 1910. It occurs in Southern California, and Barnes and Lindsey refer to this species specimens taken in Colorado and Maine which differ from typical specimens, but agree in all essential features.

3. *OIDEMATOPHORUS GRISESCENS* Walsingham, Pter. Cal., Ore., 34, 1880. Primaries narrow, heavily sprinkled with white, and with some scattered blackish scales. Ground colour of inner half, brown; of costal half, apparently grey-brown, the scales tipped with white; but this area of the wing is greyish-white because of the predominating white scales. Costa with a grey-brown dash over base of cleft and two spots beyond. Cleft preceded by a white patch, and this by a small blackish spot curving forward to costal dash in a slender line. First lobe with a black dot before apex, followed by a white pencil in the fringes. Fringes brownish-grey with a mixture of white hairs. Secondaries grey-brown with concolorous fringes. Expanse 23-30 mm. Head and thorax clothed with grey-tipped white scales. Palpi short, oblique, each joint white-tipped. Abdomen whitish with brown-tipped scale tufts on posterior margins of segments.

One specimen taken by Mr. Cockle at Kaslo on August 1st, 1907. This is a very distinct species and cannot be confused with any other British Columbia species. Type series were reared from *Artemisia* sp. at Rogue River, Southern Oregon. It also occurs in California, Colorado, and Arizona. Barnes and Lindsey also record a specimen from "British Columbia (June)," but no specific locality is given.

4. *OIDEMATOPHORUS CINERACEUS* Fish., Can., Ent., XIII., 73, 1881. Primaries brownish-white to greyish, often darker toward costa. There is a variable irroration of blackish scales which tends to collect between the veins and in the basal half of the wing. Whitish at base of cleft, preceded by a brown dash which curves outward to brown costal dash above base of cleft. Fringes brownish-grey with a few white hairs. Secondaries grey-brown with fringes, concolorous. Expanse 27-29 mm. Palpi short, oblique. Abdomen brownish-white, with central dark dots in distal half.

Not uncommon and widely distributed. Recorded from Duncan (Day); Wellington (Bryant); Alberni (Redford); Mount McLean (Day); Kaslo (Cockle); and Vavenby (Moilliet). We have not seen the species from either Victoria or Goldstream.

Our British Columbia specimens are very even in their colouring, all that I have seen being of the typical brownish-white form. The irroration of the blackish scales is, however, very variable. The species occurs in Washington, California, Colorado, Utah, Pennsylvania, and Manitoba. The life-history is unknown.

5. *OIDEMATOPHORUS FIELDI* Wright, Ent. News. XXXII., 6, 1921. Primaries: Ground colour white; the costal edge, discal area from base to cleft, and inner margin broadly brown-streaked. A dark-brown costal streak just above the base of the cleft, connected broadly with the outer end of the discal streak, preceded and followed by white; another brown costal streak at the base of the first lobe, then narrowly white to apex. A white spot preceding base of cleft, connected obliquely by a fine white line to the outer costal white spot. Second lobe brown at tip, faint brown line down the centre, and a small square white spot one-third from base. Fringe smoky, darker within the cleft. Secondaries dull smoky brown, fringes darker. Expanse 21-26 mm. Palpi mottled light brown and white. Thorax dorsally brown; anterior part, buff. Abdomen light brownish-buff on anterior part, becoming almost seal-brown mottled with lighter on the anal segments.

Two specimens from Atlin. One is from the Bryant collection without date and the other was taken by E. M. Anderson on July 19th, 1914. They are both rather faded and a little worn. Dr. Lindsey made a slide of the genitalia of the latter to ensure the identification. Barnes and Lindsey also record a specimen from Wellington (Taylor) which is paler than typical. The type series was taken at San Diego, Cal., so that the species has an extensive range; it is also recorded from Arizona.

6. *OIDEMATOPHORUS PHOEBUS* Barnes and Lindsey, Cont. Lep. No. Amer., Vol. IV., No. 4, page 406, 1921. Primaries whitish to light tawny brown, the palest area in the second lobe and along inner margin of first. Costa whitish towards base, sprinkled with blackish scales, paler towards apex. Cleft preceded at a short distance by a faint dark dot. Entire wing usually with some scattered black scales, tending to form streaks in the lobes and near the inner margin. Fringes pale on costa, elsewhere brownish-grey to brownish-black, contrastingly darker than wing. Secondaries brownish-grey with slightly darker fringes. Expanse 21-23 mm. Head brown with a whitish band between antennæ. Thorax whitish in front, becoming tawny behind. Palpi small, oblique, whitish, with traces of brown on third joint.

Described from four specimens from various localities in California. With these the authors have associated a specimen from New Westminster, which, however, is much paler than the type series. Neither the date of capture nor collector's name is given. Among the material sent from Kaslo was a specimen which was different to anything else that I had seen; it was submitted to Dr. Lindsey, who pronounced it this species. It was taken by Mr. Cockle on June 22nd, 1910.

7. *OIDEMATOPHORUS HELLANTHI* Walsingham, Pter. Cal., Ore., 54, 1880. Primaries brownish—white to tawny with some scattered dark-brown scales. A short distance before the cleft and slightly toward inner margin there is a rounded dark-brown spot, well defined, which may be extended as much as half-way to the costa by an oblique line of dark scales, and occasionally the anterior extremity of this mark alone is evident as a spot much more vague than the first (this is the case in the British Columbia example before me) apex and inner margin of first

lobe with a row of dark dots. Fringes concolorous, those in cleft with dark areas just before apices of both lobes. Secondaries grey-brown, bases paler; fringes slightly more tawny. Expanse 21-29 mm.

The only record of this species in British Columbia are some specimens taken at South Fork, Kaslo Creek, by Mr. Cockle on August 10th, 1903. Other specimens sent by Mr. Cockle from Kaslo as this species are worn specimens of *occidentalis*. The type series was taken in the Siskiyou Mountains, South Oregon, and were bred from larvæ feeding on a species of *Helianthus*. The species has also been taken in Colorado.

8. *OIDEMATOPHORUS HOMODACTYLUS* Walker, List. Lep. Ins. Brit. Mus., XXX., 941, 1864. Primaries snowy white, in some specimens with a slight irroration of brownish-grey in costal half. Cleft sometimes preceded at a short distance by a small brownish dot. Secondaries tinged with greyish. Head, thorax, and abdomen snowy white. The mid-tibiæ have a fringe of scales down the inside, but no tufts.

It is evidently a mountainous species in this Province, as our records are from Hope Mountains, July (Day and Harvey); Mount McLean, August (Day and Hanham); and Vavenby, August (Moilliet). The Mount McLean specimens were taken at an elevation of 5,000 feet. The species occurs throughout Canada from British Columbia to Quebec, south into New Jersey and Illinois. It has also been taken in California.

9. *OIDEMATOPHORUS STRAMINEUS* Walsingham, Pter. Cal., Ore., 41, 1880.

Lioptilus augustus Walsingham, Pter. Cal., Ore., 43, 1880.

Primaries usually yellow or yellowish, occasionally somewhat ochreous. There is at least a trace of a brown spot contiguous to the base of the cleft; in some specimens this spot is well marked. In most specimens a heavy brown shade runs from the base next to the inner margin into the first lobe. Fringes more greyish. Secondaries greyish with fringes concolorous. Expanse 15-21 mm. Thorax yellow. Abdomen yellow with brown dorsal stripes. Palpi slender, moderate, oblique; tips of second and third joints touched with fuscous outside.

This is the species that is listed as *stramineus* in our local lists. *Stramineus* was described from specimens taken in the Siskiyou Mountains, South Oregon, in June, and *augustus* from a series taken on Mount Shasta, California, in August. The types are in the British Museum. Mr. Edw. Meyrick has compared specimens with the types for Messrs. Barnes and Lindsey, and the latter have also compared specimens with Fernald's paratypes and are unable to find any specific differences between them. The species is very variable in appearance, due to the inconstancy of the brown shade on the primaries. Mr. Day has taken a specimen at Quamichan Lake, near Duncan, the only record we have for Vancouver Island. The same collector also took the species in the Hope Mountains in 1908. Mr. Cockle has it from Kaslo and Dr. Dyar took a long series at Ainsworth in June and July, 1903. In his note on the species Dyar states that "The moths were easily started up from low grass and weeds, but especially from the plant *Anaphalis margaritacea*, which I suppose is their food-plant. Larvæ were found commonly in the flower-heads of this plant, but unfortunately were not bred."

10. *OIDEMATOPHORUS CORVUS* Barnes and Lindsey, Cont. Lep. No. Amer., Vol. IV., No. 4, page 437, 1921. Primaries clear pale yellow in the lightest specimens, with some brown scales near base, sometimes a small brown dot a short distance before base of cleft, and sometimes a brown sub-costal shade which meets the costa in the first lobe. In the type series these wings have a pale-yellowish or greyish-yellow costal band from base to a point opposite base of cleft, in which the extreme costal margin bears some brown scales. Behind this the entire wing is clothed with brownish-grey mixed with very pale-yellowish scales, becoming more whitish toward inner margin. The spot before the cleft is faintly marked and is continued slightly toward costa to form a transverse shade. Costal fringes on first lobe yellowish, others dark greyish. Secondaries brownish-grey fringes concolorous. In pale specimens the secondaries appear dark in contrast to the yellow primaries. Expanse 17-20 mm. Palpi moderate, slender, oblique, yellowish-white with a brown outer line. Thorax pale yellow. Abdomen pale yellow to pale greyish-yellow with a fine light-brown dorsal line.

This new species was described from twenty specimens taken at Tuolumne Meadows and Deer Park Springs, Lake Tahoe, California. It has also been taken in Washington and Colorado.

It is apparently widely distributed in British Columbia, specific localities being Goldstream (Blackmore); Wellington (Bryant); Fraser Mills (Marmont); Kaslo (Cockle); and Cranbrook (Garrett).

The British Columbia specimens are very variable, both in size and in coloration. The Wellington examples are the largest, being 21-22 mm. in expanse, with the dark shades contrasting with the paler areas, which are a deep cream. A series from Goldstream average 18 mm. in expanse and are very pale, the ground colour being a sordid white, with the brown spot before cleft distinctly marked. Those from Fraser Mills are similar, but not quite so pale. Some Kaslo specimens are as pale as my Goldstream series, but a trifle smaller, although one specimen is larger than any, measuring 23 mm., and in addition is very much darker, the ground colour being dark brown. Dr. Lindsey has seen this specimen and pronounced it *corvus*, believing that the brown colour is due to age or some other cause. It was taken on June 20th, 1904.

The life-history and food-plant are unknown, although the series which I took at Goldstream in August, 1920, were all beaten from the common yarrow (*Achillia millefolium*), which may be its food-plant. I did not observe it on any other plant.

11. *OIDÆMATOPHORUS MONODACTYLUS* Linnæus, Syst. Nat. (Ed. 10), page 542, 1758. The colour of the primaries is very variable, ranging through shades of grey, yellow, and brown to various mixtures of these colours. The fore wings are very narrow, but have unusually long fringes at the anal angle of the second lobe. There is a black spot before base of cleft, sometimes extended to it, a dot in cell, some at tips of veins in both lobes, and some black scales streaking the wing near inner margin. Secondaries and fringes of both wings brownish-grey. Expanse 21-28 mm. Thorax similar to primaries. Abdomen brownish or greyish with some dark dashes, and a narrow dorsal stripe concolorous with thorax, which widens anteriorly and is usually margined with white toward its junction with the thorax. There is usually a crest of scales present on the upper surface of the hind tarsi.

This is our commonest species on Vancouver Island and it has been taken in every month of the year. The most common coloration is tawny, with a sprinkling of grey forms and a few red-brown ones. I have not seen any specimens from the Mainland, which is rather surprising, as it occurs right across the continent from the Atlantic to the Pacific and from Mexico to Canada. It also occurs in Europe, Asia, and North Africa. It feeds on a large number of different food-plants.

The following eight species recorded in the 1906 B.C. Check-list are omitted from this paper for the reasons given:—

Trichoptilus lobidactylus Fitch. Recorded from Wellington. I have examined the specimens labelled as this species in the Bryant collection and from which the records were taken for the above list, and find that they are all *Pterophorus delawarensis* Zeller without a doubt.

Oxyptilus (Pterophorus) periscelidactylus Fitch. Recorded from Wellington. The specimens labelled as such in the Bryant collection are *Platyptilia punctidactyla* Haw.

Platyptilia shastæ Wals. Recorded from Wellington. This was rather an extraordinary determination, as specimens bearing this label were undoubtedly *Oidæmatophorus cineraceus* Fish. A totally different insect and bearing no resemblance, either generically or specifically.

Platyptilia grandis Wals. and *Platyptilia modesta* Wals. Both recorded from Wellington. Specimens bearing these labels were nothing more or less than specimens of the common *carduidactyla*, which had apparently been separated according to their size; the latter species being very variable in this respect, as I have specimens ranging from 18 to 28 mm. in expanse.

Pterophorus (Oidæmatophorus) brucci Fern. Recorded from Shawnigan Lake by Dr. Dyar in his "Kootenai List." In his annotation he states: "Two specimens . . . in poor condition, but seeming to agree with specimens from Colorado, so named for me by Dr. C. H. Fernald."

I am rather inclined to doubt the correctness of Dr. Dyar's determination of this species on the following grounds: (1) That *brucci* Fern. and *mathewianus* Zell. have a somewhat superficial resemblance; (2) that Dr. Dyar's specimens were in poor condition and he himself was not positive that they were conspecific with his Colorado specimens of *brucci*; (3) that apparently Dr. Dyar did not have at that time specimens of *mathewianus* for comparison; (4) that specimens sent to me by Mr. Cockle, of Kaslo, as *brucci* have been determined by Dr. Lindsey as *mathewianus*; and (5) that of 250 specimens of this family recently examined from many diverse localities in the Province, not a single specimen turned up which has been even doubtfully referred to *brucci*. Taking all these facts into consideration, it is more reasonable to suppose that Dr. Dyar's specimens were in reality *mathewianus*, which was originally described

from Vancouver Island. Until undoubted specimens of *brucei* are taken in British Columbia I think it is better to eliminate this species from our B.C. Check-list.

Pterophorus (Oidematophorus) paleaceus Zell. Recorded from Wellington. Specimens under this name in the Bryant collection did not seem to agree with the description of that species and were submitted to Dr. Lindsey, who pronounced them to be "rather large specimens of *corvus* B. & L., not quite typical, but certainly not *paleaceus* Zell."

Pterophorus (Oidematophorus) eupatorii Fern. This record in our list was copied from Dyar's Catalogue (Bull. 52, U.S.N.M.), wherein he gives Vancouver Island, together with New York and California, as localities for this species. Barnes and Lindsey in their "Revision" give a detailed discussion of *eupatorii* Fern., *guttatus* Wals., and *mathewianus* Zell., three very closely allied species and which have given rise to a great deal of confusion in the past. The conclusions arrived at show that *eupatorii* is distinctly Eastern and does not occur on the Pacific slope.

In concluding this paper on the British Columbia Pterophoridae, I would like to point out two important pieces of biological work that remain for our local entomologists to undertake, and that is the working-out of the life-histories of (1) *Platyptilia pallidactyla* Haw. and *pica* Wals., and (2) *P. carduidactyla* Riley and *pernodactyla* Wals. Careful breeding from the ova of known females, full notes on the different larval instars, together with careful comparison of the resulting imagines, will do much to prove the specific identity or otherwise of the species indicated.

The following family, with its one North American species, is included here as it is so very closely allied to the Pterophoridae.

FAMILY ALUCITIDAE LINN.

Genus ALUCITA Linn.

Alucita Linnæus, Syst. Nat. (Ed. X.), 1, 542, 1758.

Orneodes Latreille, Precis. Car. Ins. 148, 1796.

Characters: Ocelli present. Proboscis well developed. Labial palpi strong. Both primaries and secondaries deeply cleft into six lobes each. The under-surface of the secondaries lacks the black scales which occur in the Pterophoridae, and the legs are of normal length.

1. ALUCITA MONTANA Cockerell, Ent. Mo. Mag., XXV., 213, 1889.

Orneodes hexadactyla Fernald (not Linn.), List. Lep. No. Amer., 88, 1891.

Primaries greyish-tawny, crossed by a wide dark-brown median band margined narrowly with white, which forks on the first two lobes; a subterminal band, narrower on the first two lobes, is also margined with white. Secondaries checkered with dark brown, tawny, and white.

This species is the *Orneodes hexadactyla* of our local lists, a European species with which our North American species has generally been considered conspecific, but according to Barnes and Lindsey *hexadactyla* is much lighter and more ochreous in general appearance and entirely lacks pure white scales.

Montana has a wide distribution in North America, occurring from Vancouver Island to Ontario and from New York to California.

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