

such products. Each consignment is examined when exported, but those early examinations of our nurseries do give us a lead on some of the problems that we might expect.

9. *Seed potato certification.* The only officially recognized seed potatoes in

Canada are those duly certified from crops examined by inspectors of the Division of Plant Protection. In British Columbia, which ranks third in production by provinces, the work is carried out under the direction of H. S. MacLeod.

## THE 1951 STATUS OF OUR KNOWLEDGE OF THE INSECTS OF BRITISH COLUMBIA

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When putting in a plea several years ago for further collecting to be done in all Orders in this Province, I outlined before this Society, an approximate estimate of the numbers of species recorded up to that time. It seems in order now to take stock again and to record as far as one can, what half a century's collecting has produced in this Province which contains a larger and more varied insect fauna than any other part of Canada.

There are three ways in which fairly correct estimates can be made of the known British Columbian insects:—(1) by searching all published records, (2) by working over the material in the Canadian National collection, where material collected by officers in British Columbia of the Division of Entomology has been sent for many years and (3) by arranging, identifying and listing, collections now existing in this Province.

In the list of references, I have assembled all records of collections, but until an Entomologist is sent from this Province to spend many months going over the National collection and noting all British Columbia records, it will be many years before the lists can be compiled from that source. In the case of even one genus or even one family, one of the systematists at Ottawa might have time to write out the records, but to get these records in all Orders, would be a great task.

The best that I can do at this time, is to go down the list of Orders and

to indicate what effort has been put on each one.

**THYSANURA.** Bristle-tails. Our indigenous fauna has distinctly separated, coastal and dry belt species which do not overlap. In all, I had some seven species which were sent to Dr. Silvestri at Portici, Italy, before the second world war. Correspondence before, during and after the war, failed to get identifications and now that that great man is dead, collections of Thysanura will have to be made all over again and submitted to some other authority.

**APTERA.** The order is represented by at least one species of native Campodeidae, not uncommon in forest duff and leaf mould in the vicinity of Vancouver and by possibly two species of Japygidae, a dry land form recorded by Saunders from Victoria in 1946 (*Evalljapyx sonorannus* Silv. 1911, previously recorded from Tucson, Ariz.), and another which occurs in rich garden soils around Queen Charlotte City. Mr. R. Guppy recently sent me one specimen from Wellington, Vancouver Island.

The **COLLEMBOLA** are practically untouched and sadly need attention. The only records are of those collected by J. D. Gregson from the Kamloops region and some of my own collecting at the Coast, whose list and identifications of 16 species were published in our Proceedings 44, 1948.

The **ORTHOPTERA** sens. lat. has been well studied and recorded by Ronald Buckell. There are probably between 110 and 120 species in the Province of which extensive series are placed in the National collection, the Provincial Museum at Victoria and in the Dominion Laboratory in Kamloops. About 80 species are in the University collections. An insect that needs further attention is the readily accessible *Grylloblatta* at Kamloops, discovered by Gregson in 1938 and kept in captivity and partly written up by M. G. Campbell. I feel certain that diligent search in the Interior, of talus slopes similar to those at Kamloops where this insect occurs, will reveal a wide distribution of *C. campodeiformis* in the Province

The **DERMAPTERA** or earwings have been recorded by R. Buckell in his paper "The Dermaptera of Canada," 1929. Of the five species that he has recorded in this Province, only one, *Labia minor* may be indigenous: the rest are immigrants.

The **PLECOPTERA** or Stoneflies of the Cultus Lake region and southwestern British Columbia have been well written up by Ricker, but collections of these insects from further north, especially from cold mountain streams and higher latitudes, are badly needed. With Ricker and Ferris Neave, specialists in this Order, being both stationed at the Biological Station at Departure Bay, identifications can be readily obtained. All material should be preserved in 70% ethyl alcohol, not pinned.

Of the **ISOPTERA** or Termites, only three species have been found in British Columbia, two at the Coast and one in the Interior: on Vancouver Island, all three species occur. They have been written up by Beall and by Spencer in our Proceedings, but the best work on them was done by the late Kenneth Jacob as a huge Master's thesis at the University. Steps are being taken to have at least a portion of this work published.

Of the **CORRODENTIA** less than 20 species have been taken and are now in the University collections. They were named by Miss (Dr.) K. M. Sommerman of the United States National Museum.

The **MALLOPHAGA** or bird lice are represented by a very large collection, part at the Ontario Agricultural College and part at the University. I have published two short lists of species. Steps are being taken to get all the collections named: it will make a pretentious list.

The **ANOPLURA** or sucking lice are represented by about 25 named and several unidentified species at the University. I search almost all the mammals and birds that are taken for the University, but the collections grow slowly; not many species occur that have not already been taken, in both of these Orders of lice.

Of the **ODONATA** of British Columbia, the first list was published by R. C. Osburn in 1905; since then the Order has been well covered by E. M. Walker, F. C. Whitehouse and R. Buckell. Some 78 species have been recorded for the Province. Dr. Walker's material is at the Royal Ontario Museum in Toronto; Mr. Whitehouse divided his collection between the Provincial, Vancouver City and University Museums and the Buckell collection in vials of 95% alcohol, is at the University.

The **THYSANOPTERA** or thrips, were collected only by the late R. C. Treherne, who published two papers on the Aeolothripidae, but did not put out a list of British Columbia species. His collections are in the National collection, Ottawa. As far as I am aware, there are no collections of this Order in the Province beyond about a dozen species at the University.

**HEMIPTERA-HOMOPTERA.** Of the Hemiptera, H. M. Parshley published a short list in our Proceedings in 1921, but most of the collecting of both sub-orders has been done by W. Downes, whose collection of over 13,000 specimens covering about 800 species, is at his home in Victoria. He has published extensive lists in our Proceedings. Venables has published a list of British Columbia Coccidae. That much more work needs to be done, at least on the Homoptera, is shown by a list of over 100 species taken in the last four years from Quessnel and Soda Creek during a search for vectors of Witches' Broom on potatoes. Dr. B. P. Beirne who named the collection, tells me that four-fifths of the species are not represented in the National collection: this material is all at Ottawa and in the Dominion Laboratory at Kamloops. The Aphids of the Province have been written up by Mr. R. Glendenning and by Alice Macdougall, whose doctorate thesis on the Aphids of British Columbia is at the University of Toronto. In this work she states that about 170 species are recorded from British Columbia. Efforts are being made to have her thesis brought up to date and published. Her collections on over 1100 slides and a large amount of material in alcohol, was donated to the University by her husband, Mr. Patterson, when Alice died.

Of the **NEUROPTERA** sens. lat. I reported 54 species and 10 varieties in our Proceedings of 1942. Our two biggest families are the Chrysopidae and Hemerobiidae. A number of additional species have been collected, but not yet named. The material is all at the University.

Of the **MECOPTERA**, only two species have been named both from the Kootenays, by the late J. W. Cockle. Our Provincial forms are entirely wingless. The minute "Snow Flea" *Boreus*, occurs sparsely on the north shore mountains near Vancouver.

**TRICHOPTERA** or Caddis flies. Dr. H. H. Ross of Illinois has recorded 142 species from all sources, for this Province. Much of the material upon which his list is named, is at the University and he tells me that at least another 100 species should occur in our borders. Material should be collected in 70% alcohol, not pinned.

Of the **LEPIDOPTERA**, about 1,338 species represented by 9,953 specimens of Macros and Micros, are at the University, purchased from the estate of the late E. H. Blackmore, but many species recorded in Blackmore's check list of 1927, are missing from the collection. A few additional species have been added as they came to hand. The National collection at Ottawa has a large representation from British Columbia collected by Dr. J. McDunnough and the United States National Museum has 2,000 specimens from the Blackmore collection which Mrs. Blackmore gave or sold to Gates Clarke and he later gave them to the Museum when he joined that institution. The Provincial Museum at Victoria has a good display of

Lepidoptera, named to species. Another large collection is that made by Dr. W. R. Buckell, in the Salmon Arm district. This perfectly mounted collection of 773 species (541 Macros and 232 Micros) is in Ronald Buckell's home in Salmon Arm. Mr. J. R. J. Llewellyn Jones of Cobble Hill has recently placed his fine collection of Macro-lepidoptera of 471 species from Vancouver Island, at the University on permanent loan. The most up-to-date check list of the Macro-lepidoptera of British Columbia is that published by Mr. Jones in 1951 in which he records about 1,200 species, with the check list numbers and synonyms brought up to date. A collection of several hundred species of Macros was made some years ago by Mr. W. Downes. Of these, the Geometridae were turned over by him to Mr. Llewellyn Jones. The remainder, consisting of about 400 species from both the Interior and Vancouver Island, is at his home in Victoria.

The **COLEOPTERA**. Until recently the best collection extant of British Columbia species was that of Gordon Stace-Smith of Creston, who has between 2,100 and 2,200 species from this Province. The huge Ralph Hopping collection at Vernon was willed to the California Academy of Sciences and since that institution received also the Hugh Leech collection of water beetles, it now has probably the best representation of British Columbia species. This University has about 2,000 species arranged in 36 Cornell drawers by George Hopping, about three-quarters of them being from this Province. Professor M. Hatch of the University of Washington in Seattle has over 400,000 specimens in his collection, mainly from the Pacific Northwest including material from British Columbia. Since Dr. Hatch has exchanged records with Stace-Smith and has examined all our University material (which includes specimens from Mrs. Hipplesley Clarke), his forthcoming book on "The Beetles of the Pacific Northwest" should list fairly well, most of those that have been taken in this Province. Published lists of Coleoptera from British Columbia include those of Reverend J. H. Keen, G. A. Hardy R. H. Harvey, Mrs. Hipplesley and Mrs. Clarke (formerly Hipplesley). Kenneth Auden's B.A. thesis (unpublished) in the Department of Zoology, consists of a list of about 400 species from the Midday Valley near Merritt, B.C.

The **STREPSIPTERA** remain untouched. Hugh Leech found stylozoid bees freely in the arboretum on our campus, but no one has worked on the Order.

The two large Orders, Hymenoptera and Diptera, both strongly represented in the Province, are virtually untouched except for lists of a few families.

**HYMENOPTERA**. The earliest numbers of our Proceedings contained short lists, but the names are out of date. The University collections have probably the largest number of specimens in the Province, partly separated into Families, most of it unnamed to

Species. Outstanding are Buckell's distributional lists of the Ants, Megachilidae, Andrenidae and Bombidae. Buckell and Spencer have listed all the Vespidae that probably occur in British Columbia and Spencer and Wellington the Sphecidae. Many Sawflies and Horntails have been collected and named, but no lists have been published. Foxlee and Guppy have listed some of the Ichneumonidae. Buckell's collections are at Kamloops.

The **DIPTERA** are in much the same condition. After the work and early listings by the founders of our Society, followed by Osburn on Syrphidae, Sherman on Chironomidae, Garrett on several families, Hearle on mosquitoes and Spencer on Tipulidae and Dolichopodidae, little has been published. I have fairly extensive collections of Tabanidae, Syrphidae, Asilidae, Bombyliidae and Tachinidae at the University, but only some 40 species of the Tabanidae have been named; many other families have been collected, but are less well represented.

The **SIPHONAPTERA** have been splendidly dealt with in Holland's "Siphonaptera of Canada" in which he lists 89 species for British Columbia. His several papers and two by J. Wagner deal fully with the Order. Brief earlier listings were made by Harvey and Spencer. Holland's book makes the fleas the best worked-up Order in British Columbia, if not in Canada. His huge series is at the National collection and he presented our University with an almost complete set of duplicates in balsam on slides. My collection of about 65 species named by the late Dr. J. Wagner of Belgrade, is also at the University.

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## AN ANNOTATED LIST OF TRICHOPTERA COLLECTED ON SOUTHERN VANCOUVER ISLAND

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Although Trichoptera have been the object of considerable study, those of North America are not very well known. Faunistic data, in particular, are often lacking and many described species are unknown except for the type series.

In the hope of contributing a little to the knowledge of these insects we offer the following list of species collected on Southern Vancouver Island, B.C. These specimens were taken, over a period of three years, by the junior author. Where no other indication is given, the specimens were usually taken around the house and grounds, at lights, or by beating foliage. Many, however, were captured near streams or other bodies of water, which were evidently their natural habitat. As some of these places have no names we have adopted the following system of numbering.

(3) Small moderately rapid stream, permanent water, very shaded by bushes, at sea level.

(4) Nearly the same as (3), but often dry in late summer.

(6) Small rapid stream, with still pool, very clear, gravelly bottom, permanent water.

(7) More rapid than (6). Most collecting on this stream was carried out along a stretch running over a shelf of solid rock, with many small "pot holes" created by erosion.

(10) Small shallow muddy pools at about 900 feet elevation, thickly grown with sedges, always dry in summer.

(11) Very small stream falling over steep rock cliff. Water seems to be permanent, though very low in summer.

For other streams along which some collecting was done, we have used the names found on maps of the district.

### RHYACOPHILIDAE

*Rhyacophila angelita* Bks. Fairly common in July. Wellington (4), Nanaimo, Chase R., Englishman R. Falls, Aug. 26, 1950.

*R. grandis* Bks. Very common, June to Oct. Wellington (3, 4, 7), Nanaimo, Chase R. and Millstone R.

*R. norcuta* Ross. Common. Forbidden Plateau, Aug., Englishman R. Falls, Aug. 26, 1950. Wellington (7), June and Oct.

*R. oreta* Ross. Common. Wellington (7), Mt. Benson, Sept. 19, 1950, Englishman R. Falls, Aug. 26, 1950.

*R. vacua* Milne. Very common, July to Oct. Wellington (6, 7), Englishman R. Falls, Nanaimo, Chase R., Nanoose Creek, Nanoose Bay, Mt. Benson.

*R. vaefes* Milne. Wellington (7), June 15, 1950, 2♂♂.

*R. verrula* Milne. Common. Wellington (6, 7, 11), June and Oct., Englishman R. Falls, Aug. 26, 1950.

*R. vuzana* Milne. Fairly common, July and Aug. Wellington (4, 11), Nanaimo, Chase R., Englishman R. Falls.

*Glossosoma penitum* Bks. Wellington (3, 11), June 13, 1950, 2♂♂ and 2♀♀.

*Palaeagapetus guppyi* Schm. Mt. Benson, Aug. 19, 1949, 1♂.

### PHILOPOTAMIDAE

*Dolophilodes pallidipes* (Bks.). Mt. Cokely (Arrowsmith) Aug. 10, 1948, 1♂. Forbidden Plateau, Aug. 1950, 1♂ and 1♀.

*D. dorcus* (Ross). Wellington (10), July 27, 1950, 1♂ and 1♀.

*Wormaldia gabriella* Bks. Very common. Nanaimo, Chase R. and Millstone R., Sept.-Oct. 1950.