

—Mr. Currie presented the following paper :

AN INSECT-COLLECTING TRIP TO BRITISH COLUMBIA.

By ROLLA P. CURRIE.

During the past summer I was enabled, through the kindness of Dr. H. G. Dyar, leave of absence having been granted me by the U. S. National Museum, to spend about ten weeks, in company with Dr. Dyar and Mr. A. N. Caudell, in an investigation of the insect fauna of the Kootenay District of British Columbia. Our headquarters during this time was the town of Kaslo, situated towards the northern end and on the western shore of Kootenay Lake. Dr. Dyar was the first to arrive on the ground, reaching Kaslo on the 28th of May, while the writer arrived on the 8th of June, and Mr. Caudell on the 15th.

Although occupied principally with collecting and rearing Lepidoptera and mosquitoes, Dr. Dyar nevertheless found time to secure many other insects of various orders. Mr. Caudell did a good share of the collecting although the work of inflating lepidopterous larvæ, which fell to his lot, frequently monopolized his time. The writer, therefore, was the only member of the party who was able to devote himself exclusively to general collecting.

We are much indebted to Mr. J. Wm. Cockle, part proprietor of the Kaslo Hotel and a pioneer in British Columbia, for what success we achieved on the trip. Mr. Cockle is an enthusiastic student and collector of Lepidoptera, and possesses a large and handsome collection of the species occurring in eastern British Columbia. He often accompanied us on our trips and planned several special excursions to interesting localities for our benefit. His thorough knowledge of the region was of great help to us and his interest in our expedition, as manifested not only by donations of specimens but in many other ways, added much to the pleasure of our stay.

I desire to express our thanks to Mr. W. R. Allen, Secretary of the Kaslo & Slocan Railway, for many kindnesses. Mr. Allen at one time made a collection of British Columbia Lepidoptera and presented it to the University of Oxford. Although not actively engaged in collecting at the time of our visit, he nevertheless secured a number of specimens for us, and we captured many good moths in front of the photographic laboratory in his garden, at the electric light which he obligingly left burning for us. He accompanied us on one of our trips and has had printed for us a fine set of his photographs of local scenery. He

also arranged a hand-car trip from Payne Mine to Kaslo for our benefit.

Among the many other persons who helped us by bringing in specimens which came to their notice I would mention in particular Master Stephenson, younger son of the Kaslo druggist, who developed into an enthusiastic collector and devoted considerable time to getting insects for us.

As a result of the summer's work between 38,000 and 39,000 insects, spiders and myriapods were brought back. It seems desirable, therefore, as a preface to Dr. Dyar's paper on British Columbia mosquitoes and to other papers which, it is hoped, will appear from time to time upon different groups of insects contained in the collection, to give this brief account of the trip, together with short descriptions of the localities visited. Prof. C. V. Piper, former Entomologist of the Washington Agricultural College Experiment Station, has kindly furnished me with the scientific names of the trees, shrubs, and other plants mentioned in this article.

Kootenay Lake is located in the Selkirk Mountains in eastern British Columbia and is some eighty miles long by from one to five miles wide. Its water is very cold and up to a short distance from the shore is said to have a uniform depth of 400 feet. The water this year (1903) reached a height of twenty-four feet above low-water mark in the early summer and was still somewhat higher than normal when I left. The mountains rise directly from the shores of the lake to an altitude of 10,000 feet or less. Their summits are usually bare and rocky and, in many cases, have snow on their slopes throughout the summer. The climate is less severe in winter than in the Rocky Mountains, although colder than on the Pacific Coast. Although there is much snow during the late fall, winter and early spring months, the large lakes do not freeze over, but are open for navigation the entire year. Usually the rainfall is light in summer and there are many forest fires; but last summer it rained so frequently as to interfere considerably with our collecting.

The forests in this region are notable on account of the large size and luxuriant growth of the trees—smaller than those of the Pacific Coast, but considerably larger than those in the Rocky Mountains. Giant cedar (*Thuja plicata*) and hemlock (*Tsuga heterophylla*) seem to predominate in the lower altitudes, although interspersed with Western larch (*Larix occidentalis*), yellow pine (*Pinus ponderosa*) and Douglas and Engelmann spruces (*Pseudotsuga mucronata* and *Picea englemanni*). Higher up subalpine fir (*Abies lasiocarpa*) and spruce are the prevailing trees. In the clearings and along the creeks are balm

of Gilead* and aspen poplars (*Populus trichocarpa* and *P. tremuloides*), willow, birch (*Betula papyrifera*), alder (*Alnus tenuifolia*), ceanothus (*Ceanothus velutinus*), etc. Thimbleberry (*Rubus nutkanus*), raspberry (*Rubus strigosus*), gooseberry (*Ribes irriguum*), service-berry (*Amelanchier florida*) and huckleberry (*Vaccinium membranaceum*) are common shrubs, while among the most abundant flowering plants are *Epilobium spicatum*, *Spiraea corymbosa*, a species of *Hieraceum* and *Anaphalis margaritacea*. Between the upper portion of the thickly timbered area and the rocky peaks of the mountain summits there is usually a considerable area with scant and stunted trees, or no trees at all, the ground covered with sedge, heather (*Phyllodoce empetriformis* and *Cassiope mertensiana*) and a variety of boreal or subarctic flowering plants.

Following is a list of the localities where collections were made. Whenever possible the exact or approximate altitude is given.

Kaslo (altitude 1,670 feet), May 29 to August 20.—As stated above, this town, located on Kootenay Lake, was our headquarters, and the great majority of our specimens were obtained within easy walking or rowing distance of there. The town is built upon the south side of a small bay and is bounded on the south by Kaslo Creek—at the time of our arrival a large and powerful mountain torrent though diminishing greatly in volume later in the season. At no place did collecting give better results than here. The creek harbored a variety of neuropteroid and other aquatic larvæ, while the deciduous trees which lined its banks were the resting places of many stoneflies, caddisflies and the like. From the many young trees springing up in the clearings back of the town and in those places which had, a few years back, been visited by forest fires, a variety of wood-inhabiting Coleoptera were beaten, together with parasitic Hymenoptera, Chrysopidæ, Hemerobiidæ and Raphidiidæ, small Diptera, Homoptera and Heteroptera, and innumerable spiders. The thimbleberry and other bushes made excellent sweeping for small Hymenoptera; the clover patches, on sunny days, were alive with various kinds of bees; and the grass and weeds of pastures and vacant lots yielded an embarrassing number of various small Diptera. Butterflies and moths of many kinds were abundant, especially in the clearings and more open forest and along the roadsides, while many of the night-flying moths could be detected and put to flight by thrashing the underbrush, shrubs and young trees with a stout stick or pole. Caddisworms, mosquito larvæ, aquatic Coleoptera and Hemiptera, etc., were

* The balm of Gilead poplar is called "cottonwood" in the Northwest.

found in abundance in the spring-fed pools and marshy forest ponds, and adults of these insects could, of course, be found in the neighborhood.

Although sugaring for moths was tried at other localities, Kaslo was the only place where our efforts met with marked success. We began sugaring about the middle of June and in that month sugared three times, according to my record. During the first half of July we went out about three times a week and during the remainder of July and in August sugared almost every evening when not prevented by rain. During the early part of summer, moths were not particularly abundant at sugar, and 100 or 200 specimens an evening was considered a fair catch. But later in the season the number of moths steadily increased and during August, up to the time we left, 1,000 or 2,000 specimens could easily be taken almost every evening. On one occasion we even exceeded that number and secured 2,330. Species as well as numbers of individuals were well represented, 75 species a night being the usual average in the latter part of the collecting. Although there were naturally long series of some species, yet of not many did we secure a larger number of specimens than we had use for.

Our method of procedure, though probably not essentially different from that of others who sugar for moths, was as follows: About 7 o'clock or 7.30 in the evening we went over the route and put on the "sugar," which, according to Mr. Cockle's formula, was made by heating a mixture of three pounds of sugar and one pound of molasses until thoroughly dissolved, then thinning with beer until of a syrupy consistence and adding a small glass of rum. This was spread, by means of a good-sized whitewash brush, upon stumps, fence boards and palings, telegraph poles, etc., along certain roads and paths back of Kaslo, usually along a circuitous route which brought us back to the starting point without going twice over the same ground. About 9.30 we started out again, equipped with a lantern, several large and small cyanide jars of good strength, a few vials of alcohol and two large muslin sacks one of which contained 150 or 200 empty paper pill boxes. The moths were caught on the sugar by clapping the cyanide jar over them and, when partially overcome by the fumes, they were removed to pill boxes, each moth being put, when possible, in a separate box.* Each pill box, as it was filled, was then transferred to the empty muslin sack. Next morning the boxes were opened, male moths removed to cyanide bottles and the females confined in glass jars in order, if possible, to secure eggs from them for life history studies.

* The Microlepidoptera were not kept alive, but were collected directly into chloroform killing vials and left there till our return to the hotel.

After the first of August we discarded the pill boxes, as it was deemed now too late in the season to start new life-history cultures; and Dr. Dyar was sufficiently occupied with caring for those already obtained. It was noticed that many moths fell from the sugar into the grass and onto the ground and were lost while we were engaged in collecting the others. Mr. Caudell, however, soon contrived a way to prevent this. A semicircle of springy wire was sewed to the top of a cloth funnel about one foot in diameter the bottom of which, furnished with a strong elastic, fitted tightly around the mouth of a large cyanide jar of extra strength. On approaching a sugared tree, pole or stump the unwired side of the funnel was made to fit closely around it just below the lower moths. A little jarring and blowing, or a light brushing with the fingers would precipitate them all into the funnel and down into the cyanide jar below. The jar was then corked, and as soon as the moths became quiet they were transferred to a storage cyanide jar and packed lightly between layers of cotton. A canvas apron with a number of pockets, devised by Mr. Caudell, served admirably the purpose of carrying a convenient number of cyanide jars so as to be immediately available. On the warmer evenings when there was considerable moisture in the air there seemed to be a greater flight of moths than when it was cold and dry; and in moist weather we noticed that it was unnecessary to put on fresh sugar every evening, for just as many, or even more, moths were captured when the sugar was a day, or even two days, old.

Moths were by no means the only insects attracted to the sugar. A species of *Ceutorophilus* was frequently taken, and daddy-long-legs (Phalangidea) were attracted in some numbers. One species of *Chrysopa* was often taken at the sugar, as also a few small caddisflies and some specimens of a longicorn beetle, *Pachyta spurca* LeConte. Some of our sugared stumps became so thickly infested with ants that other insects would not alight on them. We noticed, also, in several places where a stump was sugared but a few inches above the ground, that a large toad or a tree frog was nearly always stationed at its base to capture the moths which alighted within its reach. One especial stump seemed to be a favorite, for as many as four toads were sometimes noticed beside it.

As the nights were nearly always cool there was never any such flight of moths to light as we are accustomed to in more southern localities—around Washington, D. C., for instance; but a small number could be secured by going the rounds of the electric lights in Kaslo and visiting the electric-light plant at the creek. The Bombycoid moths, which are not attracted to sugar, were mostly taken at light. Toward the close of the season we rigged

up a large white sheet in what appeared to be a favorable locality and placed a good lantern and reflector behind it; but this apparatus was so little of a success in attracting moths that we abandoned it after a few trials.

Besides the localities immediately around Kaslo, specimens obtained from several near-by places on or near Kootenay Lake bear Kaslo labels. One of these we allude to in our notes as "*Lilypad Lake*," and some of our captures have this additional label. It is a small marshy pond, filled with water lillies and other aquatic plants, about a mile and a half south of Kaslo on the road leading to Mirror Lake. This was a favorite locality for collecting mosquitoes and caddisflies, in their different stages, and seemed to be the nearest place to Kaslo where dragonflies bred in any numbers. The shores of the "lake" were covered with a dense growth of trees and shrubs, and about the only way to secure dragonflies was by walking out over the water on some prostrate log and waiting for them to come within reach, taking care to avoid losing one's balance when making a pass at them. *Mirror Lake*, three miles south of Kaslo, is considerably larger than Lilypad Lake and less overgrown with aquatic plants. It is joined to Kootenay Lake by a covered ditch and is but a few steps distant. In winter enough ice is harvested from it to supply the country near by. This proved an excellent collecting ground for dragonflies, mayflies and caddisflies, and on the moist shores Saldid bugs were abundant. Many of the caddisflies were discovered by jarring the branches of the trees near the lake, thus putting them to flight and making their capture possible. Some of the specimens bear Mirror Lake labels in addition to Kaslo labels. *Fletcher's Ranch*, about five miles south of Kaslo and at some elevation above the lake, was visited by Dr. Dyar, Mr. Cockle and myself on June 11. The place was reached by taking a rowboat to a point some distance south of Mirror Lake, and then following a road up the mountain for a short way. Here a mountain meadow and pasture, covered in some places by a few inches of water, made a good collecting ground for dragonflies and a variety of other insects. The mouth of *Cooper Creek*, about three miles north of Kaslo on the opposite side of the lake, was several times visited. Beating was good here, and on one occasion, during June when the water in the creek was high, I collected a number of Carabid beetles, centipedes, spiders, etc., in the drift brought down by the creek. *Powder Creek*, opposite and a little south of Kaslo on the east side of the lake, has, near its mouth, a beautiful waterfall some forty feet in height. The creek proved a good collecting ground for caddisflies and stoneflies, and was the only locality near Kaslo where I found ant-lions, several pits being discovered in the sand.

Kaslo Creek, June 18 and 30.—On these dates Mr. Caudell and I made trips by the Kaslo & Slocan Railway to points respectively sixteen and ten miles west of Kaslo. Specimens collected at these points bear the label "Kaslo Creek" for want of a more definite locality. The railroad follows up the creek which, in many places, is lined with pools of standing water affording an abundance of Culicid and caddisfly larvæ and other aquatic insects. On these trips we secured specimens of the enormous predaceous Culicid larva *Eucorethra underwoodi* Underwood. At the time we thought they were something new, but on returning to Kaslo found that Dr. Dyar had taken smaller specimens of the same larva near Kaslo some time before and had them in a breeding jar in the hotel. The rank growth of grass and weeds made good sweeping, and we obtained a number of the delicate little mayflies which were hovering in undulating swarms above the railroad track. On June 30, at the ten-mile locality, I secured a specimen of the rare and interesting aquatic beetle *Amphizoa* among drift wood in the creek. On returning from one of these trips we discovered that holding a net out of the window of the moving train was an easy and profitable method of sweeping.

Lardo (altitude 1,670 feet), July 7.—This town is situated at the north end of Kootenay Lake about twenty miles from Kaslo. Dr. Dyar visited the place on the afternoon of July 7 and secured a few insects.

Antoine Mine, McGuigan (altitude about 10,000 feet).—This mine is located in what is known as the McGuigan Basin, in the mountains south of McGuigan—a station on the Kaslo & Slocan Railway about twenty-five miles west of Kaslo. Mr. Cockle had planned an excursion to this locality for August, but rainy weather necessitated giving it up. Nevertheless, Mr. Anderson of the Antoine Mine, who had kindly invited us to come there, collected a few specimens for us.

Frye Creek (altitude 1,670 feet), July 23.—The mouth of this creek, about nine miles north of Kaslo on the east side of the lake, is a favorite camping and picnic ground, and we took advantage of a Sunday-school excursion to visit the place. There is quite a stretch of sandy beach here and huckleberries are plentiful—hence its popularity. The scenery in Frye Creek canyon is very wild and beautiful. An excellent trail has been constructed through it for several miles giving a good opportunity of viewing its beauties and collecting insects. The collecting at this place pleased Mr. Caudell so well that he wandered far up the canyon, and when the excursion steamboat was ready to return to Kaslo he was nowhere to be found. After a half hour's waiting we were rewarded by seeing him saunter up serene and

smiling, in entire ignorance of the anxiety of his friends and the impatience to get home of those who knew not the fascinations of "bug hunting."

Ainsworth, July 10 and 11.—This is a small mining town on the western shore of Kootenay Lake about twelve miles south of Kaslo. In the mountains back of the town—which rise abruptly from the lake—about three miles distant by wagon road and at an elevation of about 5,000 feet, is an interesting limestone cave, known as Cody's Cave. As this cave is located in a good collecting region Mr. Cockle planned a trip there, and on the morning of July 10 Dr. Dyar, Mr. Caudell, Messrs. Kane and Lucas of Kaslo, and myself accompanied him by steamer to Ainsworth. Here the Presbyterian minister, Mr. G. H. Findley, who was much interested in the cave and thoroughly familiar with it, volunteered to act as our guide. We found collecting good all along the road on the way up and secured quite a number of specimens at altitudes between 2,500 and 5,000 feet. About eleven o'clock we stopped by the side of a small creek for lunch. While here we made a short search for aquatic insects and on turning over small stones in the water found a number of mayfly and stonefly nymphs and caddisfly larvæ and a few specimens of the peculiar dipterous larvæ of the family Blepharoceridæ. After lunch we left the road, and a steep climb of a half mile over rocks and fallen timber brought us to the mouth of the cave.

The cave is of considerable size and some time was spent in exploring it. A small, shallow stream of icy cold water flows through it, in some places almost covering the floor. The stalagmites and stalactites were, in most places, small and few in number, indicating, it would seem, that the cave is of comparatively recent origin. In some places the walls of the cave were of considerable height, but in others we were obliged to crawl prostrate in order to get through. Mr. Kane took several flash-light photographs which give an excellent idea of its appearance. The cave seemed to contain no animal life of any kind. This was a disappointment to us, for had it been inhabited by bats or other animals the presence of insects might have been confidently looked for. It was so cold and wet, however, as to be manifestly unfitted for animal life. I examined the limestone mud, delved into out-of-the-way corners and overturned stones in the stream, but found no trace of insects.

After leaving the cave the party, with the exception of Mr. Caudell and myself, returned to Ainsworth and Kaslo, while we went back to the road and followed it a mile and a half further to the No. 1 Mine. Here we were most hospitably entertained by the mine superintendent and his two assistants. The next morning we started down the road towards Ainsworth, collect-

ing as we went. We lunched at the same place as the day before and spent some time sweeping the banks of the creek for neuropteroid insects, hymenopterous parasites, etc., and examined the bed of the stream for aquatic larvæ. Here Mr. Caudell secured a specimen of the water beetle *Amphizoa* and some more Blepharocerid larvæ similar to those I found the day before. About a mile above Ainsworth and near the road is a long pond of several acres area called *Loon Lake*. Here were captured a number of dragonflies, representing several species. We reached Ainsworth late in the afternoon and returned to Kaslo in the evening.

Bear Lake (altitude 3,800 feet), July 20 and 29.—A station on the Kaslo & Slocan Railway twenty miles west of Kaslo. Here are two small mountain lakes from the smallest of which, Fish Lake, Kaslo Creek takes its origin. The other lake, known as Bear Lake, is just west of Fish Lake. Mr. Caudell and I visited this locality on July 20 in company with Mr. Cockle, and spent the afternoon collecting near the two lakes and along the railroad track. Butterflies and bees were found around the flowering plants, and the grass, weeds, small trees and bushes yielded a large number and variety of insects from sweeping. Neuropteroid insects were particularly abundant, especially caddisflies, mayflies and Chrysopidæ, and this was the only locality where we caught *Sialis*. We spent the night here and next morning climbed the mountain north of Bear Lake by switch-back trail to London Hill Mine at the summit. On a subsequent trip (July 29), Mr. Caudell and I sugared for moths along the railroad between Fish and Bear Lakes and secured about 100 specimens. Two-thirds of these belonged to a single species (*Noctua sierræ* Harvey), not uncommon at Kaslo. Hardly any of these moths were peculiar to the locality, but were the same species we had collected at Kaslo earlier in the season.

London Hill Mine, Bear Lake (altitude 7,000 feet), July 21, 28 and 29.—As stated in the last paragraph, Mr. Cockle, Mr. Caudell and I climbed the mountain north of Bear Lake on the morning of July 21 and, as the day was warm and sunny, spent a few hours collecting at the summit near the abandoned London Hill Mine. The forests on the mountains about Bear Lake have been completely destroyed by fires and only the charred and dead tree trunks remain standing. There was little collecting, therefore, on the way up. Around the summit the trees are stunted, grow in isolated and straggling patches, and have not been reached by the fire. These afforded very fair beating and sweeping, and the many blossoms covering the treeless areas attracted a variety of bees, flies and alpine Lepidoptera. On the extreme summit a swarm of Bombyliid, Tachinid and

Syrphid flies was hovering, and a number of them were secured. On the patches of still unmelted snow were a large number of miscellaneous insects, most of them crawling actively about though many others were dead or benumbed with cold. Among these snow insects Coleoptera and parasitic Hymenoptera seemed most abundant, although the orders Hemiptera, Orthoptera and Diptera were also represented. In the afternoon we returned to Bear Lake and took the train for Kaslo.

On July 28, Mr. Caudell and I revisited London Hill Mine in company with Dr. Dyar, this time climbing the mountain on horseback so as to have more energy for collecting when we reached the summit. Threatening showers made collecting rather poor and few Lepidoptera were flying, though we secured a *Parnassius* and a few moths. From the snow patches, which had shrunk considerably since our former visit, we collected a number of insects the majority of which, however, were evidently the same species we secured there before. At the Silver Glance Mine, a short distance below the summit, we spent the night and experienced the customary hearty western hospitality. We tried sugaring that evening, along the trail leading up from the camp, but with no success whatever. The only creatures found at the sugar were a crane fly, a slug and a mouse. Two moths, however, flew to the lantern just as I was entering the cabin, a Geometrid and a specimen of the common Noctuid *Feltia vancouverensis* Grote.

In the morning we went again to the summit, but as the sky was overcast butterfly collecting was poor, and about noon Dr. Dyar went down to Bear Lake and returned to Kaslo. I spent the forenoon in beating the firs and pines and took quite a number of small Diptera and parasitic Hymenoptera, some small stoneflies, a Coniopterygid, two Scolytid beetles, a few longicorns, etc. We again examined the snow patches and found a good variety of insects, among them a caddisfly and a small Hemerobiid. Early in the afternoon the sun came out and we were rewarded by securing a number of Lepidoptera and many flies and bees from the flower-covered slopes. We walked down to Bear Lake in the afternoon, sugared there in the evening and returned to Kaslo next day.

South Fork, August 9.—About five miles from Kaslo, on the Kaslo & Slocan Railway, at the point where the two branches of Kaslo Creek come together, is a station known as South Fork. The branch which has its source in Fish Lake and which is followed by the railroad is called Kaslo Creek, while the other, coming from the south, is known as South Fork. On our way to the Kitchener Glacier, August 9, we left the railroad at South Fork station and took saddle horses and pack outfit for the re-

mainder of the journey. While waiting here for the horses to be saddled and packs adjusted a few miscellaneous insects were picked up.

South Fork Creek, August 9 and 11.—Along this creek there is a good wagon road with trails branching off here and there to a number of mines. Dr. Dyar, Mr. Cockle, Mr. Caudell, Mr. Allen, our guide Joe and myself left South Fork station during the forenoon of August 9 on our way to the Kitchener Glacier. Specimens picked up along this road, going to and returning from the glacier, bear the label "South Fork Creek." The road leads through a forest of large cedars and hemlocks, replaced, as higher altitudes are reached, by spruces and firs. A water-covered meadow near the creek, visited on the return trip (August 11), proved to be an excellent place for collecting mosquitoes and a large number of mayfly nymphs were dredged from the water.

Kokanee Mountain (altitude, at foot of Kitchener Glacier, 7,500 to 8,000 feet), August 10 and 11.—After following the South Fork Creek wagon road for a distance of about seventeen miles from South Fork we turned off to the left and climbed Kokanee Mountain by a switchback trail. Below the peaks of the mountain is a good sized glacier, known as Kitchener Glacier, from which several creeks take their rise, South Fork Creek among them. Below the glacier and at the head of South Fork Creek are two small lakes, one just above the other. At each lake is a mining camp, neither of which were occupied by human beings at the time of our visit, although a porcupine had possession of the camp by the lower lake. We went on to Mansfield Camp, on the upper lake, and made this our stopping place. The cabin stands close beside the lake, and straight across, overhanging the opposite bank, was a wall of glacial ice.

Next morning, August 10, the day was mostly clear and pleasant and we arose early. After donning smoked glasses and waterproof footwear we went on up the mountain and out upon the glacier. On the snow, which largely covered the glacier, were quite a number and variety of insects, many of them dead but a good number alive and uninjured. Mr. Allen took several photographs and Mr. Caudell and I, after exploring the lower end of that part of the glacier which gives rise to Coffee Creek, climbed to the summit of the highest peak of the mountain—said to be the tallest peak in this entire region. It took us about an hour and a half to make the ascent over the snow-covered ice, and we had to use care to avoid the crevasses.

The extreme peak projects above the snow and ice and is a mere mass of large loose rocks, having only a few yards area on top. The view was magnificent. Upon the opposite side to

that by which we made the ascent is an almost precipitous fall of several hundred feet, and far below could be seen small lakes and winding creeks while on all sides the eye overlooked the tops of a wilderness of mountain peaks. The only insects seen here were a few Diptera. We remained awhile to rest and, if possible, to fix in our mind's eye the awe-inspiring picture before us, then returned to camp, collecting on the way. Mr. Caudell secured one specimen of the grasshopper *Podisma polita*, Scudder, a species recorded only from Oregon in Scudder's Catalogue of Orthoptera. The others were back from another part of the mountain and reported that collecting was somewhat disappointing and butterflies not as abundant as was expected.

After supper we sugared along the trail from our camp to the camp on the lower lake. About dusk we noticed a few moths flying but on going the rounds later we had almost as little success as on Bear Lake Mountain, the only insects found on the sugar being a few craneflies and one or two caddisflies—no moths whatever. From these two experiences in sugaring at high altitudes we reached the conclusion that in such localities, where the nights are naturally cold, moths cannot be captured by this method of collecting. On our way back to camp Mr. Caudell shot a porcupine. Next morning as it was cloudy and threatened rain we concluded not to remain another day, so packed up our outfit and returned to Kaslo. On the way down the mountain Mr. Allen secured a photograph of the beautiful cascades by which South Fork Creek descends to the valley.

Sandon (altitude 3,800 feet), August 13.—This mining town, about thirty miles from Kaslo, is the western terminus of the Kaslo & Slocan Railway. I left Kaslo on the morning of August 13 on my way home, taking the train to Sandon where I spent the afternoon and night, leaving the next morning for Nakusp. During the afternoon I collected some bees and other Hymenoptera and visited the Slocan Star Mine, said to be one of the best dividend-paying silver mines in this region. Mr. Oscar White, brother of the mine superintendent, showed me through a good part of it, and explained everything to me most interestingly. In the evening I made the rounds of the electric lights and secured about 90 moths, representing a good variety of species. Mr. Geo. C. Robbins, an employee of the Payne Mine, went around with me, provided me with extra cyanide jars and helped me in catching the specimens. Since my return to Washington he has sent us some additional specimens.

Revelstoke (altitude 1,475 feet), August 14.—As stated above, I left Sandon on the morning of the 14th for Nakusp on the Upper Arrow Lake, where I took steamer northward to Arrowhead and train thence to Revelstoke. At Wigwam, half

way between Arrowhead and Revelstoke, I captured a few mosquitoes which entered the car. A few moths and other insects were taken that evening at the electric lights on the balcony of the C. P. R. Hotel at Revelstoke.

The following morning (August 15) I took the transcontinental eastbound Canadian Pacific train, and thus ended my own collecting so far as British Columbia was concerned. Sunday was spent at Banff, in Alberta, the main station of the beautiful Rocky Mountain Park of Canada, and here I picked up a few insects while out walking. The scenery around Banff reminded me of parts of the Yellowstone Park. Here I met Mr. N. B. Sanson, who is Curator of the Park Museum, and had a most pleasant visit with him.

Dr. Dyar and Mr. Caudell left Kaslo on August 20. They took the lake steamer to Nelson at the foot of the lake; Mr. Caudell going east from that point and leaving British Columbia by the Crow's Nest Pass branch of the Canadian Pacific Railway and securing a few specimens at Nelson and Kootenay Landing.

Dr. Dyar has given me the following account of the remainder of his trip. He went from Nelson to Revelstoke by the Arrow Lakes steamer, collecting a few specimens at Nelson, West Robson, Nakusp and Revelstoke. Thence he went west on the main line of the C. P. R., reaching Vancouver August 23. He left the next day and crossed the water to Victoria on Vancouver Island. Five days were spent here doing a little collecting and visiting several resident entomologists. Mr. A. W. Hanham, Mr. E. M. Anderson and Mr. E. Baynes Reed were met and several pleasant hours spent with them. From Victoria, on the way to Wellington, Dr. Dyar visited Shawnigan Lake, a station on the Esquimalt & Nanaimo Railway. At Wellington, at the end of the railroad, he was entertained by Rev. G. W. Taylor, whose studies of North American Geometridæ are just taking definite shape. Mr. Theo. Bryant was also met here. Dr. Dyar returned to Victoria on September 5, and went back to the mainland the same night. At Vancouver he visited Mr. R. V. Harvey and Mr. A. H. Bush, resident collectors. The same day he started for home by the main line of the C. P. R. On September 7 a stop was made at Glacier in the Selkirk Range, and on September 8 another at Field. A number of moths were picked up at both places although the weather was stormy and cold. On September 10 and 11 a short stop was made at Banff, Alberta, but it was snowing heavily over all the mountain peaks and raining in the town, so practically no insect life was seen.

The material collected on the trip is now in the U. S. National Museum, together with about 500 specimens of Lepidoptera which were given Dr. Dyar for the National Museum by the en-

tomologists who were visited. Rev. G. W. Taylor, especially, gave valuable material, not sparing species that were uniques in his collection.

The paper was illustrated by maps and photographs.

—Dr. Dyar then read the following paper :

NOTES ON THE MOSQUITOES OF BRITISH COLUMBIA.

By HARRISON G. DYAR.

In conjunction with some other work, I made observations on the mosquitoes of British Columbia, Canada, particularly in the Kootenay District, during the past season. This was done in connection with the mosquito work which is being promoted by Dr. Howard, with the help of the Carnegie Institution.

British Columbia is a mountainous region in general, with a fairly abundant rainfall. Nevertheless, towards the middle of summer it becomes generally dry and most natural breeding places for mosquitoes disappear. The mosquitoes, therefore, come early and are soon gone, and are, in the main, composed of those species which develop rapidly and hibernate in the egg state. *Culex pipiens* was not seen anywhere in British Columbia, nor was any species of *Anopheles* met with except in a single instance. The place of *C. pipiens* in rain barrels and other stagnant water is taken by *C. incidens*.

I will mention the species in the order of their comparative abundance. I desire to express my thanks to Mr. Caudell and Mr. Currie for the kind assistance which they rendered me. I am indebted to Mr. Coquillett for patiently examining my 1,238 specimens.

Culex impiger Walker.*

This was by far the commonest mosquito. Early pools in the mountains, filled by the drainage from the melting snow banks, contained the larvæ and pupæ, apparently by the million. Near Kootenay Lake they had all gone in May; but higher in the hills larvæ could still be found till the middle of June, and at Kokanee Mountain, at the foot of the glacier, I found many larvæ on August 10. The adults soon became very common in the woods, though in a few weeks they were much worn and later disap-

* This is the *C. reptans* of my previous papers. Mr. Coquillett will give the differentiation of *impiger* and *reptans* in the new edition of Dr. Howard's "Mosquitoes."