

NOTES ON THE FAUNA AND FLORA OF MT. McLEAN, B. C.

By R. Glendenning

During the summer of 1920 this mountain was visited three times in connection with the Natural Control Investigations being carried on by the Dominion Entomological Branch. The insect being studied in this case was the Spruce Budworm, *Tortrix fumiferana*, which has been doing considerable damage to the Douglas Fir in these parts. Perhaps a brief description of the plant associations found on the mountain from base to summit would not be out of place, as no factor has greater bearing on the distribution of the insect fauna than the plant associations.

The life zones encountered on this mountain according to the system of Merriam are as follows:

Base-1000 Upper Sonoran.

1000-1700 Arid Transition.

1700-3700 Humid Transition.

3700-6600 Hudsonian.

6600-Top 7850 Arctic.

At the base of the mountain lies the town of Lillooet in the Upper Sonoran area, i.e., the sage brush country; here the dominant plant is the sagebrush (*Artemisia tridentata*) with Rabbit Bush (*Bigelovia*) and various small herbs of xerophytic habit as *Chrysopsis* the Golden Aster, and the handsome *Gaillardia aristata*. There are a few scattered trees of Yellow Pine (*Pinus ponderosa*, also a little Sumach (*Rhus glabra*). This association has to withstand the fiery heat of summer without relief from the showers which refresh our coast vegetation, or occur at higher elevations on the mountain. Life is at its zenith here early in the year, though throughout the long summer days the variously pitched songs of the Orthoptera are always to be heard. This sagebrush formation extends upwards to the 1,000 feet level, where it gradually merges into the Arid Transition area. It will be fully understood that there is no hard and fast line of demarcation between plant formations, one is only gradually replaced by the next, and at times it is difficult to say which formation one is in. As well, elevation is not the sole factor governing the type of plant formation, as a southern exposure or a dry ridge will carry the association of a lower formation to higher levels, causing an irregular contour. These remarks apply equally to the divisions between all the formations.

In the Arid Transition we have as dominant trees, the Yellow Pine (*Pinus ponderosa*) and our versatile friend the Douglas Fir, and it might be as well to lay stress here on this quality of the latter tree; it being found in three if not four zones and ranging from 1,000 to 6,000 feet, or to within 500 ft. of the limit of trees. These two trees form an open woodland pleasant to pass through and collect in. The underbrush is light and consists of Snowbrush (*Ceanothus sanguineus*), a fav-

ourite food plant of many insects, June berry (*Amelanchier*), rose bushes (*R. pisocarpa* and *nutkana*), with a low covering of the evergreen False box (*Pachystima myrsinites*), and *Spiraea lucida*. This association persists on the drier ridges for about 1,000 ft. There is here ample material for wood boring insects, consequently Buprestids are frequent. Ants also find congenial surroundings and are numerous both in species and individuals, and seem to delight in getting mixed up with ones food and crawling up ones legs at night. The mound building species are much in evidence; some of their domiciles were noticed that had been torn down by bears. For a student in myrmecology this would be an excellent place to locate.

The Arid Transition and the Humid Transition have a range of elevation of approximately 2,700 ft. or from 1,000 to 3,700 ft. above sea level. They are very similar but the greater rain and snow fall in the upper half causes a ranker growth, and several plants drop out, to be replaced by others. The woods of the Humid Transition have very much of the appearance we are familiar with on the coast. Salal (*Gaultheria shallon*) and Ocean Spray (*Spiraea discolor*), with barberries (*Berberis nervosa* and *aquifolium*) form the underbrush and the Douglas Fir is an almost pure stand and forms a much closer growth of timber than lower down.

It is within these areas, the Arid and Humid Transition, that the Spruce Bud moth is most active, and although the damage to the forests has been much less severe than in the Eastern States, a considerable amount of stripping has been noticeable for some years past in this district. In contrast with the outbreaks in New Brunswick, the outbreaks in British Columbia have always been checked in the course of a few years by natural means and it was in order to study these natural control phenomena that time was spent on the mountain.

As is so often the case, birds proved to be the greatest factor in control, and it was an interesting sight to see the flocks of sparrows, chickadees, vireos, warblers and other birds, including the brilliantly coloured western tanager, revelling in the abundance of food there to be found. These birds were exceedingly nimble and tame, and could be watched at less than arms length hopping along a branch, systematically side stepping on each branchlet to pick off the larva ensconced in its nest at the tip. When the branch was finished, they would ascend to the next and work that similarly. So thoroughly was their work done, that considerable difficulty was experienced, and much time spent, in endeavouring to collect sufficient material for parasite rearing work. Speaking from memory, at least 75% of the damaged tips examined for a larva were found to have lost their occupants. Various hymenopterous parasites, *Apanteles*, *Pimpla*, *Limnerium* and *Meteorus* were also at work but by far the greatest benefit is attributable to the birds, who have now practically controlled the outbreak on Mt. McLean. The

moths were very scarce during their annual flight during July this year, where in previous years hundreds were on the wing.

The larva of the Bud worm has various methods of defence against predators and parasites, two especially being noticeable. Firstly, from their nest at the branch tips formed by the drawn together needles, the larva drops like a plummet on the jarring of the branch and conceals itself amongst the foliage of the branch below, or secondly, in the event of a close approach when the insect is out feeding, it retracts into its cell with great rapidity. This latter move being probably of much use in escaping from some hovering parasite. There is no doubt that the more open nature of the forest in British Columbia than in New Brunswick is conducive to a greater bird population and is the missing factor in the natural control of this pest in eastern forests, where in the gloom of the balsam woods, birds are less plentiful.

Another insect of some interest met with in this zone and the next was a species of stone cricket (*Cyphoderris monstrosus*). Our evening meal being over, the chores done, we would be sitting over the camp fire when as dusk fell, a high pitched churring would be heard from the neighbouring trees. To locate the maker of this vespertine music was a difficult task, as it was very nearly dark before it commenced, and was one of those curious sounds of all pervading intensity, and apparently ventriloquial. With much perseverance we at length located one of the musicians resting lengthwise on a branch. Very careful approach was necessary to effect capture, as they would simply drop to the ground and be lost in the gloom of the gathering night. Some two dozen specimens were captured during the summer, and the exact economy of this nocturnal serenade is not clear, as no females were encountered, though careful search was made.

Insects are only tolerably abundant in this zone, being much less so than in the open flower slopes around 5,000 ft., but there were quite a few micros on the wing and large robber-flies were frequent; one being netted with a rare noctuid in his talons, quite uninjured and now in the collection of Mr. A. W. Hanham.

After 3,700 ft. altitude is reached, more boreal conditions become evident. Our plant association alters once more and we are in the Hudsonian area. Of trees, the Douglas Fir still persists but others appear, the mountain representatives of our lowland conifers, namely, spruce (*Picea engelmanni*, balsam (*Abies lasiocarpa*), hemlock (*Tsuga mertensiana*), and two pines (*Pinus contorta* and *albicaulis*). The mountain juniper (*Juniperus sibirica*), rhododendron (*Rhododendron albiflorum*), and Devil's Club (*Fatsia horrida*) also occur. These form rather dense growth in the draws but on the ridges they give way to the flower slopes that in July are, I think I am safe in saying, unmatched in North America for beauty to the artist and for interest to the entomologist. Here herbs are at their zenith and a riot of colour is provided

for the eye and a feast of richness for the innumerable flower frequenting insects. Lupines, Pentstemons, Arnicas and Asters are amongst the commoner herbs, and syrphids, bombyliids and various hymenoptera and lepidoptera come in droves to the feast. A considerable amount of collecting was done in the neighbourhood of these flower slopes, as well as in the alpine meadows above timberline. Some of the material collected is named, but much is not and should provide many new and interesting records of alpine and subalpine species when worked over by specialists. Diptera and hymenoptera were the chief orders collected in, but on the occasion of my last trip in August I had the pleasure of the congenial and erudite company of Mr. A. W. Hanham, who gathered many choice specimens of lepidoptera and coleoptera, some of which are also yet undetermined.

Five days were spent in camp at the 5,000 ft. level last August, and it might be as well to mention here that camping at this elevation in the dry belt of British Columbia is not at all unpleasant. The nights are not unduly cold, not nearly so cold as those experienced at 4,000 ft. on Mt. Cheam in the wet coast strip.

From the camping place on Mt. McLean at 5,000 ft. there is another 1,500 ft. of open Hudsonian association before the timber line is reached at 6,500 ft. This last 1,500 ft. is very steep going but pleasant and open. Where water is near the surface, the vegetation is quite rank, and coarse growing herbs abound. Collecting was good here in August on the Umbellifers *Angelica Lyallii* and *Heracleum lanatum*. *Aster foliaceus* and *Erigeron salsuginosus* also were much patronized by insects and some fine *Pachytas*, a dull yellow Cerambycid, were taken here. Just before leaving the timber, under some horse dung, were found some long legged bugs, black with a reddish shield; they were apparently feeding on the larvae of a dung beetle there. This proved to be a rather rare insect, *Alydus scutellatus*, and Mr. Downes, who identified it, informs me only taken once before from British Columbia.

To those who have toiled up a mountain side through the gloom of the forest I need not describe the joyous feeling attendant on emerging from the timber and gaining the open slopes of an alpine summit. To those who have not, I will merely say they have a treat in store. The timber line on McLean is quite sharply defined, and from the edge of the trees upward the country consists of bare rocky ridges, with occasional dwarfed clumps of conifers. The ridges, although apparently bare, are not really so, as a close mat of prostrate herbs covers them, prostrate perforce, the winds occasionally being so strong that mounted Indians decline to face them while hunting. Grasses, sedges, potentillas, dwarf lupines, heathers, saxifrages, the moss campion and the handsome *Eriogonum subalpinum* are here at home, but perhaps the commonest plant is the alpine avens, *Dryas octopetala*.

These plants are arctic in distribution and persist from timber line to summit 7,850 ft. Some of them will be found up to 10,000 where that elevation is reached.

On our visit early in July the snow was just commencing to go on these alpine slopes and but little was moving; but in August insect life was abundant in this zone. Various species of grasshoppers are to be found, lepidoptera are numerous and in fact all orders of insects are represented, often by rarely taken species, the joy of the cabinet systematist. Parnassius butterflies were abundant here in August, as were blues of several species. That very common habit of several alpine species of butterflies of closing their wings and turning on their side was noticed. The most insect frequented flowers on these alpine slopes were the arnicas (*A. latifolia* and *parryi*), a solidago (*S. corymbosa*) and two species of *Agoseris*, dandelion-like plants. The richly coloured willow herb, *Epilobium latifolium* was neglected except by bees.

I would like to record here while dealing with this subject an interesting little episode I witnessed. Away on the side of one of these lone bare wind-swept ridges was a small semi-sheltered depression still green and carpeted with a lovely bunch of Arnicas: collecting was good here. On one of the clumps of arnica I noticed a very large, heavy bodied bumble bee; it was busy robbing one of the waving heads, which having completed, it attempted to cross to another nearby whenever the fitful gusts of wind blew one in its direction. Several unsuccessful attempts were made to hold with the front pair of legs the waving blossom, and at least half a minute passed before it was at length successful in holding and scrambling over on to another flower without having recourse to flight. I think this shows more reason, than that quality described as instinct by naturalists.

Another interesting sight was some clumps of an alpine willow (*Salix arctica*) about 18 inches high covered with the pupae of a chrysomelid (leaf-eating) beetle. They had completely skeletonized the foliage and the adults were just commencing to emerge. It is a rare species and I have not yet received the name. There must have been thousands on these few bushes and a strong inky odour was prevalent in their proximity.

Some distance above timber line, at 7,000 ft. to be exact, two small lakes, each about $\frac{1}{2}$ acre in extent, were found. Here two species of water beetle, a tipulid (daddy-long-legs) and a dragonfly were noticed, also some caddis larvae. These lakes can only be free from ice for about eight weeks in the year. In the mud by the margin the footprint of a wader (curlew?) was noticed, thus exemplifying one of the methods by which water insects probably reach these isolated places.

Insect life was common at or near the very summit; grasshoppers were plentiful and several small butterflies were taken within a few yards of the top, wherever a slight depression gave shelter from the

wind, a copper (*Heodes cupreus*) and a blue (*Plebius podarce*) and several others not yet determined. These species are dwellers on the rock slides (not very good ground for chasing them) and frequented the clumps of *Solidago* and *Aplopappus* there to be found. Several specimens of noctuids of the alpine genus *Syngrapha* were also taken early in the afternoon.

The usual alpine animals were seen. Hoary marmots whistled at our intrusion of their solitudes, and rock rabbits squeaked and hid in the rock slides. Two willow ptarmigan in mottled summer plumage were very tame, and allowed good photographs to be taken. Pipits were encountered frequently and a golden crowned sparrow appeared to be nesting in a clump of wind depressed firs. There is certainly lots of insect food here for these birds during the brief summer.

To anyone wishing to spend a short time collecting under alpine and subalpine conditions, no better mountain is known in these parts. There is an immense area of land above timber line available and by no means worked out. One can travel all day and not cover the same ground. There is a good horse trail from base to timber line, used by the local inhabitants when hunting or when opening their irrigation ditches, which convey the water from the melting snows to the parched land of the valleys. Camping is pleasant, mosquitos being scarce; and its proximity to the dividing line between wet and dry belts makes it a rich field botanically and therefore entomologically.