

ANNUAL RANGER REPORT

FOREST INSECT SURVEY

BRAZEAU-ATHABASCA-

JASPER DISTRICT

1952

J.K.ROBINS.

INTRODUCTION

The area covered by this report includes Jasper National Park, the districts formerly called the Brazeau-Athabasca Forest Reserves and a portion of the adjacent Northern Alberta Fire District. The code numbers for these districts are; 124, 014 and 234 respectively.

TOPOGRAPHY AND FOREST COVER

With minor exceptions the entire area is drained by the Athabasca River system, the main tributaries of which are the Sunwapta, Miette, Snaring, Rocky, Snake Indian, Burland McLeod and Pembina rivers; all of these rise in the Rocky Mountains and join the Athabasca to flow north-eastward into Lake Athabasca.

Jasper National Park lies in the Sub Alpine Forest Region (1) where from 4000 feet to tree line Englemann spruce and western white spruce form the climax forest cover. Lodgepole pine, the sub-climax species, forms large pure and mixed stands as a result of fires. On exposed sites at lower elevations, Douglas fir, an intrusion from interior British Columbia is found. Alpine fir and alpine larch grow around tree line. In the valley bottoms trembling aspen and balsam poplar are commonly found growing on stream banks and river flats.

Soils are mostly colluvial and where mature soils have been formed they are podsoils.

To the eastward the land falls away to the rugged foothills and flat topped plateaus of the Foothills Section of the Boreal Forest (1). Here, between 3000 and 5000 ft. elevation, western white spruce forms the climax tree cover. Lodgepole pine is fire-climax and probably forms the predominant forest cover mixing with jack pine toward the north-east around Whitecourt. Here hybrids of the two species occur. Alpine fir gives way to balsam fir towards the eastern edge of the district. Black spruce and tamarack are common on low peaty sites. Trembling aspen, balsam poplar and white birch form the common deciduous tree cover.

Soils are mostly glacial in origin with mature soils podsollic.

(1) A Forest Classification for Canada - W.E.D. Halliday.

CLIMATE.

The climate of this region is characterized by a relatively heavy precipitation of around 19 inches per year with about 12 inches from April to September. Average mean temperature for this period is around 51° - 52° Fahrenheit.

The following table shows mean temperatures and precipitation with deviation from average for stations at Jasper, Entrance and Edson for April to September 1952.

| MONTH | JASPER | | | | ENTRANCE | | | | EDSON | | | |
|--------|--------|------|-----|-------|----------|------|-----|-------|-------|------|-----|-------|
| | Tm | Td | P | Pd | Tm | Td | P | Pd | Tm | Td | P | Pd |
| April | 40 | +2.0 | 1.6 | -.25 | 44 | +7.6 | 0 | -1.13 | 42 | +4.4 | .2 | -.7 |
| May | 48 | +1.4 | .9 | -1.05 | 48 | +1.5 | 1.2 | -.68 | 50 | +1.2 | 2.6 | +1.08 |
| June | 53 | -1.9 | 3.8 | +2.35 | 52 | -1.0 | 5.0 | +2.33 | 53 | -1.4 | 5.9 | +2.75 |
| July | 58 | -1.2 | 2.7 | +.27 | 57 | -1.1 | 2.3 | +.18 | 58 | -1.4 | 3.5 | +.29 |
| August | 58 | +1.6 | 1.1 | -.59 | 57 | -.4 | 1.7 | -1.07 | 56 | -1.4 | 1.6 | -1.39 |
| Sept. | 52 | +2.1 | 1.9 | +.55 | 52 | -3.8 | 2.0 | -.17 | 50 | +1.4 | 2.2 | +.57 |

Tm = Mean temperature.

Td = Deviation from Average mean temperature.

P = Precipitation.

Pd = Deviation from average precipitation.

Total precipitation Oct./51 - Sept./52 inclusive

Jasper
19.70 in.

Entrance
16.70 in.

Edson
22.60 in.

In general, the 1952 season was somewhat wetter than normal with most of the rainfall coming in June and July. Spring breakup was from 2 to 3 weeks earlier than usual.

PHENOLOGICAL DATA

First green on aspen at Entrance - May 12

First pine pollen at Jasper - June 6

Bud scales completely off white spruce at Jasper - June 7.

INSECT CONDITIONS

The 1952 field season in this district began on May 12 and ended July 16. The time in the field was cut short in order to allow the district Biology Ranger to make a special reconnaissance into the North West Territories.

Only two species of insects were in epidemic proportions during 1952; these were the Lodgepole Pine Needle Miner and the Forest Tent Caterpillar.

Lodgepole Needle Miner (*Recurvaria milleri*)

The sequential sampling technique adapted to needle miner populations by Mr. R. W. Stark of this laboratory was carried out along the main roads in Jasper National Park. Light to heavy populations were found on the Mount Edith Cavell road and in the vicinities of Paboktan Creek and Athabasca Falls. Specimens were found at scattered intervals throughout the Park.

Forest Tent Caterpillar (*Malacosoma disstria*)

Populations of this insect are on the increase on most of the eastern side of the district especially around McKay where complete defoliation was noted over several square miles. Specimens were collected from such scattered points as Pinedale, Edson, McLeod River, and Wildwood.

Spruce Budworm (*Choristoneura fumiferana*)

No indication of a build up in the numbers of this insect was noted. A few specimens were taken along the Miette River west of Jasper and up the Medicine Lake road.

Green Leaf Chafer (*Dichelonyx*)

During 1950 large numbers of these beetles were observed throughout the district especially around the Ranger cabin at Entrance. As this high population has not been observed since it would be of interest to pay some attention to the abundance of this insect in the coming season; such records may give some indication of the population fluctuation of the insect.

Grey Pine Looper (*Carapeta angustiorata*)

The high population level of this looper in the vicinity of Jasper townsite observed in 1949 has decreased to its present endemic state.

Black Headed Budworm (Acleris variana)

There is evidence of a slight decline in numbers of the Black Headed Budworm in the vicinity of Brule and the Jasper Park gate from that found in these areas in 1951.

BRANCH SAMPLE PLOTS

A total of 10 branch sample plots were set up during 1952. Eight were located between a point outside the Jasper Park east gate and the Celestine Lake turn-off, one was established near Athabasca Falls and one at Geikie.

If the usual random sampling methods produced 4 or more Black Headed Budworm per tree a permanent sampling station was established, providing it was not less than one half mile from a similar station.

A plot marker in the form of a white painted 2"X2" stake was driven into the ground and ten adjacent white spruce with diameters of from 3 to 15 inches D.B.H. were selected and tagged. Measurements of D.B.H. and height were made and increments taken. All ten trees were roughly mapped in with relation to the plot marker and forms 219 and 209 completed.

Sampling was carried out with a 2' X 2' square sheet held rigid with the aid of two cross pieces. This was held under a branch tip and the branch cut off to a length of 20 inches. The width of the branch was taken with the aid of parallel lines drawn on the sheet. Fifty such tips from 10 different trees (not necessarily the tagged trees) were tallied on the back of a collection slip giving the width of the branch and the number of each species of insect found on each branch.

The insects were placed in a collection can and sent to Seebe for final identification and rearing. The results of this sampling technique can be found in the Annual Report of the Forest Insect and Disease Survey (Calgary Laboratory).

SPECIAL INVESTIGATIONS

Following a report turned in by Ranger M.P. Reap of the Alberta Forest Service concerning high mortality in young growth Lodgepole Pine two miles south-east of Bear Lake, an investigation was carried out on July 5th. It was found that a severe hailstorm of the previous year had completely killed about 20 acres of 6 - 10 year old Lodgepole Pine. Larger white spruce and tamarac were severely damaged. Color photographs were taken. Mr. Reap was informed of the findings.

On May 9th an egg count was conducted in the area of the Forest Tent Caterpillar outbreak south of McKay. Aspen poplar from 2½ to 3½ inches D.B.H. were cut down at ½ mile intervals. Egg masses from 1951 and the previous year were counted from lower, mid and upper crowns.

The following results were noted:

TABLE

| Location | Diameter | | Lower | Mid | Upper | Total |
|-------------------------|----------|-----|-------|-----|-------|-------|
| Mile 3.4 S. of McKay | 3½" | old | 0 | 0 | 0 | 0 |
| | | new | 3 | 4 | 6 | 13 |
| Mile 4.5 | 3½" | old | 0 | 0 | 0 | 0 |
| | | new | 0 | 2 | 9 | 11 |
| Mile 6 | 3½" | old | 0 | 0 | 0 | 0 |
| | | new | 0 | 1 | 1 | 2 |
| Mile 7.7 | 3½" | old | 0 | 0 | 2 | 2 |
| | | new | 0 | 0 | 1 | 1 |
| Mile 9.2 | 2½" | old | 0 | 0 | 0 | 0 |
| | | new | 1 | 1 | 0 | 2 |
| Mile 12 | 2½" | old | 0 | 0 | 0 | 0 |
| | | new | 2 | 1 | 1 | 4 |

CO-OPERATORS

There were around 29 potential Co-operators in the employ of the National Parks and the Alberta Forest Service in this area. Of these six sent in collections and one sent in a report.

There is only one large timber operator in the area, the Imperial Lumber Company which has mills at Marlboro and Granada. No collections were received from this or any other timber operator during 1952.

PERMANENT SURVEY SAMPLING PLOTS

A total of seven permanent sampling plots have been set up in the district. Four were established in the vicinity of Entrance in 1949 and three in the Coal Branch area during 1950.

The purpose of these plots was to determine the insect conditions in stands occupying different types of site from year to year.

One hundred foot plots were set up and ten trees of the selected species were tagged. Increments, D.B.H's and heights were taken, along with other pertinent information such as soil composition, slope, exposure, story, ground cover and growth conditions. Plot forms S.E. 209 and S.E. 219 were completed. Increment borings were examined in order to obtain ages and growth conditions over the preceding ten years and graphs were prepared to show the average annual increment of the ten tagged trees for that period.

Plot #301

The tagged trees on this white spruce plot show an average annual increment for ten years of approximately 3mm. indicating very good growing conditions.

Plot #302

Growing conditions on this lodgepole pine plot are good. The average annual increment taken over a ten year period amount to 2.93 mm.

Plot #303

The tagged trees on this plot are white spruce. An average annual increment of 1.94 mm. would indicate fair growing conditions.

Plot #304

This lodgepole pine plot with an average annual increment of 1.99 mm. for the last ten years occupies a low, damp site where growing conditions are fair.

Plot #305

An average annual increment of 2.67 mm. on this lodgepole pine plot indicates good growing conditions.

Plot #306

Good conditions for growth have been present on this plot for the previous ten years as shown by an annual average increment of 2.43 mm.

Plot #307

This is a lodgepole pine plot on which the average annual increment for the previous ten years was 2.06 mm. which is somewhat above average growth for the district.

Very few samples have been taken from these plots. Some of the plots due to high lower branches and relative inaccessibility probably should be abandoned.

ANNUAL SURVEY REPORT

**NORTHERN ALBERTA EXCEPT BRAZEAU-
ATHABASCA**

P. F. LARUE

1952

ANNUAL RANGER REPORT, FOREST INSECT SURVEY

NORTHERN ALBERTA EXCEPT BRAZEAU-ATHABASCA

1952

P. F. LA RUE

INTRODUCTION

The area covered this season included that portion of the Northern Alberta Fire District which lies north of the Brazeau - Athabasca Forest Reserve and the Edmonton-Lloydminster highway. The code numbers for these districts are 205, 206, and 207 respectively.

TOPOGRAPHY AND FOREST COVER

These districts for the most part are drained by the Peace and Athabasca river systems, rising in the Rocky Mountains and flowing in a north easterly direction to join the MacKenzie river and flow northward into the Arctic Ocean. Two of the main tributaries of the Peace River are the Big Smokey river draining the Grande Prairie region, and the Little Smokey river and its tributaries which drains the western section of the Slave Lake area and the High Prairie district. The Athabasca river and its tributaries drain that portion east of Lesser Slave Lake. The main tributary is the Slave River which carries the overflow from Lesser Slave Lake to the Athabasca River.

The water shed at Lac La Biche flows westward through the La Biche River and its tributaries into the Athabasca. The east side of Lac La Biche is drained by the Beaver River with its leadwaters at Beaver Lake. This river flows eastward into Saskatchewan to the Churchill River.

Most of the Northern Alberta Fire district lies within the mixed wood section of the boreal forest (1).

The land surface is characterized by a series of low rounded hills, cut by deep wooded river valleys with numerous shallow lakes, muskegs and marshes. The slope of the area is predominantly north to north east.

The soils are glacial in origin and podsollic in type.

White spruce, balsam fir and jack pine make up the bulk of the coniferous forest cover. The pine tends to inhabit the sandy sites. Black spruce and tamarack are found on the wet sites.

Towards the western edge of the district in the foothills section of the boreal forest, lodgepole pine tends to replace jack pine. Hybridization of the two species takes place in these areas.

(1) Forest Classification of Canada - W.E.D. Halliday

The deciduous forest cover consists mainly of balsam poplar, aspen, white birch and alder.

WEATHER

The weather for Northern Alberta is characterized by a rather heavy precipitation, higher average temperatures than in other forested parts of the province, and a much longer growing season.

Precipitation averages approximately 17 inches per year, with an average temperature of 56 degrees Fahrenheit during the growing season.

The following chart shows the mean temperatures and precipitation. The deviations from average temperatures and precipitation from the previous years are also shown.

| MONTH | GRANDE PRAIRIE | | | | HIGH PRAIRIE | | | |
|--------|----------------|------|-----|------|--------------|-------|-----|-------|
| | T.M. | TD | P | P.D. | T.M. | TD | P | P.D. |
| April | 39 | +7.8 | 0.6 | -.9 | 41 | +6.8 | 0.8 | -.41 |
| May | 52 | +3.3 | 1.0 | -.25 | 55 | +3.9 | 0.1 | -1.6 |
| June | 55 | -6.2 | 2.1 | -.16 | 56 | -5.0 | 2.2 | +.73 |
| July | 60 | -0.4 | 2.0 | +0.6 | 59 | -3.4 | 4.9 | +1.76 |
| August | 57 | +2.2 | 3.0 | -.68 | 56 | +0.8 | 3.1 | -2.04 |
| Sept. | 52 | -0.8 | 1.2 | +.19 | 51 | -2.41 | 1.5 | +.29 |

| MONTH | KEGG RIVER | | | | LAC LA BICHE | | | |
|-----------|------------|------|-----|-------|--------------|-------|-----|------|
| | T.M. | T.D | P | P.D | T.M. | T.D | P | P.D. |
| April | 39 | +8.8 | .07 | +.21 | 44 | +10.1 | .06 | - |
| May | 54 | +5.0 | .5 | +1.37 | 54 | +4.9 | 1.0 | - |
| June | 55 | -3.1 | 3.0 | +.99 | 58 | -1.6 | 4.5 | - |
| July | 61 | -.01 | 2.9 | +.29 | 61 | -3.2 | 3.4 | - |
| August | 56 | +4.4 | 2.5 | -.91 | 59 | +1.8 | 0.8 | - |
| September | 48 | -3.6 | 1.4 | +.05 | 52 | -1. | 0.7 | +.46 |

| MONTH | SLAVE LAKE | | | | WHITECOURT | | | |
|-----------|------------|------|-----|-------|------------|------|-----|------|
| | T.M. | T.D. | P | P.D. | T.M. | T.D. | P | P.D. |
| April | 42 | +8.2 | 0.1 | +1.7 | 42 | +8.8 | 0.1 | - |
| May | 51 | +3.4 | 0.7 | +1.17 | 49 | +2.5 | 1.5 | - |
| June | 55 | -3.6 | 3.6 | +1.11 | 54 | -2.8 | 3.9 | - |
| July | 59 | -1.4 | 2.6 | - | 58 | -1.3 | 4.0 | - |
| August | 57 | +2.9 | 1.6 | + .57 | 56 | +2.2 | 3.4 | - |
| September | 51 | -0.2 | 0.8 | +1.08 | 50 | +0.7 | 1.0 | - |

"T.M." - Mean temperature. "T.D." Deviation from average mean temperature.
 "P" - Precipitation. "P.D." Deviation from average precipitation.

Total precipitation year ending September, 1952

| <u>GRANDE PRAIRIE</u> | <u>HIGH PRAIRIE</u> | <u>KEGG RIVER</u> | <u>LAC LA BICHE</u> | <u>SLAVE LAKE</u> |
|-----------------------|---------------------|-------------------|---------------------|-------------------|
| 17.3 | 17.8 | 15.1 | 15.0 | 14.2 |

WHITE COURT

20.6

The 1952 season was in general slightly warmer with a noticeable decline in precipitation over the 1951 season.

PHENOLOGICAL DATA

Aspen was in leaf at Smith on the arrival of the Insect Ranger on May 2nd 1952. Bud scales were completely off white spruce at Calling Lake, north of Athabasca on May 28th.

INSECT CONDITIONS

During the 1952 field season, work commenced on May 3rd with an egg count on the forest tent caterpillar and continued until September 4th. The Bark-beetle population in the outbreak in white spruce near Calling Lake was greatly reduced from that of last year. The only other insect found in the infestation category was the forest tent caterpillar and possibly the larch sawfly in the Cold Lake region.

Forest Tent Caterpillar - (Malacosoma disstria)

This insect was found in large numbers extensively throughout the Northern district. The heaviest defoliation found in the 1952 season was in the Smith and Whitecourt areas where these insects were found feeding on all types of deciduous foliage.

A comparatively large outbreak was reported in the Peace River block north of Spirit River.

Larch Sawfly - (*Pristiphora erichsonii*)

The larch sawfly is extending its range slightly each year, but is still confined almost exclusively to the Cold Lake area. The true range of this insect can not be accurately determined due to the "transient" nature of the country involved but a slight increase is expected over the previous year.

Black Headed Budworm - (*Acleris variana*)

A number of larvae of this insect were found in all districts visited. Although this insect was widespread and common, it was not found in any great numbers in any of the areas visited.

Ugly Nest Caterpillar - (*Archips cerasivorana*)

The nests of this insect were found south of French Bay in the Cold Lake district on chokecherry, willow and aspen. They were found in large numbers also in the High Prairie region feeding on every type of deciduous foliage.

Green Headed Spruce Sawfly - (*Pikonema diminockii*)

It was found that this insect was wide-spread and common in all the areas visited.

In the High Prairie and Lac La Biche districts, it was slightly higher than in others. Numerous shade trees were heavily infested and in one area at High Prairie, trees were badly defoliated and dying.

Balsam Fir Sawfly - (*Neodiprion* sp.)

This insect was found in light numbers in a pure stand of jack pine approximately one mile north of Peace River town.

SPECIAL INVESTIGATIONS

In 1951 a heavy outbreak of a bark-beetle of the *Ips* sp. was reported in a spruce stand at Calling Lake. The majority of the spruce and balsam fir trees were killed outright. During 1952 the Insect Ranger accompanied by Mr. G. R. Hopping inspected the area in the vicinity of the mill site. Upon investigation, it was found that very few new trees were infested and that the bark - beetle population was greatly reduced in comparison to that of 1951. This area however, warrants a yearly inspection as new logging operations are taking place in the adjacent stands.

At the request of Mr. Jack Quate of the Dominion Forest Service, a survey was conducted through his experimental plots to determine the number of trees attacked by bark-beetle.

Numerous trees were found injured and dying, however, most of this damage could be attributed to mechanical injuries caused during logging operations, rather than to insects, as only four white spruce trees were heavily infested *with bark beetles* lightly attacked.

On May 4th, an egg count on the forest tent caterpillar (*Malacosoma distria*) was undertaken to determine the number of egg clusters present on aspen in the vicinity of Smith, Alberta. The result from this investigation can be seen from the following chart.

| 1 - Inch Class | | | | | |
|----------------|--------------|----------|--------------|--|--|
| Tree No. | Egg Clusters | Tree No. | Egg Clusters | | |
| 1 | 0 | 1 | 1 | | |
| 2 | 1 | 2 | 0 | | |
| 3 | 0 | 3 | 0 | | |
| 4 | 0 | 4 | 0 | | |
| 5 | 2 | 5 | 1 | | |
| 6 | 0 | 6 | 0 | | |
| 7 | 1 | 7 | 0 | | |
| 8 | 0 | 8 | 1 | | |
| 9 | 0 | 9 | 1 | | |
| 10 | 1 | 10 | 0 | | |

| 2 - Inch Class | | | 3 - Inch Class | | |
|----------------|--------------|---------------|----------------|---------------|--------------|
| Tree Sections | Egg Clusters | Tree Sections | Egg clusters | Tree Sections | Egg Clusters |
| Top | 1 | Top | 1 | Top | 1 |
| Middle | 4 | Middle | 1 | Middle | 2 |
| Lower | 0 | Lower | 0 | Lower | 0 |

From this table it can be seen that the average number of egg clusters on the two and three inch trees is greater than the average on the one inch trees.

This indicates to some extent that the most egg clusters are laid in the bigger and usually taller trees.

BRANCH SAMPLING PLOTS

Three branch sampling plots were set up during the 1952 season. The first was located in a spruce stand in the Whitecourt district, where more larvae than usual are found in the surrounding timber.

The second was established in a white spruce and balsam fir stand in the Slave Lake area. This was established as a white spruce plot.

An aluminum marker was attached to a tree so as to be easily detected from the road. Ten dominant trees were selected and tagged. Increments, heights and diameters of these trees were taken and recorded.

Sampling was carried out with a 2 x 2 ft. canvas sheet held rigid by two cross pieces. The sheet was held under a branch tip, and the tip cut off at a length of 20 inches. The width of the branches was also taken.

Fifty tips from trees in the plot were cut and examined for insects and the results from each tip was tallied on the back of the enclosure slips.

The larvae, adults and pupae from collections were placed in a collecting can and sent to the field station at Seebe for final identification.

The result from this sampling method can be found in the Annual Report of the Forest Insect and Disease Survey.

ANNUAL SURVEY REPORT - 1952

**CLEARWATER, BOW RIVER, AND NORTHERN ALBERTA
FIRE DISTRICT**

E. J. McNEIL

FOREST BIOLOGY RANGER REPORT 1952

CLEARWATER, BOW RIVER, AND

NORTHERN ALBERTA FIRE DISTRICT

E.J. MC NEIL

INTRODUCTION

Forest insect survey sampling and investigations were carried out during 1952 in the Clearwater Forest Reserve, northern part of the Bow River Forest Reserve and the Northern Alberta Fire District along the eastern edge of the two former areas.

The code numbers for these districts are as follows: 012, 011, 222 respectively.

TOPOGRAPHY, SOILS AND FOREST COVER

The Clearwater and Bow River Forest Reserves that lie in the foot-hills of the Rocky Mountains between 3000 to 5000 feet elevation are subalpine and present a rough and broken topography descending eastward to the plains region in a series of somewhat flat-topped plateaux, much dissected by sharply cut river valleys.

The Northern Alberta Fire District, situated between the sub-alpine and plains region is Boreal Forest type.

The Clearwater, and Bow River Forest Reserves

Lodgepole pine, white and black spruce forms the main forest cover which is predominantly coniferous. Aspen and white birch have scattered representation in mixture with the above species. Eastern larch and some black spruce are found in the swampy areas.

The Northern Alberta Fire District.

Aspen, white birch and cottonwood form the main forest cover, which is predominantly deciduous. Lodgepole pine, white and black spruce and eastern larch have a scattered representation with the above species.

CLIMATIC CONDITIONS

Climate is characterized by long winters. Temperatures and precipitation at Rocky Mountain House (N.A.F.D.) and Nordegg (Clearwater F.R.) are showing in the following table.

east of Rimby along the north end of Bull Lake and north of Rimby as far as the Tomahawk ferry on the North Saskatchewan River.

Investigation of Forest Tent Caterpillar - Malacosoma disstria

A survey of egg masses in the Leadale area on May 6, 1952 resulted in the following report. Trees cut down and egg masses were counted. The survey ran from east to west and from north to south.

Tree No. 1. at edge (East)

| | | |
|-------------|-----------------|-----------------|
| | 1950 egg masses | 1951 egg masses |
| Upper crown | 16 | 53 |
| Mid crown | 3 | 21 |
| Lower crown | $\frac{1}{3}$ | $\frac{9}{3}$ |
| Totals | 20 | 83 |

Tree No. 2 at 1 mile

| | | |
|-------------|-----------------|-----------------|
| | 1950 egg masses | 1951 egg masses |
| Upper Crown | 6 | 17 |
| Mid crown | 0 | 4 |
| Lower crown | $\frac{3}{9}$ | $\frac{1}{22}$ |
| Totals | 9 | 22 |

Tree No. 3 at 2 miles

| | | |
|-------------|----------------|----------------|
| Upper crown | 19 | 42 |
| Mid crown | 17 | 12 |
| Lower crown | $\frac{0}{36}$ | $\frac{0}{54}$ |
| Totals | 36 | 54 |

Tree No. 4 at 3 miles

| | | |
|-------------|----------------|-----------------|
| Upper crown | 33 | 117 |
| Mid crown | 11 | 26 |
| Lower crown | $\frac{7}{51}$ | $\frac{4}{147}$ |
| Totals | 51 | 147 |

Tree No. 5 at 4 miles

| | | |
|-------------|---------------|----------------|
| Upper crown | 0 | 4 |
| Mid crown | 2 | 9 |
| Lower crown | $\frac{1}{3}$ | $\frac{1}{14}$ |
| Totals | 3 | 14 |

Tree No. 6 at 5 miles

| | | |
|-------------|----------------|----------------|
| Upper crown | 7 | 29 |
| Mid crown | 5 | 22 |
| Lower crown | $\frac{0}{12}$ | $\frac{0}{51}$ |
| Totals | 12 | 51 |

Tree No. 7 at 6 miles

| | | |
|-------------|---------------|----------------|
| Upper crown | 0 | 13 |
| Mid crown | 6 | 0 |
| Lower crown | $\frac{2}{8}$ | $\frac{5}{18}$ |
| Totals | 8 | 18 |

Tree No. 8 at 7 miles

| | | |
|-------------|-----------------|-----------------|
| Upper crown | 14 | 78 |
| Mid crown | 1 | 41 |
| Lower crown | $\frac{15}{30}$ | $\frac{0}{119}$ |
| Totals | 30 | 119 |

Tree No. 9 at edge (West)

| | | |
|-------------|---------------|----------------|
| Upper crown | 3 | 27 |
| Mid crown | 0 | 6 |
| Lower crown | $\frac{0}{3}$ | $\frac{0}{33}$ |
| Totals | 3 | 33 |

Tree No. 10 at 1 mile

| | | |
|-------------|----------------|-----------------|
| Upper crown | 19 | 102 |
| Mid crown | 15 | 28 |
| Lower crown | $\frac{1}{35}$ | $\frac{1}{131}$ |
| Totals | 35 | 131 |

Tree No. 11 at 2 miles

| | | |
|-------------|----------------|------------------|
| Upper crown | 25 | 63 |
| Mid crown | 11 | 29 |
| Lower crown | $\frac{6}{42}$ | $\frac{14}{106}$ |
| Totals | 42 | 106 |

Note: Trees Nos. 1 to 8 are from east to west.
Tree Nos. 9 to 11 are from north to south.

A survey in the Bingley area approximately five acres produced the following report.

Four trees were cut down and egg masses were counted.

| | Upper Crown | | Mid Crown | | Lower Crown | |
|------------|-------------|-----------|-----------|----------|-------------|----------|
| | New | Old | New | Old | New | Old |
| Tree No. 1 | 31 | 4 | 9 | 2 | 1 | 1 |
| Tree No. 2 | 11 | 5 | 1 | 2 | 0 | 0 |
| Tree No. 3 | 16 | 2 | 0 | 1 | 0 | 0 |
| Tree No. 4 | <u>39</u> | <u>12</u> | <u>8</u> | <u>1</u> | <u>3</u> | <u>2</u> |
| Totals | 97 | 23 | 18 | 6 | 4 | 3 |

A survey was carried out by W. C. McGuffin and E. J. McNeil on October 5 at the Leadale infestation.

The following taken from W. C. McGuffin's report, Forest Tent Caterpillar Egg Mass Survey.

TABLE 1

LEADALE

| LOCATION | | TREE DESCRIPTION | | | CROWN | | | |
|----------|----------------|------------------|--------|--------|-------|--------|-------|-------|
| TREE NO. | LOCALITY | NOTES | D.B.H. | HEIGHT | LOWER | MIDDLE | UPPER | TOTAL |
| E. 1 | By road | B. poplar | 3. 7/8 | - | 1 | 0 | 0 | 1 |
| E. 1 | " " | T. aspen | 3. 3/4 | - | 3 | 4 | 2 | 9 |
| E. 2 | " " | T. aspen | 3. 3/4 | - | 1 | 4 | 14 | 19 |
| E. 3 | In bush | " " | 3. 3/4 | 38 | 0 | 0 | 9 | 9 |
| E. 4 | " " | " " | 3. 1/2 | 46 | 0 | 1 | 4 | 5 |
| E. 5x | By road | suppressed | 3. 7/8 | 27 | 0 | 0 | 1 | 1 |
| E. 5x | By road | dominant | 4.0 | 26 | 5 | 10 | 16 | 31 |
| E. 6 | In bush | | 3. 7/8 | 37 | 0 | 0 | 23 | 23 |
| E. 7 | In bush | | 3. 3/4 | 35 | 5 | 2 | 13 | 20 |
| E. 8xx | In bush | | 3. 1/2 | 23 | 0 | 1 | 0 | 1 |
| E. 8xx | In open bush | | 3. 1/2 | 23 | 1 | 0 | 1 | 2 |
| E. 9 | In bush | | 3. 3/4 | 44 | 0 | 1 | 19 | 20 |
| W. 8 | In bush | | 3. 3/4 | 43 | 0 | 1 | 2 | 3 |
| W. 7 | In bush | | 3. 3/4 | 41 | 1 | 3 | 2 | 6 |
| W. 6 | Leaves on tree | | 3. 5/8 | 54 | 0 | 0 | 1 | 1 |
| W. 5 | " " | " " | 3. 7/8 | 39 | 3 | 1 | 8 | 12 |
| W. 4 | " " | " " | 3. 3/4 | 46 | 0 | 0 | 6 | 6 |
| W. 3 | " " | " " | 3. 7/8 | 39 | 1 | 1 | 26 | 28 |
| W. 2xxx | " " | " " | 3. 3/4 | 38 | 0 | 0 | 0 | 0 |
| W. 2xxx | " " | " " | 4.0 | 36 | 2 | 0 | 1 | 3 |
| W. 1 | At road | | 4.0 | 53 | 0 | 0 | 0 | 0 |
| Total | | | | | 23 | 29 | 148 | |

x - same locality
 xx - " "
 xxx - " "

This Table No. 1 is from east to west.

TABLE NO. 2

Forest Tent Caterpillar Egg Mass Survey

| LOCATION | | TREE | DESCRIPTION | | CROWN | | |
|------------------------------|-------------|--------|-------------|-------------------|--------|-------|-------|
| Tree No. | Location | D.B.H. | HEIGHT | Lower | Middle | Upper | Total |
| | | | | No. of Egg Masses | | | |
| 1 N. from mi. 9 | 1 1/2 miles | 3 3/4 | 43 | 0 | 0 | 2 | 2 |
| 2 N. | 1 1/2 miles | 3 7/8 | 42 | 1 | 1 | 6 | 8 |
| 3 S. | 1 mile | 4 | 53 | 1 | 0 | 1 | 2 |
| 4 S. | 2 miles | 3 3/4 | 27 | 3 | 12 | | 15 |
| 5.1 mi. S. of Aura School | | 4 | 40 | 0 | 1 | 13 | 14 |
| 6.6 " | | 3 3/4 | 27 | 5 | 8 | 16 | 29 |
| TOTALS | | | | 10 | 22 | 38 | |

The tables indicate that there was a larger number of egg masses per tree in the spring survey; whereas the fall survey shows a larger infested area but a smaller number of egg masses.

Western Tent Caterpillar - Malacosoma pluvialis

These were prevalent on dwarf birch in one small swampy area six miles north of Saunders on the Holbrook cabin trail.

Larch Sawfly - Pristiphora erichsonii

This insect was found in small numbers in the Caroline and Rimbly areas.

The Pine Root Weevil - Hypomolyx sp.

This insect was detected at the Strachan project last summer. Through investigations it was found to be quite general throughout the Clearwater area. The specific areas were: eighteen miles west of Caroline at Wrigglesworths pole camp, where weevils were found on all sides of the trees; near Ferrier, seven miles west of Rocky Mountain House and one mile north of the main highway trees were infested on the north and west sides; eighteen miles west of Rocky Mountain House near Horburg, trees were also infested on the north and west sides; north of Saunders on the Holbrook cabin trail, trees were infested on all sides; north of Harlech trees were infested on the north and west sides; near Oras, eight miles north-east of Rocky Mountain House the trees were infested on the north and east sides; thirty miles northwest of Leadale there were very few weevils on the trees and these few were on the north side.

The weevils were found in low areas where there was considerable duff and loose damp soil; none were found where the soil was dry and sandy.

American Poplar Leaf Beetle - Phytodecta americana

There was a noticeable decrease in defoliation from this insect this year.

Bark-Beetle - Ips sp.

Investigations at Wigglesworths pole and lumber camp west of Caroline revealed heavy infestations of this insect in logs cut from February to July. The June cut logs were the most heavily infested.

Thistle Butterfly - Vanessa cardui

This insect caused complete defoliation of the Canada thistle at Bingley, Rocky Mountain House, Baptiste River and Sindre.

Needle Miner - Recurvaria milleri

A survey was made on May 23 in the Panther-Dormer River area and Yaha tinda Ranch area. The population was very low.

SPECIAL INVESTIGATIONS

Acting on Mr. Hopping's instructions, E. J. McNeil and Mr. C. Enwright conducted a survey north of Saunders on July 9th to determine the cause of dead and dying trees in the Lodgepole pine stands. However, the only insect detected was the pine root weevil.

On August 1st, Ranger E. J. McNeil and Mr. C. Enwright rechecked the damage to the Lodgepole pine stands north of Saunders. A negative report was made concerning this area.

BRANCH SAMPLE PLOTS

Five plots were set up in 1952 at the following locations: Rimby, Winfield, Ferrier, Nordegg and Strachen.

These plots were established after the usual beating methods had produced not less than three larvae of the black headed budworm per tree.

A plot marker was placed so it could be seen from the roadway; it was in the form of an aluminum numbered tag 6 x 6 inches placed either on a tree or on a stake.

Ten white spruce were tagged, diameter, height, and surrounding area cover tabulated on the proper forms.

Sampling was carried out with a 2'x 2' sheet held rigid with crossed sticks; this was placed under the branch tip at a length of 20 inches, width measurements were recorded on the back of inclosure

slips along with larval counts, placed in one or more collecting cans and shipped to Seebe.

Results as taken from the 1952 report of Forest Insect Survey of the Calgary Laboratory.

| Location of Sampling area | Branch area in square feet. | No of Larvae per square foot of foliage | Zeiraphera | Acleris | Choristoneura | Neodiprion |
|---------------------------|-----------------------------|---|------------|---------|---------------|------------|
| Ferrier | 47.7 | 1.5 | 1.1 | 0 | 0 | |
| Strachan | 47.7 | 1.5 | 2.1 | 0 | 0 | |
| Nordegg | 50.5 | 0.1 | 0.5 | 0 | 0 | |
| Bimby | 46.7 | 0 | 0 | 0 | 0 | |
| Winfield | 47.7 | 0 | 0.2 | 0 | 0 | |

PERMANENT SAMPLE PLOTS

In 1950 and 1951 a total of 23 plots were set up throughout the Clearwater Forest Reserve area.

No. 201 - Four miles west of Nordegg. It consists of white spruce; ten trees tagged, other cover lodgepole pine, willow and aspen.

Average annual increment (I) white spruce for 10 years 1941 - 1950 was 2 m.m. per tree per year.

Average D.B.H. of spruce was 6.85 inches; average height of spruce 32.95 feet.

Larval Samples From Spruce

| Host | Larvae | Date |
|-----------|-------------------------------------|--------------|
| W. Spruce | 1 Larva - <i>Nyctobia Limitaria</i> | July 7, 1952 |
| | 1 " <i>Eupithecia filicata</i> | |
| | 4 Larvae <i>Acleris varians</i> | |
| | 2 " Syrphid sp. | |

No. 221 - Same location as above. Ten trees of lodgepole pine were tagged.

Average annual increment of the lodgepole pine for 10 years 1941 - 1950 was 1.00 m.m. per tree per year.

Average D.B.H. of lodgepole pine was 6.62 inches and average height 34.87 feet.

No larval samples were obtained from pine trees.

Plot No. 202 is situated at Marleck. Ten trees of white spruce were tagged. Other trees on plot are lodgepole pine, aspen and willow.

Average annual increment of white spruce for 10 years 1941 - 1950 was 1.85 m.m. per tree per year.

Average D.B.H. of spruce was 5.21 inches and average height of spruce 30.59 feet.

Larval Samples from Spruce

| Host | Larvae | Date |
|-----------|---------------------------------------|--------------|
| W. spruce | 1 Larva - Noctuid sp. | July 5, 1952 |
| | 1 " - Tortricoid sp. | |
| | 1 " - <u>Eupithecia filmata</u> | |
| | 3 L. 1 P. - <u>Belieris varians</u> | |
| Aspen | 1 Larva - <u>Dynamigia loricaaria</u> | May 16, 1952 |
| | 4 Larvae - Tortricoid sp. | |
| | 1 Larva - | |

No aspen tagged but samples taken off plot.

Plot 202 - Same location as above, ten trees tagged of lodgepole pine.

Average annual increment of lodgepole pine for 10 years, 1941-50, was 1.95 mm. per tree per year.

Average D.B.H. of pine was 7.52 inches; average height of pine 39.62 feet.

No larval samples were obtained from pine.

Plot 203 - One mile south of Saunders on Ranger Station road.

Ten trees of lodgepole pine were tagged. Other trees on plot are White spruce, aspen, and willow.

Average annual increment of lodgepole pine for ten years, 1941-50, was 1.35 mm. per tree per year.

Average D.B.H. of pine was 8.31 inches; average height of pine was 48.85 feet.

Larval Samples from Pine

| Host | Larvae | Date |
|----------------|--------------------------------------|--------------|
| Lodgepole pine | 1 C. <u>Malacosoma disstria</u> | June 7, 1951 |
| | 1 L. <u>Choristoneura fumiferana</u> | |

Plot No. 223 - Same location as above. Ten trees of aspen were tagged.

Average annual increment of aspen for 10 years 1941-50 was 1.22 mm. per tree per year; average D.B.H. of aspen was 4.85 inches; average height of aspen 39.06 feet.

Larval Samples from Aspen

Aspen 2 Larvae - 2 Cocoons Malacosoma disstria June 7, 1951

| Host | | Larvae | Date |
|--------------|----------|---------------------------|--------------|
| White spruce | 6 Larvae | <u>Acleris varians</u> | July 7, 1952 |
| | 2 pupae | | |
| | 1 Larva | <u>Nyctobia limitaria</u> | |
| | 1 Larva | <u>Eupithecia filmata</u> | |

Plot No. 204 - 1.3 miles south of Nordegg road on Saunders road. Ten trees of lodgepole pine were tagged. Other trees on plot are white spruce, aspen, and willow.

Average annual increment of lodgepole pine for 10 years, 1941-50, was 6.5 mm. per tree per year.

Average D.B.H. of pine was 6.73 inches; average height of pine 34.69 feet.

Larval samples from Pine

| Host | | Larvae | Date |
|----------------|----------|----------------------------|-----------------|
| Lodgepole Pine | 3 larvae | <u>Eufidonia nototaria</u> | August 14, 1951 |
| | 1 larva | <u>Acantholida</u> sp. | |
| Lodgepole Pine | 1 larva | Tenthredinis sp. | July 2, 1952 |
| | 1 pupa | Syrphid sp. | |

No tagged spruce trees on plot but samples taken from small trees on plot.

| | | | |
|--------------|----------|---------------------------|---------------|
| White spruce | 3 larvae | <u>Acleris varians</u> | July 13, 1951 |
| | 1 larva | <u>Tortricid</u> sp. | |
| | 1 pupa | | |
| | 1 pupa | <u>Tortricid</u> sp. | |
| | 1 larva | <u>Syrphid</u> sp. | |
| | 1 pupa | " | |
| White spruce | 4 larvae | <u>Acleris varians</u> | July 6, 1952 |
| | 1 larva | <u>Feriala jocosus</u> | |
| | 4 larvae | <u>Pilonema dimmockii</u> | |
| | 1 larva | <u>Neodiprion abietis</u> | |
| | 1 larva | <u>Eupithecia filmata</u> | |

Plot No. 205 - 0.3 miles east of Clearwater Ranger Station. Ten trees of lodgepole pine were tagged. Other trees on plot are white spruce, aspen, and willow.

Average annual increment of lodgepole pine for 10 years, 1941-50, was 1.38 mm. per tree per year.

Average D.B.H. of pine was 5.93 inches; average height of pine was 37.44 feet.

Larval samples from pine

| Host | Larvae | Date |
|----------------|------------------------------------|----------------|
| Lodgepole pine | 1 larva <u>Parasemia</u> sp. | Sept. 11, 1950 |
| lodgepole pine | 1 larva <u>Eufidonia nototaria</u> | Aug. 4, 1951 |
| | 1 larva <u>Panthea furcilla</u> | |
| | 1 larva <u>Notodontid</u> sp. | |

Plot No. 224 - Same location as above. Ten trees tagged of white spruce; average annual increment for ten years, 1941-50, was 1.82 mm. per tree per year.

Average D.B.H. of white spruce 5.46 inches; average height of spruce 33.85 feet.

Larval samples from spruce

| Host | Larvae | Date |
|--------------|-----------------------------------|---------------|
| White spruce | 4 larvae <u>Acleris varians</u> | July 13, 1951 |
| | 1 pupa <u>Acleris jobosa</u> | |
| White spruce | 5 larvae <u>Acleris varians</u> | |
| | 1 larva <u>Pikonema dimmockii</u> | |
| | 1 larva <u>Neodiprion abietis</u> | |

Plot No. 225 - Same location as above. Ten trees of aspen were tagged; average annual increment for 10 years, 1941-1950, was 1.32 mm. per tree per year.

Average D.B.H. of aspen was 5.57 inches; average height of aspen was 33.09 feet.

Larval samples from aspen

| Host | Larvae | Date |
|-------|---------------------------------|---------------|
| Aspen | 1 larva <u>Xylonyges dolosa</u> | July 13, 1951 |
| | 5 pupae <u>Geotrichid</u> sp. | |
| | 1 cocoon Hymenopterous parasite | |

Plot No. 206 - One half mile from Clearwater Ranger Station boundary gate. Ten trees of lodgepole pine were tagged. Other trees on plot are white spruce and aspen.

Average annual increment for lodgepole pine for 10 years, 1941-50, was 1.75 mm. per tree per year.

Average D.B.H. of pine 7.09 inches; average height of pine 44.80 feet.

No larval samples obtained from the pine.

Plot No. 226 - Same location as above plot. Ten trees of aspen tagged; average annual increment for 10 years, 1941-50, was 1.3 mm. per tree per year; average D.B.H. of aspen was 4.96 inches; average height of aspen was 31.28 feet.

No larval samples obtained from aspen.

Larval samples from White spruce on above plot; all trees under 3 inches D.B.H.,

| Host | Larvae | Date |
|--------------|-----------------------------------|---------------|
| White spruce | 1 pupa <u>Syrphid</u> sp. | July 17, 1951 |
| | 1 larva <u>Syrphid</u> sp. | |
| | 1 larva <u>Nyctobia limitaria</u> | |
| | 2 larvae <u>Acleris varians</u> | |

Plot No. 207 - One mile from boundary cabin on Red Deer Ranger Station road. Ten trees of lodgepole pine were tagged. Other trees on plot are aspen, small white spruce, cottonwood. Average annual increment for 10 years, 1941-50, on lodgepole pine was 2.1 mm. per tree per year.

Average D.B.H. of pine was 4.95 inches; average height of pine was 33.48 feet.

Larval samples from pine

| Host | Larvae | Date |
|----------------|--------------------------------------|----------------|
| Lodgepole pine | 1 larva <u>Caripeta angustiorata</u> | Sept. 13, 1950 |
| | 1 larva <u>Semiothisa granitata</u> | |

Plot No. 227 - Same location as above plot. Ten trees of aspen were tagged; average annual increment of aspen for 10 years, 1941-50, was .85 mm. per tree per year.

Average D.B.H. of aspen 6.13 inches; average height of aspen 40.56 feet.

Larval samples from aspen

| Host | | Larvae | Date |
|-------|----------|---------------------------|--------------|
| Aspen | 6 larvae | <u>Dysmigia laricaria</u> | May 22, 1952 |
| | 1 larva | <u>Campaea perlata</u> | |
| | 3 larvae | <u>Tortricid sp.</u> | |

Larval samples from small spruce; none tagged.

| Host | | Larvae | Date |
|--------------|---------|------------------------|---------------|
| White spruce | 1 larva | <u>Acleris variana</u> | July 17, 1951 |

Plot No. 208 - Two miles east of boundary cabin on Red Deer Ranger Station road. Ten trees of lodgepole pine were tagged; other trees on plot are white spruce, aspen and willow. Average annual increment of lodgepole pine for 10 years, 1941-50, was 1.29 mm. per tree per year.

Average D.B.H. of pine was 8.88 inches; average height of pine was 50. feet.

No larval samples were obtained from pine.

Plot No. 228 - Same location as Plot No. 208. Ten trees of white spruce were tagged. Average annual increment of white spruce for 10 years, 1941-50, was 1.62 mm. per tree per year; average D.B.H. of spruce was 6.50 inches; average height of spruce 36.58 feet.

No larval samples were obtained from spruce.

Plot No. 229 - Same location as Plot No. 208. Ten trees of aspen were tagged; average annual increment of aspen for 10 years, 1941-50, was 1.11 mm. per tree per year; average D.B.H. of aspen was 5.12 inches; average height of aspen was 41.15 feet.

Larval samples from aspen

| Host | | Larvae | Date |
|-------|----------|---------------------------|--------------|
| Aspen | 4 larvae | <u>Dysmigia laricaria</u> | May 22, 1952 |

Plot No. 209 - 0.6 miles north of James River near Ranger Station. Ten trees of lodgepole pine were tagged; other trees on plot are aspen and white spruce.

Average annual increment of lodgepole pine for 10 years, 1941-50, was 2.45 mm. per tree per year; average D.B.H. of pine was 8.20 inches;

average height of pine was 44.22 feet.

Larval samples from pine

| Host | Larvae | Date |
|----------------|--------------------------------------|----------------|
| Lodgepole pine | 1 larva <u>Eupithecia palpata</u> | Sept. 15, 1950 |
| | 1 larva <u>Caripeta angustiorata</u> | |

Plot No. 230 - Same location as above plot.

Ten trees of aspen were tagged; average annual increment of aspen for 10 years, 1941-50, was 1.17 mm. per tree per year; average D.B.H. of aspen was 6.40 inches. Average height of aspen was 35.98 feet.

Larvae samples from aspen

| Host | Larvae | Date |
|-------|-------------------------------------|--------------|
| Aspen | 3 larvae Tortricid sp. | May 20, 1952 |
| | 1 larva <u>Autographa ampla</u> | |
| | 8 larvae <u>Dynamigia loricaria</u> | |

June 24, 1953
Forest Zoology Laboratory
402 Customs Building
Calgary, Alberta

A N N U A L S U R V E Y R E P O R T

**BANFF, KOOTENAY, YOHO, REVELSTOCK, and
GLACIER NATIONAL PARKS**

E. F. THORNTON

1952

FOREST BIOLOGY RANGER REPORT

FOR BANFF NATIONAL PARK

KOOTENAY NATIONAL PARK

YOHO NATIONAL PARK

REVELSTOKE NATIONAL PARK

GLACIER NATIONAL PARK

1952

E.F. THORNTON

INTRODUCTION

Forest Insect Survey sampling and investigations were carried out in this area from May 5 to September 8. The code numbers for these districts are 113, 123, 133, 153 and 143, respectively.

TOPOGRAPHY SOILS AND FOREST COVER

Banff National Park is drained to the east by the Bow and North Saskatchewan Rivers and their tributaries. Kootenay National Park is drained to the south by the Vermilion and Kootenay Rivers, Yoho National Park, the eastern boundary of which marks the 'Great Divide', is drained by the Kicking Horse River and its tributaries. This river flows southward through the park till it joins the Columbia River at Golden, B.C. There is a great variation of altitude in the mountains which results in a definite pattern of plant distribution. Alpine fir, engelmann spruce, limber pine and alpine larch grow at higher elevations than other tree species and they are generally the predominant species found at timber line. Under Halliday's classification (1) the Rocky Mountain Parks fall under the 'Subalpine Forest Region'. It is essentially a coniferous forest; lodgepole pine occupies a larger area than any other tree species; it is the main subclimax type. In wet sites white and engelmann spruce are found as the climax stand, especially in the Bow Valley from Hector Lake northward to the North Saskatchewan Crossing. Alpine fir is the main regeneration species in these stands. Douglas fir is found in most areas on rocky ridges where it escaped fire damage. Trembling aspen, willow and black alder grow along stream and river courses.

On the western slopes of the Rockies in Yoho National Park, western red cedar and western hemlock occur. Undergrowth is more luxuriant and many species not found on the eastern slopes occur.

(1) Halliday, W.E.D. 19 Forest Classification of Canada

Mountain maple, elder berry and mountain ash grow in profusion in the vicinity of the 'Spiral Tunnels' in the Kicking Horse valley.

In Kootenay National Park the timber types are similar to Banff with the exception of the southern end where some western red cedar occurs. Douglas fir grows in pure stands along the south boundary of the park. ^{Rocky Mountain Juniper} *Juniperus scopulorum* forms small trees in this region.

The climate is intemperate; the rainfall is relatively high; the temperatures go to extremes and the growing season is short. Winters are long and often subjected to rapid fluctuations of temperatures caused by 'Chinook' winds. The following table shows mean temperature and precipitation with deviations from average temperatures and precipitation for the year ending September 1952.

| BANFF | | | | | LAKE LOUISE | | | | |
|--|------|-------|------|--------|--|------|-------|-----|--------|
| Month | T.M. | T.D. | P. | P.D. | Month | T.M. | T.D. | P. | P.D. |
| April | 40 | + 3.5 | 1.30 | + .06 | April | 35 | + 3.5 | 1.7 | + .49 |
| May | 46 | + .6 | 2.6 | + .63 | May | 43 | - 1.0 | 2.7 | + 1.18 |
| June | 51 | - 1.0 | 4.8 | + 1.99 | June | 48 | - 1 | 4.3 | + 1.82 |
| July | 57 | - .8 | 1.90 | - .11 | July | 53 | - .7 | 2.7 | + 1.06 |
| August | 55 | - .6 | 2.0 | + .21 | August | 52 | - .4 | 2.3 | - .57 |
| September | 50 | + 3.0 | 1.1 | - .55 | Sept. | 47 | - 4 | 1.2 | + .62 |
| Total precipitation for 12 months = 20.50" | | | | | Total precipitation for 12 months = 34.10" | | | | |

| GLACIER | | | | | REVALSTOKE | | | | |
|--|------|-------|-----|--------|--|------|-------|-----|--------|
| Month | T.M. | T.D. | P. | P.D. | Month | T.M. | T.D. | P. | P.D. |
| April | 39 | - 3.6 | 3.3 | - .69 | April | 45 | + 1.4 | 1.4 | - .43 |
| May | 48 | - 3.5 | 2.0 | - .25 | May | 53 | - .4 | 2.8 | - .74 |
| June | 51 | - .8 | 5.5 | + 2.5 | June | 59 | - .6 | 4.5 | + 1.77 |
| July | 57 | + 1. | 2.0 | - .41 | July | 65 | - .7 | 2.2 | + .14 |
| August | 57 | + .2 | 1.6 | - .93 | August | 64 | + 1.6 | 1.6 | - .39 |
| Sept. | 51 | + 3.6 | 2.5 | - 1.05 | Sept. | 57 | + 4.8 | 0.9 | - 1.86 |
| Total precipitation for 12 months = 61.50" | | | | | Total precipitation 12 months = 43.60" | | | | |

| SINCLAIR PASS | | | | |
|--|------|-------|-----|--------|
| Month | T.M. | T.D. | P. | P.D. |
| April | 36 | - 3.8 | 1.7 | - .77 |
| May | 44 | - 1.8 | 2.4 | + .07 |
| June | 49 | - 2.5 | 5.4 | + 2.56 |
| July | 56 | - 2.4 | 2.2 | - .13 |
| August | 56 | - .4 | 2.1 | - .45 |
| Sept. | 50 | - 6.0 | 1.6 | - .16 |
| Total precipitation for 11 months = 20.50" | | | | |

T.M. - Mean temperature
 T.D. - Deviation from average temperature.
 P. - Precipitation
 P.D. - Deviation from average precipitation.

PHENOLOGY

| | |
|------------------------------|------------------------------|
| Bud scales off spruce | Banff, Alta. June 1, 1950 |
| First green on aspen | Banff, Alta. May 10, 1951 |
| First green on aspen | Banff, Alta. May 10, 1952 |
| Lodgepole pine pollen flying | Banff, Alta. July 1, 1952 |
| Aspen leaves turning | Banff, Alta. Sept. 6, 1952 |
| Most aspen leaves off | Banff, Alta. Sept. 22, 1952. |

INSECT CONDITIONS

Survey sampling began May 24 and terminated August 28. The time from May 5 to May 23 was spent at Mount Eisenhower assisting technical officers R. Shepherd and R.W. Stark.

Spruce Budworm - Choristoneura fumiferana (Chem)

This current flight year for C. fumiferana found the population for that insect not greatly changed geographically or numerically from the last flight year, 1950. The heaviest populations occurred at Boom Creek, B.N.P., Mystaya Canyon, B.N.P., Marble Canyon, K.N.P., Kicking Horse Bridge, Y.N.P. and Emerald Lake, Y.N.P.

Disease was discovered in last instar and prepupal larvae in most areas and diseased larvae were sent to the 'Laboratory of Insect Pathology at Sault Ste. Marie.' A sample of 16 specimens collected at the Kicking Horse Bridge in the Yoho valley on July 20 contained three larvae infected with Beauveria globulifera (red) a fungus disease capable of killing off insect populations. Thirteen of the larvae were infected with contaminants and bacteria, as far as is known, of not too great importance. From Vermilion Crossing on August 8 a sample of 17 larvae was found to contain 7 larvae infected with Beauveria globulifera (red) and 10 with contaminants.

At Vermilion Summit on August 8 a sample of 12 larvae contained 4 larvae infected with B. globulifera (yellow) 2 with Empusa sp. and 6 with contaminants. At Marble Canyon on August 8 a sample of 6 larvae contained 1 Empusa, 1 Empusa and Iseris farinosa. At Hawk Creek on August 8 a sampling of 6 larvae contained 3 B. globulifera (red) and 3 with contaminants. The presence of disease in C. fumiferana may be a controlling factor for this insect.

Black Headed Budworm - Acleris/ariana

This insect appears in isolated areas in Banff in relatively large numbers. At Carrot Creek just inside the east gate and at Mystaya

Canyon near the North Saskatchewan Crossing the population was much higher than at any other area sampled. In Kootenay National Park A. varians appeared in an endemic state throughout the park. In Yoho National Park, A. varians had a very light population from the confluence of the Yoho and Kicking Horse Rivers to the Natural Bridge.

Lodgepole pine needle miner - Recurvaria milleri (Busck)

Very little change in location or intensity of needle miner population was noted in Kootenay and Yoho National Parks. A heavy population was discovered in the Cascade valley north east of Banff in the vicinity of Stoney Creek. This insect appeared again on the west slope of Hector Mountain, above the 5000 foot level in medium infestation. North from the North Saskatchewan Crossing to the North Fork of the North Saskatchewan River a distance of approximately 25 miles the needle miner has caused considerable browning of pine foliage on the west side of the river valley. A small area in the vicinity of the Kicking Horse Tea Room in Yoho National Park had a heavy population.

Mountain Pine Bark Beetle - Dendroctonus monticolae

At Ice River, Yoho National Park the 'red tops' had practically disappeared and no fresh 'pitch tubes' were found.

Terminal Shoot Weevil - Pissodes sp.

On the Kootenay River flats this insect is still causing damage to regeneration of open growing spruce. It does not appear to be on the increase.

OTHER INVESTIGATIONS

On June 10, an investigation was carried out in Revelstoke National Park to determine the population and extent of the forest tent caterpillar outbreak. It was discovered that the infested area in the park covered approximately 10 acres. One 3" D.B.H. 30' high trembling aspen was cut down and an egg mass count made. A total of 64 masses were found.

A trip was made to Jasper National Park August 18, in response to a report of Aphid damage in Jasper townsite. Maple, Russian poplar, balsam poplar, white birch and a number of shrubs and vines were found to be infested. Spraying had been carried out by the park personnel with a 'Tifa' sprayer using Black Leaf 40, a nicotine sulphate spray. The results were very ineffective. The population was still at a high level on August 20 when the investigation was made. A second spraying was done then with very little mortality to the Aphids. It was concluded that the 'Tifa' sprayer used was not suitable. Mr. Hopping has forwarded suggestions for next year's control of the pest. Although the trees had a blighted, unhealthy look it is doubtful if there will be much mortality.

Semiothisa granitata - Caripeta angustiorata

Survey sampling was carried out in Jasper National Park from August 20 to August 27 in an effort to secure a large number of S. granitata for winter rearing. Eighteen well distributed areas were chosen and collections made from these areas from douglas fir, white spruce and lodgepole pine. It was decided that the population of S. granitata and C. angustiorata was very low.

PERMANENT BRANCH SAMPLE PLOTS

Three permanent branch sample plots were set up in Banff National Park, one in Kootenay National Park and one in Yoho National Park. The object of these plots is to show the population trend of the spruce budworm, black headed budworm and balsam fir sawfly from year to year. Where one or more of these larvae were found per tree a plot was established. When a suitable location had been found for a plot, 10 trees were tagged, increments, heights and D.B.H. taken. Forms S.E. 219 and S.E. 209 were filled in and a map showing the location of the plot was drawn. A branch sample was made by cutting a branch tip 20" long from a tree holding a flat 2'x2' canvas sheet below it to prevent loss of larvae. Every twig and bud was thoroughly examined for larvae which were sent to Seebe for identification and rearing. Branch measurements were taken with the 2'x 2' canvas sheet which was marked off in inches. Fifty such samples comprised a collection, branches either from the 10 tagged trees or from trees of the same species in the vicinity of them, where possible four branches were cut from each tree i.e. north, south, east and west sides. The following table gives the results for 1952.

| Location of Sampling Point | Branch Area (sq. ft.) | Number of Larvae/sq.ft.foliage | | | |
|--|-----------------------|--------------------------------|---------|---------------|------------|
| | | Zeraphera | Acleris | Choristoneura | Neodiprion |
| Mistaya River, Banff N.P. | 69.8 | 0 | 1.1 | 0.3 | 0 |
| Boom Creek, Banff N.P. | 71.2 | 0 | 0.05 | 1.1 | 0 |
| Carrot Creek, Banff N.P. | 81.7 | 0 | 0.8 | 0.006 | 0.06 |
| Marble Canyon, Kootenay N.P. | 81.7 | 0.01 | 1.1 | 0 | 0 |
| Kicking Horse River Bridge Yoho, N.P. | 82.8 | 0 | 0.1 | 0.7 | 0 |

PERMANENT SAMPLING PLOTS

Seven permanent sample plots were established in Banff National Park during May 1950. These plots are 100 feet on each side, 10 trees of the species for each plot were tagged, D.B.H., height and increments were taken and recorded on the sample plot forms S.E. 219 and S.E. 209 as well as a description of each tree as to crown class, story, shade defoliation and injury. The increments were counted and a graph showing annual growth and accumulated growth from 1941 to 1950 inclusive. The object of these plots was to determine the growth conditions on various sites and to find out what insects occurred on the plots.

The following table shows larvae taken from plot 101 (white spruce) situated on bench land 3 miles west of the east gate of Banff National Park.

| <u>Sample plot</u> | <u>Larvae</u> | <u>Host</u> | <u>Date</u> |
|--------------------|---------------------------------------|--------------|-------------|
| 101 | 6 larvae - <i>Thera otisi</i> | juniper | 30-V-50 |
| 101 | 2 larvae - <i>Pikonema alaskensis</i> | white spruce | 17-VII-50 |
| 101 | 1 larva - Tenthredinid sp. | shepherdia | 17-VII-50 |
| 101 | 1 larva - Geometrid sp. | bearberry | 17-VII-50 |
| (101 | 12 larvae - <i>Thera otisis</i> | juniper | 27-VI-51) |
| (101 | 1 pupa - <i>Eupithecia nyphe-</i> | |) |
| (| dophilata | juniper | 27-VI-51) |
| 101 | 1 larva - Tenthredinid sp. | White spruce | 27-VI-51 |

No collections were made in 1952.

Sample plots 101, 102 and 103 lie within the same boundary. 101 is white spruce, 102 douglas fir, and 103 lodgepole pine. They are situated on bench land 5 miles east of Banff just off the Banff, Calgary highway, the elevation is 4362', the soil is sandy loam, well drained and level in a sheltered spot. The growth conditions are considered good and it is fairly representative of the surrounding forest.

The average annual growth for the period 1941 to 1950 inclusive on plot 101 white spruce was 4m.m./tree/year. The average annual growth for the period 1941 to 1950 inclusive on plot 102 douglas fir was 3.1 1/5 m.m./tree/year. The average annual growth for the period 1941 to 1950 inclusive on plot 103 lodgepole pine was 2.1 m.m./tree/year.

Sample plot 105 is white spruce, situated 12 miles west of Banff, the elevation is 4593' the soil is sandy loam, well drained and level, in a sheltered position. The growth conditions are considered good and it is fairly representative of the surrounding forest.

The average annual growth for the period 1941 to 1950 inclusive was 2.3 m.m./tree/year.

Sample plot 106 is lodgepole pine situated 17 miles west of Banff, the elevation is 4676' the soil is sandy loam, level not well drained, rather a damp site in a sheltered spot. Prior to the needle miner mortality in the Bow River valley during the winter of 1950-1951 this plot was heavily infested with needle miner. The graph for plot 106 'annual increment' shows a steady decline for the period 1941 to 1950.

The average annual growth for the period 1941 to 1950 inclusive was 2.4 1/5 m.m./tree/year.

Sample plot 107 is white spruce situated on Tunnel Mountain near Banff, the elevation is 5000' the soil is sandy loam, well drained and level in a sheltered spot. The growth conditions are considered good and it is fairly representative of the surrounding forest. The average annual growth for the period 1941 to 1950 inclusive was 2.5 m.m./tree/year.

Sample plot 108 is douglas fir, it is located on Tunnel Mountain near Banff at an elevation of 5000'. The soil consists of from 1 to 3 inches of loam on rock and gravel, it is a dry site with a southern exposure. The growth conditions are considered to be good. This plot does not represent the surrounding forest. Some old douglas fir averaging about 150 years grow along this mountain side. The regeneration from them averaging about 35 years old form the greatest percentage of the trees on this sample plot. A graph for this plot has not been completed as it is necessary to obtain more increments.

ANNUAL SURVEY REPORT

CROWNEST-BOW RIVER DISTRICT

R. R. STANLEY

1952

FOREST BIOLOGY RANGER REPORT
CROWNEST-BOW RIVER FOREST RESERVE
WATERTON LAKES NATIONAL PARK AND
ELKWATER PROVINCIAL PARK

R. R. STANLEY, 1952.

Introduction

Forest Insect Survey sampling and investigation covered in this report, were conducted throughout the following districts; Crownsnest-Bow River Forest Reserve, Waterton Lakes National Park, and Elkwater Provincial Park. Also included was the portion of the N.A.F.D. adjacent to these areas.

The code numbers of these districts are: 011, 021, 031, and 041 respectively.

Topography, Soils, and Forest Cover.

The Crownsnest-Bow River Forest Reserve and Waterton Lakes National Park lie along the east slopes of the Rocky Mountains, where the principal watercourse is the Old Man River. This stream with its many tributaries drains over half of this region. Among other rivers are the Bow along the northern end, and the Waterton and Belly rivers in the south. All these streams drain into the South Saskatchewan River, which in turn empties into Lake Winnipeg and from thence to Hudson's Bay by the Nelson River.

A characteristically coniferous forest covers this section from around the 4000 ft. elevation to tree line, approximately 7000 ft. In the northern portion, lodgepole pine following fires, forms the bulk of the forest coverage. Englemann and white spruce are usually found on north slopes and wet places. Alpine fir enters towards tree line along with small patches of white bark pine. Some limber pine is present on the foothills and exposed ridges. Along the lower slopes and passes, there is some intrusion of douglas fir from the Montane Forest Region. A fringe of aspen occurs where this area comes in contact with the Grassland Formation.

In the southern portion, or Waterton Lakes area, the lodgepole pine and douglas fir are the pre-dominant species, with Englemann and white spruce in canyon bottoms and seepage spots. As in the northern section alpine fir replaces the lodgepole pine and douglas fir near timberline. Limber pine is also present along rocky valley bottoms and hillsides, and clumps of aspen at the contact with the Grassland Formation.

The topography is mountainous with steep-sided valleys. The soils are mostly colluvial, derived from glacial and residual material.

The Elkwater Provincial Park takes in the Cypress Hills, which are approximately twenty five miles long and four to five miles wide.

The general slope of the timbered section is north and east, and is drained along the north side by several small streams which eventually empty into the South Saskatchewan River. The Battle Creek and its tributaries drain the eastern end ^{and} flow into the Milk River to the south.

The main forest cover is lodgepole pine along with white spruce; the latter is generally found on north slopes. Aspen has a scattered representation in mixture with the above species. The timbered area lies between the four thousand and the forty-eight hundred foot elevation. The topography is a series of rolling hills rising approximately one thousand feet above the surrounding country, with open grassy meadows on the upper benches. Soil conditions are much the same as in the previous section.

CLIMATE

The climate is characterized in general by long winters, rather low precipitation of from 15 to 30 inches, increasing westward in the higher elevations; temperatures are low and the growing season short.

The following table shows mean temperatures and precipitation, also deviation from average temperature and precipitation. *for 1952 Season.*

| WATERTON | | | | | COWLEY | | | | |
|----------|------|------|-----|------|--------|------|-------|-----|-------|
| Month | T.M. | T.D. | P | P.D. | Month | T.M. | T.D. | P | P.D. |
| Apr. | 44 | - | 2.2 | - | Apr. | 43 | + 3.6 | 0.2 | -1.04 |
| May | 49 | - | 1.6 | - | May | 48 | - .4 | 0.9 | -1.71 |
| June | - | - | 4.0 | - | June | 54 | + .4 | 2.5 | -1.31 |
| July | 60 | - | 3.0 | - | July | 59 | - 3.0 | 1.0 | - .58 |
| Aug. | - | - | - | - | Aug. | 58 | - 1.8 | 2.0 | + .46 |
| Sept. | 56 | - | 1.4 | - | Sept. | 55 | + 3.6 | 0.4 | -1.66 |

Total precipitation for 11 months
= 30.70

Total precipitation for 12 months
= 16.70

| PERISKO | | | | | KANANASKIS | | | | |
|---------|------|-------|-----|--------|------------|------|-------|-----|-------|
| Month | T.M. | T.D. | P. | P.D. | Month | T.M. | T.D. | P. | P.D. |
| Apr. | 41 | † 6.2 | 0.7 | - 1.31 | Apr. | 42 | † 5.0 | 0.9 | - .50 |
| May | 45 | † 1.6 | 3.5 | † .58 | May | 46 | † 0.2 | 2.9 | - .48 |
| June | 50 | † 1.4 | 6.6 | † 2.79 | June | 51 | † 0.2 | 7.5 | 43.61 |
| July | 54 | - 2.6 | 2.6 | † .55 | July | 56 | - 1.8 | 3.2 | † .74 |
| Aug. | - | - | - | - | Aug. | - | - | - | - |
| Sept. | 50 | † 4.0 | 1.5 | - .85 | Sept. | - | - | - | - |

Total precipitation for 11 months
= 25.30

Total precipitation for 10 months
= 23.50

T.M. = Mean temperature

T.D. = Difference from average temperature

P = Precipitation

P.D. = Difference from average precipitation

INSECT CONDITIONS

Survey sampling was initiated on May 5, and continued to July 23 in these districts south of the Bow River. The reason for the early termination of work in these areas was to have rangers available to conduct a general survey and special investigation strip into Woods Buffalo Park and the Northwest Territories, to check on the Spruce Budworm and Large Aspen Loctrix outbreaks reported last year. This survey was completed on Aug. 29, and is covered by G. R. Hopping's report. The remainder of the season was spent assisting R. W. Reid on the Bark Beetle project being carried on at Strachan.

CROWNEST-BOW RIVER FOREST RESERVE

This reserve was covered from May 10 to May 19, May 26 to June 10 and June 20 to July 10. A few species capable of causing damage were taken, but the only noticeable defoliation encountered was due to American Leaf-eating Beetles. A total of 176 survey samples was made.

American Leaf-eating Beetles - *Phytodecta americana*

Small infestations of this insect were found in nearly all districts from the Bow River along the east slope of the Rockies, to Castlemount. In most cases the damage was light and widely scattered; however along the Highwood river, from two miles east of the reserve gate to Cat Creek, defoliation was quite noticeable and occurred quite frequently. Other districts affected to a greater extent were the

north fork of Sheep Creek and the West Porcupines. In all cases the outbreaks did not include more than three acres.

Large Aspen Tortrix; Archips conflictana

These insects were present in nearly all areas where aspen occurred but damage was light.

Ugly Nest Caterpillars; Archips cerasovorana

A small infestation of these caterpillars was noted approximately four miles west of Longview on the Highwood River. Chokecherry and Rose were completely defoliated. The area attacked was not more than three acres in extent.

Western Tent Caterpillars; Malacosoma pluviale

These insects were commonly collected throughout this section. While most numerous in the Crowsnest Pass and the Highwood River valley it was also present in all other districts representing a fairly high population. Wild rose was the preferred host; along with it, saskatoon and other shrubs were eaten.

Forest Tent Caterpillars; Malacosoma disstria

This was taken in very small quantities, apparently the outbreak of this insect in the northern districts did not extend south of the Bow River.

Lodgepole Pine Needle-miner; Recurvaria milleri

As in previous years only a few trees showed evidence of Needle-miner activity in widely scattered locations. Each collection contained only one or two mined needles and damage was negligible.

Spruce Weevil; Bissodes spp.

These were present in all districts representing an endemic population.

Sawflies; Neodiprion abietis and Lanthredinid spp.

The distribution of these sawflies was general throughout the forested region and although they appeared quite numerous in places, there was no noticeable defoliation. *associated with them*

Budworm; Zeiraphera sp.

There was no noticeable increase of this budworm in this section, and conditions were much the same as in the previous year, with a fairly high population in the Porcupine Hills and Crowsnest Pass areas.

Defoliation was light.

Black-headed Budworm, Acronycta variana
~~This budworm~~ was also present in most areas in small numbers.

Autographa alias:

Collections of this larva from most parts of this section, indicate a small well dispersed population, similar to that of 1951. There was no noticeable defoliation by them.

WATERTON LAKES NATIONAL PARK

Investigations and sampling were conducted in this area from May 20 to May 25, June 11 to June 19, and July 17 to July 22. During this time eighty-six survey samples were taken. No serious infestations were observed.

American Leaf-eating Beetles, Phytodecta americana

There was defoliation in patches ranging from light to very heavy all along the Chief Mountain Highway from the Prk. gate to the International boundary. Other districts affected to a lesser degree, were along the valley from Waterton to Twin Butte, and the Red Rock Canyon area.

During the latter part of May and early June, defoliation was plainly visible in all these stands of aspen; the upper crown of the larger trees were noticeably affected. On a later visit in July it was found that the trees had recovered to a point where defoliation was hardly noticeable. The pictures below showing defoliated aspen were taken on June 14, approximately fourteen miles south-east of Waterton on the Chief Mountains Highway.

Tent Caterpillars; Malacosoma spp.

Malacosoma pluviale It was present in small quantities in nearly all areas. Defoliation was light on rose, saskatoon and other small shrubs.

Malacosoma disstria: It was not encountered and very few specimens have been taken in previous years.

Sawflies, Neodiprion and Tenthredinid sp.

These sawflies were collected in all districts in numbers corresponding to that of 1951. Damage was very light.

Ugly Nest Caterpillars; Archips cerasivorana

These insects were quite numerous in the vicinity of Waterton Lakes townsite and golf course and also along the Chief Mt. Highway two miles south of the Belly River bridge. Defoliation was heaviest on Chokecherry.

Lodgepole Pine Needle-miner; Recurvaria milleri

There was very little change in needle-miner population throughout the park during 1952, evidence of its presence was found in several different areas indicating a wide distribution, but in all cases several trees would have to be examined to find one or two mined needles.

Semiothisa granitata and Eupithecia sp.

These were present in all districts in small quantities.

ELKWATER PROVINCIAL PARK

This park was visited twice by Insect Rangers during the past season: from May 6 to May 9, and from July 11 to July 16. Due to a late spring very little was accomplished on the first trip in the line of sampling. There were large patches of snow lying in shaded places and the leaves had not yet started to appear on the aspen. However, on ~~the~~ visit in July, a fairly complete coverage was given both the Alberta and Saskatchewan sides of the hills.

The only defoliation encountered was caused by Phytodecta americana on aspen. Thirty-three survey samples were taken.

American Leaf-eating Beetles; Phytodecta americana

There was defoliation caused by this insect ranging from light to medium on aspen in small patches along the road leading from Fox to Maple Creek. In all cases the areas affected were limited to one or two acres. ~~They~~ ^{the insects} were also present in scattered areas in the vicinity of Elkwater and the Springs Creek R.S. ^{where} defoliation ~~in these patches~~ was light.

Lodgepole Pine Needle-miner; Recurvaria milleri

A survey was made early in May to determine the population of Needle-miner on Lodgepole Pine throughout the hills. On taking samples from several different localities, it was found that although they ~~were~~ present in nearly all areas, they ~~were~~ not in sufficient numbers to warrant an infestation report. Also, it was decided that the ~~life~~ cycle, ^{of these} corresponds to the Banff ~~outbreak~~. ^{life cycle of these at}

The pictures below were taken on May 8, showing snow still lying in sheltered places, and aspen that ~~has~~ not yet started to leaf out. This indicated that the season was approximately two weeks behind that of the districts farther north.

OTHER INVESTIGATIONS

On June 10, a trip was made into the area lying south of Morley to investigate the brownish tinge on Lodgepole Pine and Douglas fir. Several samples were taken and the trees affected were closely inspected for beetle damage and root insects.

There was no insect activity found, so it is thought that the injury is probably due to "red belt", as this section is frequently hit by chinook winds and the temperatures vary greatly in the course of a few hours.

Another special trip was made into a stand of Lodgepole Pine lying along the east slope of Sofa Mountain. This area suffered frost damage during 1950 and has not yet recovered. A small percentage of the trees are dead and it was thought that ^{as it was} ~~being~~ an ideal bark beetle breeding ground, these insects might increase to outbreak proportions. However there was no change in the boundary of the affected area, and the only beetle damage present was confined to trees that had been blown down. The trees affected in this stand of pine are being cut by Parks personnel and used for bridges, fence posts, and telephone poles.

During July, two investigations were conducted in Waterton Lakes National Park by Insect Ranger Stanley and Forest Pathology Officer, Bourchier. The first inspection was made in a stand of aspen, approximately sixteen miles south-east of Waterton, near the foot of Sofa Mountain, where the only foliage on these trees was in clusters at the tips of the branches. There were also a number of dead trees in this stand. There was no evidence of insect or game damage, and it would appear that a disease was responsible for this condition. Samples of branch stems were taken and are being cultured in the Forest Pathology Laboratory in Calgary. No conclusions have been reached as yet as to the cause of the damage, the picture attached shows the general appearance of these trees.

The other investigation was made approximately five miles west of Waterton Lakes along the north side of the Cameron Creek valley; this area consists mostly of lodgepole pine and for the past three years has been showing a brownish tinge with scattered dead or dying trees throughout the region. No definite decision was reached on the causal effect but it was thought that the

damage was caused by "Pole Blight". Samples were taken and are being studied in the Forest Pathology Laboratory at Calgary.

There was no apparent insect damage in this area.

PHENOLOGY, 1952

| | <u>Locality</u> |
|-------------------------|----------------------------|
| First green on aspen | K.F.E.S. Hdqters. Apr. 28 |
| " " " " | K.F.E.S. Aspen Plot May 11 |
| Bud scales off spruce. | " " " June 2 |
| L.P. Pine pollen flying | " " " June 9 |
| Aspen leaves turning | " " " Sept 8 |
| Most aspen leaves off. | " " " Sept 29 |

Permanent Branch Sample Plots

Three branch sample plots were set up in the following areas: One in the West Porcupine Hills, one approximately three miles south of Hillcrest, and one in the Belly River district. The areas were picked where one or more of these three species of larvae were taken per tree. Spruce Budworm, Black Headed Budworm, and Balsam Fir Sawfly. Ten trees were selected and four branch tips per tree were measured for length and width; the tips were then carefully examined for larvae, pupae and eggs, and the numbers recorded on the back of the enclosure slip. Insects and foliage were placed in a can and sent to Seebe for final identification and rearing.

These plots were laid out in convenient areas where there was little chance of disturbance. The ten sample trees were tagged and a marker put up for identification. A complete description of the tagged trees was taken regarding, tree number, diameter, height and species; increments were not counted due to lack of equipment. Soil, slopes and ground cover was also listed and rough maps showing location of plots were made.

Results as taken from the annual report of the Forest Insect and Disease Survey 1952.

| Location of Sampling point. | Branch Area (Sq. ft.) | Number of Larvae/ Sq. ft. Foliage | | | |
|-------------------------------|-----------------------|-----------------------------------|----------------|----------------------|-------------------|
| | | <u>Zeiraphera</u> | <u>Acleris</u> | <u>Chorestoneura</u> | <u>Neodiprion</u> |
| Belly River, Waterton L.N.P. | 45.3 | 0 | 0 | 0.02 | 0.4 |
| Summit, W.Porcupine Crow F.D. | 49.8 | 0.2 | 0.1 | 0 | 0 |
| Hillcrest | 51.9 | 0.02 | 0.02 | 0 | 0.2 |

Permanent Sampling Plots.

In 1949 and 1950 a total of 12 permanent sampling plots were set up in these districts: Two in the Cypress Hills, three in Waterton Lakes National Park, and seven in the Crownsnest Forest Reserve.

These plots are 100 feet on each side. On each plot ten trees of type were tagged, and a red band painted around them for easy spotting. A complete description was taken regarding: tree number, D.B.H., height, species, crown class, story, shade, defoliation, and other injury. Increments were taken and a graph drawn up to indicate; annual growth and accumulated growth from 1940 to 1949 inclusive.

Since these plots were established, it has been the custom to take samples from four branches on different sides of each tagged tree by heating the branches into a sweep net. All other samples taken on these plots were done by the usual method of using a beating sheet and shaking the insects out of the trees onto it.

The object in setting up these plots was to determine if possible, the type of site, whether it was good, bad, or intermediate, and also to find out what insects were to be found on such sites.

(1) In the Cypress Hills, plot C.H.1. is a lodgepole pine plot, located on the same area as plot C.H.2 (spruce).

Growth conditions as determined by averaging the annual increment of ten trees over a period of ten years (1940-49) were fair. (1.9 mm./tree/year.)

This plot was sampled on August 10, 1950, June 30 1951, and July 12, 1952.

Larvae obtained on sampling:

| Host | Larvae | Date |
|-----------|-----------------------------------|---------------|
| L.P. Pine | 1 larva. <i>Eupithecia ornata</i> | Aug. 10, 1950 |
| | 1 " <i>Semiothisa granitata</i> | |
| | 1 " <i>Chrysomelid sp.</i> | |
| | 1 " <i>Autographa alias</i> | June 30, 1951 |
| | 2 " <i>Neodiprion sp.</i> | July 12, 1952 |

(2) Plot C.H.2 in the Cypress Hills is a white spruce plot, located with plot C.H.1.

Growth conditions as determined by averaging the annual increment of ten trees over a period of ten years (1940-49) is poor. (0.62 mm./tree/year)

This plot was sampled on August 6, 1951, June 20, 1951 and July 12, 1952

Larvae obtained on sampling:

| Host. | | Larva | Date |
|-----------|----------|---------------------|----------------|
| W. Spruce | 2 larvae | Pikonema dimmockii: | August 6, 1951 |
| | 2 " | Autographa alia | June 20, 1951 |
| | 1 " | Eupithecia filmata. | June 12, 1952 |

(3) In Waterton Lakes National Park, plot W.1 is an Englemann spruce plot. Growth conditions as determined by averaging the annual increment of ten trees over a period of ten years. (1940-49) were fair. (1.2 mm/tree/year).

This plot was sampled on July 18, 1950, June 11, 1951, June 14, 1952 and July 21, 1952.

Larvae obtained on sampling:

| Host. | | Larva | Date |
|-----------|------------|----------------------|---------------|
| E. Spruce | 2 larvae | Pikonema dimmockii: | July 18, 1950 |
| | 14 " | Neodiprion abietis | |
| | 1 " | Acleris varians | |
| | 2 " | Nyctobia limitaria | |
| | 1 " | Phalaenid sp. | |
| | 1 " | Hemerobiid sp. | June 11, 1951 |
| | 7 " | Geometrid sp. | June 14, 1952 |
| | 1 " | Acleris varians | |
| | 16 " | Neodiprion abietis | |
| | 7 " | Pikonema alaskensis | July 21, 1952 |
| | 5 " | Pikonema dimmockii | |
| | 3 " | Neodiprion abietis | |
| | Meadow Rue | 1 larvae | Geometrid sp. |
| 4 " | | Phalaenid sp. | |
| 1 " | | Syrphid sp. | |
| T. Aspen | 14 larvae | Archips conflictana, | July 18, 1950 |
| | 1 " | Orthosia hibisci | |

(4) Plot W.2 in Waterton Lakes National Park is a lodgepole pine plot, located with plot W.3. Growth conditions as determined by averaging the annual increment of ten trees over a period of ten years (1940-49) were fairly good. (1.9 mm./tree/year.)

There were no larvae collected from this plot.

(5) Plot W.3 is an Englemann spruce plot located with plot W.2. in the Waterton Lakes National Park.

Growth conditions as determined by averaging the annual increment of ten trees over a period of ten years (1940-49) were poor. (1.05 mm./tree/year).

This plot was sampled on July 17, 1950 and July 30, 1951.

Larvae obtained on sampling:

| Host | | Larva | Date |
|-------------|-----------|-------------------------|---------------|
| E. Spruce | 15 larvae | Neodiprion abeitis | July 17, 1950 |
| | 2 " | Nyctobia limitaria | |
| | 1 " | Zeiraphera fortunana | July 17, 1950 |
| | 4 " | Neodiprion abeitis | July 30, 1951 |
| | 1 " | Acleris variana | |
| | 1 " | Hemerobiid sp. | |
| Willow | 4 " | Tenthredinid sp. | July 17, 1950 |
| | 1 " | Scoliopteryx libatrix | |
| | 1 " | Protobearmia porcelaria | |
| | 1 " | Polygonia faunus | |
| Mal. Poplar | 1 " | Tenthredenid sp. | July 17, 1950 |

(6) Plot C_wB.1 is a lodgepole pine plot located in the Crowsnest Pass area of the Crowsnest Forest Reserve.

Growth conditions as determined by averaging the annual increment of ten trees over a period of ten years (1940-49) were good. (2.1 mm./tree/year.)

This plot was sampled on July 6, 1950, July 17, 1951 and June 25, 1952.

Larvae obtained on sampling:

| Host | | Larva | Date |
|-------------------------|--------------|------------------------|---------------|
| L.P. Pine (Juniper?) | 4 larvae | Tortricid sp. | July 6, 1950 |
| | 1 " | Thera otisi | |
| | 1 " | Tortricid sp. | |
| | 1 " | Syrphid | |
| | 1 pupa | Tortricid sp. | July 17, 1951 |
| | 1 larva | Syrphid sp. | June 6, 1950 |
| D. Fir | 1 " | Neodiprion abeitis | July 6, 1950 |
| | 1 " | Coccinella sp. | |
| | 1 " & 1 pupa | Metasyrphus lapponicus | |
| Shepherdia | 2 " | Phalaenid sp. | July 6, 1950 |
| | 1 " | Geometrid sp. | |
| | 1 " | Malacosoma pluviale | |

(7) Plot C.B.2 is a lodgepole pine plot located in the Crowsnest Forest Reserve.

Growth conditions as determined by averaging the annual increment of ten trees over a period of ten years. (1940-49) were very good (3.6mm./tree/year)

This plot was sampled on July 10, 1950, and July 20, 1951.

Larvae obtained on sampling:

| Host | | Larva | Date |
|-------------|--------------|----------------------|---------------|
| L.P.Pine | 4 larvae | Metasyrphus sp. | July 10, 1950 |
| | 1 " & 1 pupa | Syrphid sp. | |
| | 1 larvae | Lambdina ficellaria | |
| E. Spruce | 8 " | Gelechiid sp. | July 20, 1951 |
| | 1 " | Epirrhoe plebaculata | July 10, 1950 |
| | 1 " | Pamphiliid sp. | |
| Limber Pine | 1 " | Incisalia eryphon | July 10, 1950 |
| Shepherdia | 1 " | Archips conflictana | July 10, 1950 |
| | 2 " | Phalaenid sp. | |
| | 1 " | Tortricid sp. | |
| D.Fir. | 10 " | Syrphid spp. | July 10, 1950 |

(8) Plot C.B.3 is an Englemann spruce plot located in the Crowsnest Forest Reserve.

Growth conditions as determined by averaging the annual increment of ten trees over a period of ten years (1940-49) were good. (2.3mm./tree/year.)

This plot was sampled on July 11, 1950, July 24, 1951 and June 20, 1952

Larvae obtained on sampling:

| Host | | Larva | Date |
|-----------|-----------|----------------------|----------------|
| E. Spruce | 2 larvae | Neodiprion abietis | July 11, 1950 |
| | 3 " | Pikonema dimmockii | |
| | 2 " | Neodiprion abietis | July 24, 1951 |
| | 1 " | Pikonema dimmockii | |
| | 2 " | Zieraphera fortunana | June 20, 1952. |
| | 1 " | Pikonema alaskensis | |
| | 1 " | Neodiprion sp. | |
| Willow | 2 " | Archips conflictana | July 11, 1950 |
| | 1 " | Geometrid sp. | |
| | 1 " | Tortricid sp. | |
| T.Aspen | 1 " | Tortricid sp. | July 11, 1950 |
| | 1 " | Epinotia cruciana | |
| L.P.Pine | No Larvae | | July 11, 1950 |

(9) Plot C.B.4 is a limber pine plot located in the West Porcupine area of the Crowsnest Forest Reserve.

Growth conditions as determined by averaging the annual increment of nine trees over a period of ten years (1940-49) were good. (2.1 mm./tree/year).

This plot was sampled on July 13, 1950, July 16, 1951 and June 25, 1952.

Larvae obtained on sampling:

| Host | | Larva | Date |
|-------------|----------|----------------------|---------------|
| Limber Pine | 8 larvae | Phalaenid sp. | July 13, 1950 |
| | 1 " | Xylomyges dolosa | |
| | 1 " | Lepithecia filmata | |
| | 5 " | Phalaenid sp. | July 16, 1951 |
| | 1 Cocoon | Tenthredinid sp. | |
| | 3 larvae | Phalaenid spp. | |
| | | 5 " | Phalaenid sp. |
| | 2 " | Phalaenid sp. | |
| L.F.P ine | 1 " | Incisalia eryphon | |
| | 1 " | Geometrid sp. | July 13, 1950 |
| D.Fir | 1 " | Zieraphera fortunana | |
| | 1 " | Syrphid sp. | July 13, 1950 |
| T.Aspen | 1 " | Sicya macularia | |
| | 1 " | Autographa sp. | |
| | 1 " | Malasosoma pluviale | |
| | 1 " | Archips conflictana | |

(10) Plot C.B.5 is a lodgepole pine plot located in the Crowsnest Forest Reserve.

Growth conditions as determined by averaging the annual increment of ten trees over a period of ten years. (1940-49) were good. (2.8 mm./tree/year).

This plot was sampled on July 4, 1950 and July 24, 1951.

These larvae were obtained by sampling:

| Host | | Larvae | Date |
|-----------|---------|-----------------------|---------------|
| L.P.Pine | 1 larva | Acantholyda sp. | July 24, 1951 |
| Willow | 1 " | Arthosia hibisci | July 4, 1950 |
| | 1 " | Phalaenid sp. | |
| | 1 " | Bombycia algens | |
| | 1 " | Epionaptera americana | |
| | T.Aspen | 1 " | Geometrid sp. |
| | 1 " | Dysmigia loricaria | |
| | 1 " | Phalaenid sp. | |
| | 1 " | Malasosoma pluviale | July 4, 1950 |
| Saskatoon | 2 " | Tortricid sp. | |

(11) Plot C.B.6 is a douglas fir plot located in the Crowsnest Forest Reserve.

Growth conditions as determined by averaging the annual increment of ten trees over a period of ten years. (1940-49) were good. (2.5 mm./tree/year).

This plot was sampled on July 10, 1950, July 19, 1951, and June 21, 1952.

These larvae were obtained on sampling:

| Host | | Larva | Date |
|-------------|---------|--------------------------|---------------|
| D.Fir | 1 larva | Chorestoneura fumiferana | July 10, 1950 |
| | 1 " | Metasyrphus sp. | |
| | 1 " | Nyctobia limitaria | July 19, 1951 |
| | 1 " | Noctuid sp. | June 21, 1952 |
| | 1 " | Syrphid sp. | |
| Bal. Poplar | 1 " | Malacosoma pluviale | July 10, 1952 |
| | 1 " | Graptolitha ferrealis | |
| E.Spruce | 3 " | Neodiprion abietis | July 10, 1950 |
| | 1 " | Feralia jocosu | |
| Willow | 7 " | Tortricid sp. | July 10, 1950 |
| | 1 " | Geometrid sp. | |

(12) Plot C.B.8 is an Englemann spruce plot located in the Crowsnest Forest Reserve.

Growth conditions as determined by averaging the annual increment of ten trees over a period of ten years (1940-49) were good.
(2.3 mm./tree/year)

This plot was sampled on July 13, 1950 and July 25, 1951.

Larvae obtained on sampling:

| Host | | Larva | Date |
|----------|----------|-------------------|----------------|
| E.Spruce | 3 larvae | Syrphid spp. | July 13, 1950 |
| | 1 " | Pikonema dimockii | |
| | 1 " | Syrphid sp. | July 25, 1951 |
| L.P.Pine | 1 " | Incisalia eryphon | July 13, 1950 |
| | 1 " | Zeiraphera sp. | |
| | 1 " | Tenthredinid sp. | July 13, 1950. |