Red Deer-Edson-Westlock area of Alberta, the Meadow Lake area of Saskatchewan, and the Piney-Vita district in south-eastern Manitoba. Severe defoliation is expected to occur in these areas next season. The large aspen tortrix defoliated native poplar in a small area west of Red Deer, Alta., a large area near Glaslyn, Sask., and a small area south of Grenfell, Sask. Two species of *Anisota* caused severe defoliation of oak in southern Manitoba; *Anisota virginiensis* Dru. was present near Thornhill, Morris, Otterbourn, and St. Pierre, Man., and *A. manitobensis* McD. occurred in the Pembina Valley south of Thornhill, Man.—C. E. Brown.

ROCKY MOUNTAIN REGION

Cone Damage by Birds.—Late in July, a small flock of the common purple finch, *Carpodacus purpureus* (Gmelin), attacked the cones of white-spruce trees growing near the buildings at the Kananaskis Forest Experiment Station, Seebe, Alberta. Although many cones were left on the trees, a large number dropped to the ground and the seeds had been removed from them. Mechanical injury in the form of beak scratches caused browning of the green cone scales. According to P. A. Taverner (Birds of Canada, 1947) this bird feeds on buds and fruit; as no mention is made of damage to spruce cones, this record may be unique.—W. C. McGuffin.

BRITISH COLUMBIA

Decay in Western Hemlock in the Upper Columbia Region.—Survey analyses of western hemlock in the Upper Columbia region of British Columbia have been completed. Investigations of 833 trees have confirmed previous evidence of the high incidence of decay in this region. Cull losses on a per acre basis measured in terms of cubic and board foot computations are 42 per cent and 74 per cent respectively. Over 60 per cent of the decay is caused by brown stringy rot (*Echinodontium tinctorium* (Ell. & Ever.)). An additional 25 per cent of the decay is caused by white pitted rot (*Fomes pini* (Thore) Lloyd). The remaining 24 fungi associated with decay on the sample areas examined were of relatively minor importance. Considerable differences in cull losses were recorded between the eight sample areas investigated. Most of these differences were related to varying sizes, ages, and site indices. *Echinodontium tinctorium* was found to increase, and *Fomes pini* to decrease, in importance with decreasing site quality. Analyses of visible abnormalities showed that sporophores, scars, dead tops, and rotten branches were valuable indicators of hidden defect. These abnormalities served to confirm the validity of a tree decadence index prepared for old-growth timber. Trees classed as suspect and residual on the basis of the presence or absence of abnormalities of decay significance were found to contain 12 per cent and 60 per cent defect respectively. This classification provided for the designation of areas containing greater or lesser than average defect, and thus was useful in forest inventory procedures. Western hemlock was considered to reach physiological as well as pathological maturity at an earlier age than in the Coast region. Immature stands contained approximately 20 per cent defect at 150 years, and mature stands reached an advanced stage of deterioration at 250 years.—R. E. Foster.

The Douglas Fir Beetle Problem in the Interior of British Columbia.—In July, 1952, the Forest Insect Laboratory at Vernon, B.C. began a study of the Douglas fir beetle, *Dendroctonus pseudotsugae* Hopk., directing special attention to the relationship between the bionomics of the insect and forest management. A preliminary aspect of the study was the examination of active infestations scattered throughout the range of Douglas fir to determine their present and future status and to obtain background information before establishing a formal research project. Although the work completed to date has necessarily been exploratory, it has already provided some indications of the characteristics of the pest and of conditions necessary for its control.

Two flights of the beetle occur each year, one in the spring, the other in the summer. Both flights produce broods which emerge the following spring and summer respectively, completing the life cycle in one year in each case. On material studied to date, the length of the galleries range from 1§ inches to 20 inches. An average of four elongate groups of eggs are laid on alternate sides of each egg gallery and from each group an average of six larvae hatch, of which one third reach the adult stage.

Examinations were made of 23 infestations varying in size from 10 trees to 350 trees. Possible causes, based on presumptive evidence, were discovered for most of the infestations. The origin and decline of some infestations are, however, unknown mainly because of the limited information on the bionomics of the beetle.

The difficulty in making precise management recommendations at the present time is obvious from a comparison of the infestations at Canim Lake in the Cariboo district, and at Fleet Mountain near Kamloops. Logs with a volume of 28,000 f.b.m. were unclaimed for two years at Canim Lake and provided a breeding medium for beetles already active in the slash. In 1951, beetles emerging from the logs killed 157 trees (17,000 f.b.m.). Fortunately, overcrowding of the broods appears to have caused considerable larval mortality in the infested trees. The infestation at Canim Lake exemplifies the potential which existed at Fleet Mountain. Although 380,000 f.b.m. of logs were unclaimed for three years and were heavily infested by beetles, few trees were killed in the immediate vicinity. Small infestations are numerous for several miles around, but it is not known if they originated in the logs at Fleet Mountain. More detailed information on the bionomics of the beetle, particularly the characteristics of beetle flight, may explain the origin of infestations such as those in the Creighton Valley near Lumby where the slash and numerous windfalls under infested stands supported only a negligible population of beetles.

Most infestations are attributable to excessive slash, discontinued logging, and possibly, sawmill waste. A typical example is the infestation in an all-aged stand logged at Bestwick near Kamloops where 11·8 per cent of the trees (26 per cent of the gross volume) were killed on 200 acres by beetles emerging from slash the year after logging ceased.

Discontinuous logging in the vicinity of Higdon Creek near Quesnel, probably played a part in the infestation in an adjacent stand of virgin Douglas fir. The area south and west of the infested area was logged up to 1948, the slash and windfall providing breeding media for beetles, which, when logging ceased, attacked 250 overmature (210 years) trees representing a volume of 100,000 f.b.m. Fortunately, unknown factors of natural control (possibly climatic) checked the broods and the infestation shows no signs of spreading. It is impossible to state, at the present time, whether beetles emerging from slash will attack the residual stand (as at Bestwick) or will migrate to virgin stands (as at Higdon Creek).

Stumps, cull logs, and unclaimed logs can generally support very large populations of beetles. Tops generally support only meagre populations, but at Buck Ridge, southwest of Quesnel, where beetles are particularly numerous, tops down to a diameter of 2 inches are heavily populated. Slash from sawmill operations in the same district attracted a tremendous number of beetles. Whether or not this material can successfully support beetle broods is not yet known. It seems likely, however, that shaded slabs in the centres of slab piles may remain sufficiently moist to permit the successful development of beetle broods, but studies must be made of the factors which are favourable or otherwise to the development of beetle broods before treatment of the various breeding media can be recommended.

Some infestations are attributable to stand overmaturity. This is the case on 40 acres of even-aged forest northwest of Quesnel. Since the stand matured, 26 per cent of the trees (25 per cent of the gross volume) have succumbed to beetle attack. Although the unhealthy condition of the stand is primarily due to fire scars and butt rot, the beetle is hastening the death of the stand. It is probable that an infestation which existed on 700 acres 4 miles to the south had similar origins. Although this area has now been logged, evidence was collected to substantiate this view. Maintenance of residual stands of Douglas fir in such areas may prove wasteful and perhaps impossible.

Although some information is available for interim application to forest management, the inadequate state of our knowledge of bark beetle behaviour prohibits the presentation of precise recommendations. The difficulties experienced this year in accounting for some infestations and their decline indicate that more information is required on beetle dispersal, the factors controlling beetle mortality, and the factors responsible for tree susceptibility under various population levels, before recommendations can be offered for industrial application.—H. Walters and K. Graham.

Forest Insect Survey Notes, British Columbia.—The forest insect survey was conducted in nearly every region of British Columbia this year and a total of 6,569 insect survey collections were received by September 20.

Some foresters engaged in the forest industry have recently shown increasing interest in establishing systems of permanent sampling in some of their management licences so that their forestry staff can keep an annual or semi-annual check on insect conditions. In three different management licences, a group of permanent sampling stations has been established to give a minimum insect survey coverage of the forest types, age-classes, and physiographic features in each. This appears to be an excellent way of assisting co-operators to sample on