The average radial increments for the trees in the three groups for the years 1949 to 1963 are plotted in Fig. 1. Despite the differences in flowering histories the growth patterns of the three groups of trees closely paralleled each other throughout most of this period. The only major differences were in 1952 when the trees in Groups I and II exhibited declines in radial increment from the previous year while the Group III trees did not. This decline in growth was particularly marked in the trees that had a history of repeated heavy flower production and is undoubtedly related to the severe defoliation by jack-pine budworm larvae that occurred in the area in 1951.

Two other years of sharply decreased increment growth, 1958 and 1961, were common to all groups of trees. These can both be attributed to climatic causes. As previously stated, 1958 was characterized by spring drought and frost damage. Severe drought occured throughout the spring and summer of 1961.

There was no evidence that flowering had any pronounced, direct effect on increment growth as the growth patterns of the flowering and non-flowering trees were both very similar, and both showed the same responses to sub-normal climatic conditions. Trees of the two crown types differed in staminate flower productivity and in susceptibility to jack-pine budworm feeding. This is apparent in the differences in increment exhibited by the two types of trees following a year of high budworm population. This dissimilarity in response could be of use in tracing the history of budworm outbreaks in a stand where the two crown forms coexist. However, it would be necessary to consider the possible transition in crown form of a tree during its development in response to closure or opening of the stand.—R. J. Heron and L. D. Nairn.

BRITISH COLUMBIA

Canker and Dieback of Douglas-fir in the Cariboo Region.—A severe canker and dieback of Douglas-fir was common in four widely separated areas of the Aspen-Lodgepole pine-Douglas-fir Parkland in the summer of 1964 in the Cariboo area. The effects were pronounced on saplings 1-4 inches d.b.h. The disease occurred in localized areas ranging in extent from several hundred yards to several miles. In one area extending for approximately 1½ miles along the roadside, an estimated 25% of the trees had been top-killed.

The bark in cankered areas of the trees becomes sunken and reddish. Attacked branches appear to die back to the trunk and form a canker at the base of the branch which frequently girdles the stem. The needles in the dead branches and leaders become reddened.

In all four areas where the disease was found, the lesions contained the fruiting structures of an undertermined species of *Dermea*. Mid-summer collections had only conidial fruiting bodies, but collections made in September had well-developed apothecia. Although a species of *Valsa* has been found in the distal, killed portions, the constant association of the *Dermea* fungus with the lesions indicates that it is responsible for the dieback conditions.

Observations also indicate that the disease has been active for at least 2 years; lesions in which the bark had become cracked and dried were present on some trees. The apothecia in the older lesions were still active. Some of the stems with older lesions appeared to have a greater number of internodal (lammas) shoots than healthy stems.

Because most of the attacked trees were vigorous and growing on good sites, predisposing factors of a climatic nature were indicated. Recently, early winter frosts of unusual severity have been reported from this region. These may be a factor in predisposition to the disease by damaging or killing the bark before it is hardened-off for the winter. The tissues may be made more susceptible to attack by weakly parasitic fungi to which the genus *Dermea* belongs.

The *Dermea* fungus has has been obtained in culture from ascospores and is being tested for pathogenicity in potted seedlings of Douglas-fir.—A. Funk, C. Cottrell, and T. Woods.

Rearing Cone Insects in the Laboratory on an Artificial Diet.—In 1964, three species of cone insects were reared on an artificial diet (McMorran, A. Can. Entomol. 97:58-62, 1965). More than 500 *Barbara colfaxiana* larvae were reared from hatching to pupation. Development on the diet was rapid. *B. colfaxiana* larvae require about 2 months to pupation under field conditions in cones, but on the diet some completed feeding in about 1 month and all had pupated in 6 weeks. Smaller numbers of *Laspeyresia youngana* and *L. piperana* were reared on the diet during the latter half of their larval development.

The freshly prepared medium was poured into small vials (about ½" in the bottom of 1-dram shell vials), or into Petri dishes and sliced into cubes for transfer to vials as required. Vials were plugged with non-absorbent cotton to reduce the chance of infection in the medium and to prevent insects from escaping.

Some of the important rearing difficulties overcome were.

1. Larvae were reared singly to prevent cannibalism.
2. The newly hatched larva were placed in a hole punched in the medium to facilitate feeding.
3. The vial was inverted when the insect was placed on medium. If the insect wandered it tended to move upwards, and this reduced the chances of entanglement in the cotton plug.
4. Vials were checked regularly for excessive moisture in feeding tunnels, mould, and drying and shrinking of the medium.
5. Moulting larvae were not removed from the medium as this may cause complications in shedding skin and head capsule.
6. Larvae were not allowed to spin pupal cocoons or to pupate in feeding tunnels in the medium. Mature larvae were provided with thin slices of medium, and cotton batting or loosened dental roll in which to pupate. *Laspeyresia* over-winters in the larval stage and does not present this problem.—A. F. Hedlin.

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