in the heartwood of the root collars just above and below the ground level. Collections and rearings have shown that damage is mainly caused by a round-headed borer of the genus *Saperda*. Surveys to date indicate that this insect infests both trembling aspen and balsam poplar, usually growing under unfavourable conditions, throughout central Saskatchewan and parts of eastern and northern Manitoba. The most active borer populations were found in small pockets of stunted, open-growing poplar trees having a diameter of one to two inches and usually under eight feet in height.

Preliminary field observations suggest that this borer has a three-year cycle. The adults emerge in early June and oviposition occurs at the base of the host tree. On hatching the larvae enter the heartwood at the root collar and tunnel slightly above and below ground level. Larvae overwinter at one end of a plugged gallery usually at or below ground level and pupation occurs at the end of a gallery above the ground level in mid-May. The number of larvae occurring in an infested collar depends on the diameter of the tree. Generaly only one borer occurs in trees of the one-inch diameter class but up to four have been found in larger specimens. Tunnelling in the heartwood causes the tree to become weakened and susceptible to attacks by secondary invaders. In many cases abandoned galleries are re-infested by carpenter ants causing additional damage to the heartwood. The flat-headed borer, *Poecilonota cyanipes* (Say), was also found in infested root collars but damage by this species is relatively insignificant and usually restricted to the cambial layer.

Despite some apparent differences in biology and habits, adults reared from infested root collars closely resemble the common poplar borer, *Saperda calcarata* Say. Additional specimens are being reared using techniques outlined by Warren (Can. Ent. 90 (7): 425-428, 1958) for cytological studies by S. G. Smith at Sault Ste. Marie, Ontario.—J. A. Drouin, B. B. McLeod and H. R. Wong.

BRITISH COLUMBIA

Electrical Determination of Wood Moisture Content.— A rapid non-destructive technique giving direct readings of wood moisture content from oven dryness up to saturation appears from initial experiments to have definite practicality. Curves of electrical resistance over wood moisture content have been obtained by adapting the Colman soil moisture instrument to wood, the fiberglas electrode unit being embedded in the wood and the resistance at gravimetrically determined intervals of moisture content read from the ohmmeter. The curves, which were based on five series of measurements using two blocks of western white pine and two of alder, extended from 5-100 per cent saturation. The first three series in which tapwater was used to saturate the blocks gave similarly shaped mean curves but rather a wide scattering of points; the fourth and fifth series, using only distilled water, also gave similar mean curves while deviations from the line averaged only 2.5 per cent. Although the composite curve for both pine blocks, due to a few aberrant points, had somewhat greater scatter than the individual curves the average deviation was about the same. The curves for alder were also very similar and had small deviations; however, the curves for alder and pine were entirely different.

The electrodes were routed into blocks of about 2 in. cube to give a snug fit when the wood was oven dry; subsequent saturation of the wood caused swelling and ensured a tight fit. The junction of the block surface with the electrode was sealed with sealing-wax. Meter readings were taken at saturation; the blocks were then dried in a 70° oven until approximately 5 per cent of the wood moisture had been driven off and then they were kept for 24 hours in plastic bags at room temperature to allow equilibration of the moisture gradient in the wood. The next meter reading was taken and the exact moisture content calculated from the block weight. The results were plotted on 5-cycle semi-logarithmic paper. This procedure was repeated until each block was at approximately 5 per cent of saturation when it was resaturated and the next series of measurements commenced. In spite of the relative crudity of the technique, the reproducibility was gratifying and suggested that no major variation was inherent in the method.

Although the principle of measuring the moisture content of wood by ohmmeters is well established, existing electrode probe instruments do not give reliable results above fibre saturation point because the current passes through the wood (Stamm, A. J. Measurement of Wood Moisture Content by Electrical Conductance. Ind. and Eng. Chem. Analytical edition Vol. 1, No. 2: 94-97. 1927). However, an electrode sandwich type of instrument, such as the Colman soil moisture unit, gives consistent results because the current passes through a standardized conductor (Colman, E. A. and T. M. Hendrix. The Fiberglas Electrical Soil-Moisture Instrument. Soil Sci. 67 (6): 425-437. 1949). That the resistance of soil and wood have similar relationships to moisture content is evident from the curves which resembled each other in being sigmoid and compound, with inflection points at similar positions. In view of the porous structure of both substances this similarity is perhaps not surprising.

It will be of interest to ascertain if tree species have individual wood moisture curves or whether they may be grouped, for example as conifers, as ring porous hardwoods, and as diffuse porous hardwoods. Furthermore, it may be possible to record electrically, and even continously, wood moisture content of living trees. Within its limitations, whatever they may be, the method should result in a considerable time saving compared with existing gravimetric methods of determining wood moisture content.—W. J. Bloomberg.

Survey of Poria Rot in Second-growth Douglas Fir Stands.—Poria root rot, caused by *Poria weirii* Murr., or a strain of this fungus, causes severe economic losses in second-growth stands of Douglas fir (*Pseudotsuga menziesii* (Mirb.) Franco) in the Pacific Northwest. Factors related to the frequency of disease occurrence and the degree of its intensity are mostly unknown. Such knowledge is necessary for appraising potential losses. This report gives preliminary findings of a survey to determine the incidence of root rot infection centres and damage in relation to site quality.

Five natural, second-growth, Douglas-fir stands, representative of two forest site types prevalent in the Cowichan Lake District, were sampled. Three stands were on the high quality swordfern site (V. J. Krajina; unpublished) and two stands were on the lower quality salal site. Stands were sampled using continuous strips, one-half chain in width and five chains apart. Strips were subdivided into plots containing 20 Douglas fir. A record was made of site type, plot size, diameter of all living trees, tree age, and diameter of all trees visibly affected by root rot within the strip and within all disease foci falling on the strip.

The number of diseased trees per acre on the salal site was considerably greater than on the swordfern site (Table I). However, the proportion of trees affected by root rot was approximately the same because total stand density differed on the two sites. No significant difference was recorded in the basal area per acre of diseased trees on the two sites; the larger size of trees on the swordfern site apparently offset the greater number of trees on the salal site.

TABLE I

AVERAGE NUMBER AND AVERAGE BASAL AREA OF PORIA ROOT ROT INFESTED DOUGLAS FIR IN 50- TO 60-YEAR-OLD STANDS.

	Av. No. of trees/acre			Av. basal area/acre (sq. ft.)			Av. basal area/tree (sq. ft.)		Av. No. of foci/acre
	Total	Diseased	Per cent diseased	Total	Diseased	Per cent diseased	Healthy	Diseased	
SWORDFERN—									
Stand 1..........	208	16	7.7	196	11	5.6	0.94	0.69	6.8
Stand 2..........	224	22	9.8	244	16	6.6	1.07	0.74	5.4
Stand 3..........	172	21	12.2	147	8	5.8	0.85	0.41	5.8
AVERAGE..........	201	20	9.9	196	12	6.0	0.95	0.61	6.0
SALAL—									
Stand 1..........	340	27	8.8	163	10	5.8	0.48	0.34	10.4
Stand 2..........	398	42	10.4	145	12	8.1	0.36	0.28	7.4
AVERAGE..........	369	34	9.2	154	11	7.0	0.42	0.31	8.9

On both sites the average size of diseased trees was less than that of healthy trees. Inclusion within the diseased category of trees which had been dead for a number of years may account for some of this difference. In addition, loss in annual increment resulting from gradual death of root systems and more rapid killing of smaller trees were other possible factors influencing the disparity in size between healthy and diseased trees.

Although losses were approximately the same for both sites in the age class examined, the greater frequency of disease foci in the salal site might result in greater losses in any extended rotation which may be required in such stands because growth rates are slow.