not appear to be great. This is probably because of the protection given by the relatively heavy seed coats. The microscopic examination of apparently undamaged seed showed that mycelium was present in the outer layer of cells of the hard seed coats. Mycelium was not observed in the inner papery seed coats in the samples examined. Cultural tests were carried out of dissected seed surface sterilized with 0·1 per cent mercuric chloride for 5 minutes. Fungi were isolated from kernels with and without corresponding isolation from seed coats.

This evidence suggests that moulds may penetrate Douglas-fir seed and may occur both externally and internally. These findings appear to substantiate the following statement of Davis, Wright, and Hartley: "Organisms that may cause decay after the seed is sown are sometimes found inside the seed coats of apparently sound, stored seed."

In the mould assays made, the fungi most commonly found were *Penicillium* spp., *Mucor* spp., *Aspergillus glaucus* Lk., and *Pullularia* sp. Within these four groups, five out of six isolates of *Aspergillus glaucus* did not grow at 5° C., but almost all the 18 isolates tested from the other three groups did. Thus, some of the more common seed moulds can grow at temperatures comparable to those under which conifer seed is usually stored in British Columbia. Growth of moulds would not be expected, however, in conifer seed stored at a moisture content of 8 per cent or less.—P. J. Salisbury.

Deterioration of Looper-killed Western Hemlock on Lower Vancouver Island.—During 1945 and 1946 extensive stands of mature western hemlock on lower Vancouver Island were attacked by the western hemlock looper. As a result, these defoliated stands suffered heavy mortality and thus became subject to pathological deterioration. Since information was lacking in regard to the deterioration of such timber, a series of periodic examinations were undertaken by the Forest Pathology Laboratory at Victoria, B.C., to determine the rate of decay of these stands and the identity of the causal fungi. Three such examinations have been made, the first in 1948, the second in 1950, and the third and final in 1953. This report presents a brief summary of results obtained to date from the final analysis.

Fifty-five hemlock, ranging in diameter from 12 to 50 inches, were analysed on a representative 1-acre rectangular plot in a 100 per cent looper-killed stand in the Wilson Creek area. Although all the trees were standing, none had retained their tops and only a few had retained any of their branches. In many cases a sizable portion of the upper bole was also missing. These losses, estimated to average between 5 and 10 per cent of the original gross volume, were attributed to the combined action of weathering, principally wind and snow, and weakening by fungi and insects.

The total volume of decay, excluding that occurring in the trees prior to their death, measured 74,278 board feet or 66 per cent of the total gross volume. Eighty-five per cent of the decay volume was recorded as advanced decay and 15 per cent as incipient decay. In the lower diameter classes, 20 inches and under, almost the entire merchantable volume was lost through the action of decay. In the larger diameter classes, the decay losses remained high but decreased from 90 per cent in the 25-inch class to 59 per cent in the 50-inch class.

The average depth of radial penetration has not been determined to date. While taking field data, however, it was noted that the depth varied considerably in trees of the same diameter as well as in trees of different diameters, but in all cases increased toward the tops which were mostly 100 per cent decayed.

Brown crumbly rot, caused by *Fomes pinicola* (Sw.) Cooke, the principal decay found associated with the deterioration of the looper-killed hemlock, accounted for 87 per cent of the recorded decay volume. Yellow stringy and white spongy rots were responsible for most of the remaining decay volume which was confined primarily to the lower sections of the butt logs. The principal fungi associated with these latter rots have been tentatively identified as *Armillaria mellea* (Vahl ex Fr.) Quél. and *Fomes annosus* (Fries) Cooke. Pitted saprot, caused by *Polyporus abietinus* Dicks. ex Fries, was noted in the sapwood of some of the trees but not in measurable quantities, although in the earlier examinations this fungus was one of the more important saprots. Several other fungi, still unidentified, were also isolated from the affected trees, but the volume of decay associated with them was generally insignificant.—N. T. Engelhardt.

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