Comments and Communications

A Commentary on Structural Variation in Conifer Wood

Sen and Banerjee (*Science*, 1950, **111**, 151) have presented x-ray diagrams of the wood of chir pine, both normal and after attacks by *Lenzites striata*, from which they claim to show that the fungal infection has led to a change in orientation of the cellulose fibrils in the walls of the tracheids. While rightly pointing out the extreme variability of structure in conifer wood, they are apparently unaware of the systematic study that has been given to it in this laboratory during the past twenty years (Preston, R. D. *Phil. Trans.*, 1934, **B 224**, 131; *Proc. Roy. Soc.*, London, 1946, **B 133**, 327; 1947, **B 134**, 202; *Biochem. et Biophys. Acta*, 1948, **2**, 370; Preston, R. D., and Wardrop, A. *Biochem. et Biophys. Acta*, 1949, **3**, 585; Wardrop and Preston, *Nature*, 1947, **160**, 911). This work makes it desirable to utter a word of warning.

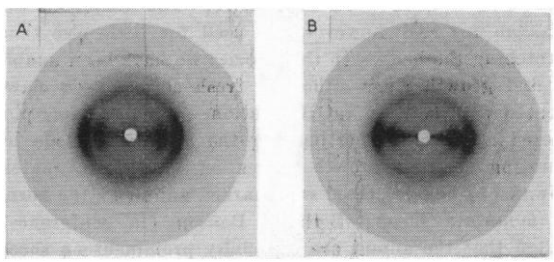

FIG. 1. X-ray diagrams of wood from eleventh annual ring of a specimen of *Pseudotsuga taxifolia*. CuK*a* radiation, beam perpendicular to grain of wood and along a radius; *a*, early wood; *b*, late wood, at a position about 1.5 mm from *a*. Fig. 1 *a* compares with Fig. 1 *left* of Sen and Banerjee, and *b* with their Fig. 1 *right*.

An unequivocal demonstration of a change in the submicroscopic structure of wood after infection would demand a comparison of a sample of infected wood with the *same sample* before infection, and it is only insofar as the "normal" sample used by Sen and Banerjee duplicates the structure of the "infected" sample before infection that their conclusions can be accepted. It is known that the fine structure of wood varies, not only along the length of a trunk and across the annual rings, but markedly also across a single annual ring. The x-ray diagrams presented here correspond, for instance, to the early wood (Fig. 1, *a*) and late wood (Fig. 1, *b*) of the eleventh annual ring of a sample of *Pseudotsuga taxifolia* taken at breast height and are typical of the behavior of conifer wood generally. The difference between these two diagrams is the same in kind, and of at least the same degree, as that shown in the diagrams of Sen and Banerjee. In a block of sapwood of the size used by Sen and Banerjec (4 in. × 2 in.) there is bound to be considerable structural variation of the kind represented by their illustrations. Unless, therefore, the irradiated samples of normal and infected wood were chosen with meticulous care, the comparison made between them may well be invalid. Unless, indeed, the two diagrams are examples of many other pairs showing the same difference, it is difficult to see how the claim that a small change in structure is induced by infection could in any case be substantiated.

Even if the difference between the diagrams does correspond to a change in infection and not merely to a normal variation from point to point in the wood, then it is still unsafe to associate it a priori with a *change in orientation*, whatever that may, precisely, mean. The possibility should not be ignored, for instance, that the fungus may be removing the more disordered fraction of the cellulose with a consequent improvement of the diagram. It is to be suggested that these alternatives—and other possibilities—could best be distinguished by optical investigation of single cell walls under a polarizing microscope. The genesis of the spiral x-ray diagrams would seem to be much too complex for any results of value to be achieved by their further detailed examination by the methods proposed by Sen and Banerjee.

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Maximal Consumption of Ethyl Alcohol

Evidence has recently been advanced by Newman (*Science*, 1949, **109**, 594) to show that "the maximum daily consumption of alcohol by a man of average weight is represented by a quart of 100-proof liquor, and that estimates greater than this are in error." This statement has been accepted by the press and by medical authorities (*J.A.M.A.*, 1939, **141**, 535) with such a degree of finality that it seems highly desirable to point out certain aspects of this conclusion that have not been previously considered. The establishment of such a figure has many important implications in both medical and legal practice, so that only the most unequivocal evidence should merit such complete acceptance.

It is true, as Newman states, that alcoholics are poor judges of their own alcohol consumption, but there are numerous accounts that indicate that some persons of average weight *can* consume more than a quart of 100-proof liquor in a 24-hr period, and the writer has himself known two persons who consumed substantially twice this amount over extended periods of time. Newman is certainly correct in asserting that high levels of consumption can only be achieved by maintaining the blood alcohol concentration at a high level, and individuals who consume such large amounts of alcohol are invariably "round-the-clock" drinkers. Both enzyme kinetics and