

TECHNICAL NOTE NUMBER 177

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

FOREST PRODUCTS LABORATORY

MADISON 5, WISCONSIN

REVISED December 1952

PROPERTIES OF A GOOD WOOD PRESERVATIVE

A list of the various substances that have been used or suggested for preserving timber from decay would include a surprisingly large proportion of those known to industrial chemistry. By-products for which no use could be found have often taken their last stand as possible preservatives of wood. There have been sent to the U. S. Forest Products Laboratory for testing of their preservative qualities the condensed fumes of smelters, the waste liquors of pulp plants, the refuse of tanneries, the skimmed milk of creameries, and a wide assortment of compounds under trade names.

Very few materials have been found to have value as wood preservatives. Most of them lack one or more of the requirements of a good preservative.

To preserve wood against decay a substance must first of all be poisonous to wood-destroying fungi. Decay in wood is not due to direct chemical action or action of the elements but is always the result of the activity of these plants which feed on the wood and thus destroy it. To prevent fungus infection, the preservative must be able to penetrate the wood thoroughly enough to form a continuous exterior shell of poisonous treated wood deeper than any surface checks which are likely to develop, and to retain its toxicity, or poisoning power, under service conditions.

Safety in handling and use is another important consideration. A wood preservative must not be a dangerous poison to men and animals, a highly inflammable substance, nor a material injurious to wood. If it seriously corrodes iron, steel, or brass its use is limited because of its action on the treating equipment and on bolts and metal fastenings in contact with the wood in service. Color, odor, and effect on paint are often of considerable importance.

Provided a preservative meets these requirements, its cost, availability, and uniformity will largely determine its usefulness.

There are materials of established protective value now on the market which are both cheap and plentiful. The principal wood preservatives used in the United States are coal-tar creosote, solutions of creosote and either coal-tar or petroleum, pentachlorophenol solutions and water-borne materials containing one or more compounds of zinc, copper, arsenic, and chromium. Their value has been established through service records on railroad ties, poles, posts, piling, and other wood treated with them. Search for new and better preservatives is constantly being made, and some very promising ones are now being promoted, especially for uses where the color, odor and oily nature of creosote are objectionable. In the meantime the wood-preserving industry has at its command a variety of established preservatives, and these afford a basis for judging the effectiveness, suitability, and economy of the new materials.