

TECHNICAL NOTE NUMBER 212

FOREST PRODUCTS LABORATORY - U. S. FOREST SERVICE - MADISON, WISCONSIN

AMERICAN WOODS FOR PAPER MAKING

The following is a summary of the pulping qualities of the principal commercial woods of the United States. Only five or six of these woods now find extensive use in the pulp and paper industry, but laboratory trials indicate that with slight modifications in the standard pulping processes many others might be used in the manufacture of commercial grades of paper.

The pulping and paper-making trials were conducted by the Forest Products Laboratory, U. S. Forest Service, Madison, Wisconsin. Detailed results of the experiments on any of the woods are obtainable from the laboratory.

SOFTWOODS

SPRUCES. All spruces are suitable for pulping by any process. All make high quality pulp.

HEMLOCKS. Western hemlock is very similar to spruce in its pulping qualities. In the groundwood or mechanical pulping process it requires more power than spruce to yield pulp of the same strength. Eastern hemlock is not so suitable for groundwood, and chemical pulps from it are darker, require more bleach, and are usually weaker than spruce pulps.

FIRS. All true firs are suitable for pulping by any process. Red fir gives rather dark sulphite and mechanical pulps, and its sulphate is more difficult to bleach than is spruce sulphate. The other firs are as readily pulped by any process as spruce is, and the pulps obtained are comparable to spruce pulps.

PINES. Lodgepole, western yellow, white, sugar, limber, and pinon pines all make good mechanical pulps.

The other pines tested are too dark or contain too much pitch to be well suited to the groundwood process. Jack, loblolly, lodgepole, Norway, pond, sand, and scrub pines by slight modifications of the cooking process, can be made into good sulphite pulp with reasonable bleach consumption. With the other pines uniformity of digestion is more of a problem. All the pines reduce readily in the alkaline (soda and sulphate) processes, and all bleach satisfactorily under proper conditions.

CYPRESS, DOUGLAS FIR, LARCHES, REDWOOD, AND RED CEDARS. None of these woods are suitable for groundwood. They are much more difficult to pulp by the sulphite process than hemlock, and the bleach consumption is barely within the range of commercial feasibility. They all may be reduced by alkaline processes to pulps not quite so strong but otherwise comparable to pine pulps. Redwood and the red cedars are too light weight to make their use practical.

WHITE CEDARS. White cedars reduce readily by all processes. The pulp yield per cord of wood is very small, however, since it is proportional to the weight of the wood. As pulpwood is bought on a cord basis, the white cedars probably would not prove acceptable to the industry.

HARDWOODS

Hardwoods are not well adapted to the manufacture of mechanical pulp because of the excessive power required to grind them.

All hardwoods can be reduced by the soda process, and the pulp can be used in conjunction with spruce sulphite or some other long fibered stock in the manufacture of book and similar grades of paper. Basswood and aspen are pulped most easily. Red alder, balsa, chestnut (after tannin extraction), elms, soft maples, and willows all pulp fairly easily. Ash, birches, beech, buckeye, butternut, catalpa, gums, hackberry, magnolias,

mangrove, and hard maples are rather difficult to pulp, but some of them are used commercially. Hickory, locust, oaks, and sassafras are very difficult to pulp, and their use is generally impractical.

Some of the hardwoods can be readily pulped by the sulphite process and made into book and similar grades of paper with small bleach consumption. Among them are ash, aspen, birches, butternut, most elms, gums, hackberry, hickory, magnolias, maples, sycamore, and willows. Hardwoods that are difficult to pulp by the sulphite process because of structural irregularities or the presence of extractive materials are basswood, buckeye, catalpa, chestnut, locust, oaks, red gum, sassafras, and slippery elm.

Recent trials at the Forest Products Laboratory give promise that a number of hardwoods, including aspen, beech, birch, cottonwood, black gum, tupelo gum, maple, and other light-colored woods can be reduced by a combination of a chemical and a mechanical process to a pulp well suited for the manufacture of the lower grades of print paper.