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Forest Humpty Dumpty

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The year was 1886. For weeks fat logs from upper Minnesota had been plunging into the swollen waters of the St. Croix River, throwing up great geysers, bobbing and hissing down river to the sawmills. The spring drive was on.

In a few days it was an up-ended, shattered and criss-crossed miles-long jam. It took 200 men with help of 100 horses six weeks to free the jagged mass—the greatest log-jam in history. No one was particularly impressed. It was the golden age of American logging. And there was no end to the virgin timber.

Since that day the forests of America have continued to yield the pulp, cross-ties, poles cordwood and lumber necessary to a growing nation. We have taken out some 235 million cords of pulpwood alone. We have taken enough lumber to build 191 million wood houses. The average American uses the equivalent of 400 trees in his lifetime.

To fill our needs, the great logging camps and sawmills have pursued the retreating forests from Maine to New York to the Great Lakes, along the Gulf Coast and down the Pacific. In keeping up with demand today, even the fabulous Paul Bunyan, who could fell a whole forest with one swing of his mighty axe, is being outdone. The flashing double bits and cross-cut saws are giving way to power-driven saws, cranes, trucks, bulldozers and tractors. But there are signs that it is just a question of time until our forest species will be as scarce as the ginkgo—an almost prehistoric tree—unless something is done soon.

The simple economics of our forest resources are that the 461 million acres of commercial forest each year produce about 34 billion board feet of marketable timber. That’s the interest on our capital of 1,700 billion standing board feet. However, we annually cut 50 billion board feet. If we include the 5 billion lost to fire, insects, disease and waste, we have a sizeable chunk of our forest capital expended each year. It looks as though we would run out of timber in about eighty-five years. But in the carbon-monoxide wake of our mechanized logging there may be an equally efficient answer. It is forest management coupled with better forest utilization.

A small army of specially trained men (61,000) is constantly ready to respond to the call of forest rangers and forest wardens.
To support them, forest owners, state and federal governments spend an average of 30 million dollars a year. Their biggest enemy, as colored posters point out during the tinderbox months from July to November, is the careless smoker.

Insects and disease are slowly being brought under control. One of the most successful experiments of recent years was the use of DDT (including Monsanto’s Santobane) in the control of the tussock moth in northern Idaho. Thousands of acres of timber were saved from this insect’s destruction. A similar program is in the offing for the spruce bud worm and the bark beetle in Idaho and Montana. But these are only more dramatic elements of forest management through forest protection. The big job is tree farms, of which there already are 47 million acres.

By treating wood as a crop, lumbermen are deviating from old practices and building for the future. By selective cutting they hope to maintain a balance between young and mature trees. This means taking out diseased and rotted trees, leaving seed trees to naturally reforest cutover areas. Reforestation by planting is resorted to in those areas where fire or severe cutting has destroyed

Today’s farsighted lumbermen are keeping mechanized logging in check, take out only such mature timber as this. But in producing these clean logs, one-quarter of the tree—tops, limbs, stumps and cull sections—was left in the woods.

(Photo courtesy The Timberman)
The seasoned unplanned lumber pictured here represents 50% of the total log volume that entered this modern "forest factory." We annually harvest 50 billion board feet from a 461 million acre forest area that only grows 35 billion board feet in the same period. (Photo courtesy The Timberman)

the forest's ability to recreate itself. These are all long range plans. The job is tedious, slow and means tying up capital for at least fifty years. Of immediate interest is the utilization of more of the tree—its limbs, bark, trimmings, cullsections, sawdust and shavings.

Some waste has always been used since grandmother used ashes for soap. Much of it has been utilized as fuel to power various sawmill rigs. Bark is finding use as a filler, as is wood flour (in Monsanto's Resinox plastic, for instance). Increasing amounts of waste from primary manufacture (in saw and planing mills) goes into glued-up products, panels, furniture and small dimension products. There is also the conversion of wood waste into something "unrecognizable as wood" by the application of chemistry. But the demand is for wood for toothpicks, telephone poles and homes—not magic metamorphosis. And wood waste can help supply the demand.

How much waste is there? Plenty. Two-thirds of every tree is wasted, either in the logging and sawing, or in the manufacture of wood products. Putting some of these humpty-dumpty
pieces together again—150 million tons each year, in all—is the objective of one phase of Monsanto's Western Division research. Latest development, a second cousin to plywood, is a dry process waste wallboard sheet which can be used in homes and in many phases of construction to bolster the lagging supply of wood products.

Although waste wallboards are being used in considerable numbers, the reason is they require high quality waste and must be expensively processed. In the Monsanto Process, for which a special phenolic glue has been developed, planer shavings, sawdust, wood fiber and bark are simply doused with the glue and subjected to heat and pressure. The result, depending on the amount of binder and pressure, is a smooth wallboard varying from a low density to a high one.

In appearance obviously a conglomeration, it will not entice a confirmed whittler to take out his penknife. But it can be used where strength and not appearance is required. It makes good sub-flooring (third largest consumer of wood), wall and roof sheathing and building forms. In all these uses it behaves like good wood. For other uses where appearance is also wanted, there is another type.

Coarse peeler waste—and—bark core pictured above was produced by applying heat and pressure to wood waste doused with special Monsanto glues. It can be overlain with sawdust, paper or fine veneer for walls, doors, cupboards or shelving. Unfinished board makes good sheathing and sub-flooring, third largest consumer of wood.  (Photo courtesy The Timberman)
Using the ugly duckling as a core and overlaying it with a variety of veneers—paper, metal foil, knotty pine slices, fabrics or high compressed wood waste—an esthetically pleasing board results. Such board is for doors, cupboards, wall and ceiling panels, etc. In both cases, ultimate manufacture with a continuous process is seen as a possibility. The equipment is simple and with the exception of a hot press, inexpensive.

The next step is to go after the wasteful, costly and sometimes destructive burning of slash—the tops, limbs and other trimmings, yes, even the needles. Plans are to send portable chippers and semi-portable processing plants into the forests after it. What will all this mean to the building industry?

The immediate dividend will be 73,000,000 board feet of building material that once went up in smoke in which prefabricators are especially interested. The demand for synthetic boards is expected to increase rapidly, as the less expensive produced by the Monsanto dry process becomes widespread. To the forests it will mean a much-needed breather, time to catch up. For fifty years is a long time, and in the meantime we must make the most use of what we have. After that we can hope to have a never ending supply of wood from our scientifically managed forest lands.

FACTS ABOUT THE AUTHOR

Ernest E. Hubert received his B. S. and M. S. in Forestry and Botany from the University of Montana in 1912. In 1923 he received his Ph. D. in Forest Pathology at the University of Wisconsin.

He was employed at the Laboratory of Forest Pathology, Bureau of Plant Industry, Missoula, Montana from 1915-1920. Mr. Hubert, from 1920-1925, did research work at the Forest Products Laboratory. For the next ten years he was Professor of Forestry at the School of Forestry, University of Idaho. During this time he also worked on cooperative projects with lumber industries, U. S. Forest Service and U. S. Bureau of Plant Industry.

Mr. Hubert was Research Technologist for the Western Pine Association from 1935-1942. It was during this time in studies of wood preservation and utilization that he developed chlorophenol solutions for millwork use.

From 1942 to the present date he has been employed by Western Division of the Monsanto Chemical Company as Chief Pathologist and Wood Technologist.

We feel particularly fortunate to have a man so well qualified to discuss progress in wood utilization.

Ames Forester