WHITE PAPER

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dreds of thousands of dollars doing it.

Perhaps if Harry Straus had been a Ph.D. in chemistry, too, he would have known it couldn't be done. But he's never been to college, so he hired chemists and mechanical engineers and told them to get busy.

The Bureau of Standards in Washington, the Government's Forest Products Laboratory at Madison, Wis., several universities and at least one paper company had come to a dead end. They could remove the woody core by chemicals, but chemicals that would do that job damaged the fibers. They could combine mechanical and chemical means and get undamaged fibers, but at the cost of wasting a large proportion of them.

Mill And Laboratory Clash

Straus' engineers, too, had bitter disappointment. It was one thing to succeed in the laboratory, another to succeed in the mill where time and money count. They would develop a process that accomplished wonders on five pound lots, and carry this hopefully to France, only to see it fizzle when used on 500 pound batch. Then they would come home and start all over.

One highly promising combination tested in a mill worked in a 100-pound batch, but failed when tried on a commercial scale. This time, however, the Straus engineers got a clue; they began concentrating on the simple fact that in waterlogged flax straw, the density of wood was greater than the density of the fiber. Why not separate the two by flotation? Difficulty was that the fibers and the wood were locked in such tight embrace that the fibers acted as life preservers for the wood. At long last the engineers developed a secret washing technique which unlocked the grip of wood and fiber, and let gravity do the rest. Used in step with improved mechanical and chemical processes all down the line, this spelled success.

Just as the Straus engineers were reporting success the Straus agronomists were reporting failure.

Most of the flax grown in the United States is not the kind used for linen, but a type grown entirely for the linseed from which oil is pressed for paints and varnishes. The Straus agronomists wanted to develop a great supply of fiber flax. They tested soils, sought advice from state and federal experts, had agents scour Europe for promising varieties. They planted 600 acres in South Carolina and for three years nursed it along. They tried smaller plantings in North Carolina, Virginia, Oregon, the Florida Everglades and the black belt of Alabama. On Maryland's eastern shore, they planted 500 plots each with a different fertilizer.

Hundreds of thousands of dollars went thus, and out of it all came nothing. Whatever the climate, whatever the soil, whatever the fertilizer or the farming practice, they couldn't get enough straw per acre to compete with the price of imported rags.

With grim determination, Straus turned from flax to hemp. He was making headway when a new Federal law intended to suppress marijuana gave hemp a black eye. Ignoring all advice, Straus then pointed his engineers at seed-flax straw, always considered useless. Flax farmers were harvesting the seed and spending time and money to get rid of the straw. But the Straus engineers took the processes they had developed for fiber flax and adapted them to seed flax straw. Straus triumphantly had some paper run off in his French mill and showed it to American cigarette makers. Munich was just a few months ahead. Big American cigarette manufacturers saw the point, and together they lent Straus $2,000,000 to build an American mill.

Water Is Important

Never was a mill site more carefully chosen. Everyone wanted it in North Carolina, which manufactures more than half of America's cigarettes, but some 60 locations were surveyed before selecting the broad, black corn bottoms where the Davidson River comes tumbling out of the tree-covered mile-high Pisgah National Forest. No one could get between this location and the government-protected watershed. The water was analyzed and even sent to France for mill tests; it was found soft and free of minerals—iron, for example, would give cigarette paper a taste. Studies running back for decades were checked to prove that the Davidson River had withstood the worst drought years.

Legal aspects were studied. The Federal Government controls navigable rivers and any stream flowing into them, hence controls the Tennessee and French Broad rivers—but not a stream twice-removed, like the Davidson which empties into French Broad. There was even research to pick a name. Scholars here and abroad dug up the Cherokee word "Ecusta," meaning "rippling water."

Construction of Ecusta's 17 buildings began in June, 1938. Eleven months later, French craftsmen arrived to teach green mountaineers how to make cigarette paper. Most of Ecusta's workmen had never been employed in a mill of any type. Technique and machinery new even to the French experts were being employed.

Here on a plateau half a mile high was the weirdest industrial school ever opened. One by one the machines were put in operation by the Frenchmen. Near by stood the pupils, and between the two groups were two French-Canadians and two French-speaking Americans. The Frenchmen worked, the mountaineers watched, and the interpreters explained. Swiftly they all learned together, blending the French art, handed down from family to family, with American factory methods. By August, paper was coming off the machines in test batches. By September war was on and American cigarette paper was headed for American cigarette factories. All the "Big Five" among cigarette makers are using Ecusta paper, currently meeting one-third of the nation's needs. Production will be doubled by next Spring. Three other domestic mills are now producing cigarette paper from seed-flax straw.

Today the Frenchmen are gone and nine-tenths of Ecusta's 900 employees are from Carolina's mountain counties. In the refinery room you will find full-fledged journeymen who in 1939 were green as Pisgah. On the first anniversary of war, and of mill operation, ground was broken for a big addition. When expansion is completed next Summer 500 more men will be needed. Some of the tenders on the new paper machines will be men who have learned the art in two years instead of the traditional ten.

Straus' paper mill has given the whole region a lift. The nearby town of Brevard has had a small boom; a new theater, an increase in auto sales, and even freshening up of church buildings. The county's bonds, once at 24c on the dollar, have now gone above 50c.

But Ecusta's rep... are more far-flung ... Each day three to ... cars of fiber arrive f... tication plants in ... and Minnesota. In Sa... and Imperial valleys ... fornia and over most ... sota, farmers have a ... crop. This year 14... of straw have been b... cigarette paper. Thi... increased in 1941.

Once A Loss, Now ...

Flax farmers are ... acre ahead. They used ... $1.50 an acre to g... straw; now they get ... But that is not all. Str... nomists are helping f... crease their straw y... acre. With the univ... Minnesota and Califo... are developing new st... is a matter of five to ... but already yields hav... creased by improved ... Farmers have been ... sow their flax more t... the stalks support on... and thus grow taller, ... more straw. By dem... straw clean of weeds ... experts got farmers to ... fields; an extra yield ... was an unexpected b... "keeping the fields bla... extra yield, together w... acreage, spells greater ... production of flaxseed.

No one knows wher... will lead. Other fine ... like those used for curt... and may be made f... straws rather than ... Further, success in ... paper has given added ... to the use of flax in ... Much research, Fede... and industrial, is bein... into this problem. ... Georgia Tech engin... nounced a new proce... fiber for spinning.

Straus himself is try... velop a third great ... ing region so as not t... lean altogether on ... and California. Kan... North Carolina are e... ble regions, but seven... states are also moving ... the same goal. And ... searchers are workin... another significant ... Trying to find indust... for the wood removed ... fibers. Four-fifths of ... is wood. Plastics, w... linoleum, fertilizer and ... can all be made fr... "shives," but not eco... as yet. Straus has tur... into a double-duty cro... anyone solves the shiv... lem, farmers can thank ... triple play.