

AGRICULTURE

Tung Trees in America

Introduced Here 30 Years Ago, Rapid-Growing Trees From the Orient Gain Root-Hold in the South

By DR. FRANK THONE

See Front Cover

BIRNAM WOOD came to Dunsinane Hill, Shakespeare tells us. It came in the form of branches cut down and carried by the soldiers of MacDuff—one of the first recorded uses of camouflage, and probably the only time that trees took marching orders from a general.

But trees have taken marching orders from agriculture and industry for many ages. The trails of their migrations criss-cross the map of the world. Every orchard you see is a regiment of trees that has marched into our land from somewhere afar: apples and pears from central Europe and interior Asia, cherries and peaches from Persia or China, all the citrus fruits from some rather vaguely determined region on the Road to Mandalay.

From our own New World, too, trees have gone a-marching: Para rubber from Brazil to Indonesia, quinine-yielding cinchona from the Andes to the uplands of the same British and Netherlands colonies, cacao from the Orinoco country to Africa. These beneficent invasions and counter-invasions by trees have been going on since the gray dawn of civilization, and they are going on still.

New Recruits

Newest recruits to these tree armies of agriculture and commerce are the tung trees of China. Their forces are now in the neighborhood of the four-million mark and increasing every year. They are entrenched all along the Gulf coast from eastern Texas to northern Florida, across the peninsula as far south as Tampa Bay, and on to the sea on the southeastern coast of Georgia. A hundred miles wide is the territory considered suitable for tung tree occupation along the Gulf, with a block at least three times that deep in northern and central peninsular Florida.

All this, where five years ago the total number of trees hardly reached the half-million mark.

Why this astonishing recruitment-rate, among trees that are still hardly even a name to most of us?

Not hard to answer. Though we may

know little or nothing of the tung tree, that does not prevent us from contact with its product every day of our lives. Tung oil enters into the paint and varnish on our walls and floors, the synthetic plastics in our toothbrush handles and radio-set fittings, the linoleum on the kitchen floor and the oilcloth on the pantry shelves, and even into the ink in the printed advertising matter that makes us want to buy all these things. Tung oil is an important ingredient in the industrial complex of American life, and was important even before tung trees first made their landing on American shores.

Tung oil comes from the seeds of the tree that bears its name. Each fruit of the tung tree is an object the size of a small apple, that looks something like a black walnut with the hull still on it and something like an unsuccessful tomato. Each fruit contains five large, oil-rich seeds.

Heart

The leaves of the tree are large and heart-shaped. The Chinese word for heart is "tung." So tung became the name of the oil, and the seeds, and the tree itself.

For many centuries the Chinese had been using tung oil, obtained by crude methods of extraction, for calking and painting their boats, treating leather, waterproofing paper and cloth. A few early travelers and missionaries brought out small quantities of the oil and told of its use. But it was not until well into the nineteenth century that American and European manufacturers really began to make large use of tung oil.

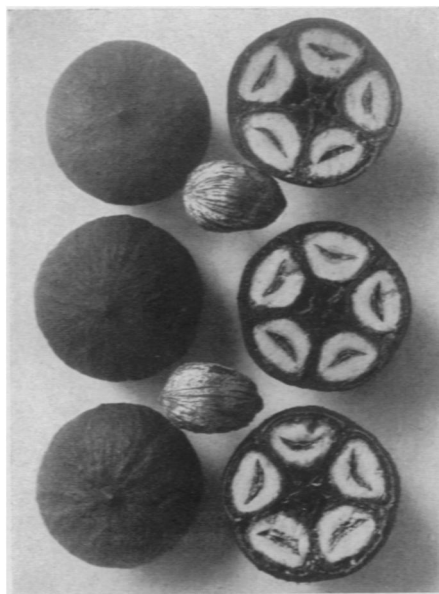
The world's supply of tung oil still comes almost altogether from China. Hankow, on the Yangtse river, is the principal port, though considerable quantities also start from Shanghai, Canton, and Hongkong. The exports in 1936 from Hankow alone amounted to nearly 80,000 tons, of which the United States absorbed about three-fourths and the whole of Europe the rest. Since the whole of the American-grown tung oil production last year amounted to only 1,000 tons, the extent to which we are

dependent on China is startlingly apparent.

The little tung oil that we have been able to put on the market so far is eagerly licked up to the last drop as fast as it is offered. With better machinery and methods, American tung oil producers are able to obtain a transparent, honey-clear oil, while the oil imported from China is turbid and dark as molasses, and contains considerably more free acid than the American product—a decided technical disadvantage. Besides, a good many of the canny Chinese have no scruples over turning a somewhat dishonest penny by adulterating their tung oil with cheaper oils, such as soybean oil and peanut oil.

Held Down

The result of the unsatisfactory quality and lack of uniformity in the imported tung oil has been to discourage its use in American industrial plants. One manufacturer told a representative of the U. S. Department of Commerce, "We hold tung oil down to the absolute necessary minimum in our formulae, and get along on about one tank car load a week; but if we could be sure of a steady supply of American-produced oil we would step up our



TUNG FRUITS

One is sliced across to show the seeds, or nuts, and two of the nuts, taken out.



LOVELY

A tung tree in full bloom can hold its own in a beauty contest with apple, peach, cherry or any other orchard tree you might wish to name.

tung-oil purchases to seven carloads a week."

The supply of American tung oil should increase rapidly from the plantings already in the ground, not counting the thousands of acres that are being added every year now. This is because the great majority of the trees are still young, so that their yield per individual tree will go up fast during the next few years. The bearing habit of the tung tree seems to resemble that of an apple tree. It will produce a small crop of fruit by the time it is five years old, but does not reach maximum productivity until it is about twenty. After that its bearing life may be long—how long, nobody knows as yet, for the oldest trees in this country were set out only about thirty years ago.

Quick Production

The quick and abundant production of tung trees, and the rapid extension of their territory during the past few years, are likely to set traps for the enthusiastic but unwary investor. Already there has sprung up a pestilent crop of "blue-sky" promoters, who are inducing poor folk to entrust them with the care of tung orchards in the South which they will (they hope) make their "Shangri La" when they grow old. It is an old racket, and has been worked in citrus, pecan, and a number of other lines—

always to the detriment of honest business and of the South in general. Legitimate tung planters and related businessmen and bankers boil over whenever this subject is mentioned, but they can do little about it, for this jackal fringe manages to stay within the letter of the law.

Do It Yourself

All that can be done is to emphasize over and over that if you expect to make money out of tung oil you must live among your trees and take care of them yourself. Applicable here is the maxim that Benjamin Franklin wrote long ago, for Poor Richard's Almanack: "He that by the plough would thrive,

Himself must either hold or drive."

It is probable that the bulk of American tung oil will be produced on large plantations, perhaps owned by corporations or cooperative societies. Yet there is ample opportunity for the small landowner to tend a few trees planted on land not suited for field cultivation, and thus be able to pick up a neat bit of cash each year when the fruits ripen.

Unless new and hardy varieties of tung trees can be produced by breeding, it is not likely that orchards will be planted for profit outside the present rather restricted limits. Experience has shown that the trees have certain rather

"fussy" requirements as to soil and climate.

They are deciduous, shedding their leaves in autumn and standing bare and dormant during the winter; for this reason they thrive best where there is at least a short cool season with a suggestion of frost. Yet they cannot stand more than just a little frost. An ordinary freeze will kill their buds, and a severe freeze makes an end of the trees outright. So both southern and northern limits are rather severely set by climate.

Critical

Their water requirements are almost as critical. They will not thrive on less than thirty inches of rain a year, and they do better on the forty-plus rainfall of the eastern Gulf coast and northern Florida. Moreover, they want well-drained soil; rolling land with deep, porous surface soil giving good down-drainage as well as free run-off is best.

Finally, they will not tolerate the least degree of alkalinity. They rebel at even a neutral soil, but smile and thank you if you plant them in acid land. Fortunately, in the cutover pinelands of the Gulf coast, acid soil is "what they ain't got nothin' else but." However, there are places where a limestone subsoil comes close to the surface, and where tung-oil trees were injudiciously set out on such land they invariably died off.

Tung trees will bring more than wealth to the South. When they are in blossom they are objects of breath-taking beauty—flowering trees that will make even the orange groves of Florida and the peach orchards of Georgia look well to their honors. Their flowers are bell-shaped with a slightly flaring rim, marked with pink or deep yellow in the throat, and are borne in close clusters. They come before the leaves so that a tung tree in bloom looks like a single giant bouquet.

Ornamental

Planted far enough apart to give each tree chance to develop its full size, they are splendid things to see when they are covered with their dense crown of dark-green, heart-shaped leaves. A really large tung tree will become almost spherical, forty feet high and as much in spread. They can be ornaments for lawn or park as well as work-trees in orchards.

The tung-oil of the South is expected to form a vital link with the farming-for-industry movement in the North,

through another oil plant that also came from China, the soy bean. Soy bean oil is now being produced in considerable quantities, with the principal center in Illinois and neighboring Corn Belt states. The oil is in considerable demand for food uses and in the manufacture of soap, but its greatest potential market is as a paint ingredient.

Used alone in paint, soy bean oil is that thing anathema to all good painters, a slow drier. But if the proper proportion of heat-treated tung oil is added, the performance of the paint is very greatly improved. American production of soy bean oil is away out in front at present; it is up to tung oil to catch up.

America is not the only country where tung trees are being cultivated. In the warmer lands of the vast British Empire—India, South Africa, Australia, the Pacific islands—large-scale experiments are going on. Argentina, Paraguay and Brazil are among the potential tung-oil countries in South America. And latterly the Soviet Union has had delegations of experts visiting our plantings in the South, with a view to setting out trees in the warmer lands of interior Asia.

Tung oil, it would appear, is about to step out.

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Science News Letter, July 17, 1937

EDUCATION

Deafness Is Handicap In Learning To Write

DEAFNESS, known to be an almost insuperable obstacle to the learning of speech, now appears also to be a handicap in learning how to write good English. At the meeting of the American Association for the Advancement of Science, Prof. William H. Thompson of the University of Omaha reported a study of 16,000 school assignments by 800 deaf children, which lend strong support to this thesis.

Of the children studied, 47 per cent. were born deaf, 21 per cent. became deaf before the age of five years, and 32 per cent. after five. All the children had more difficulty in learning written English composition than normal children would have had. Children who had once been able to hear averaged better than those born deaf. The errors of those who lost their hearing after the age of five closely resemble the errors of normal public school children.

Science News Letter, July 17, 1937

BOTANY

Arctic Botanist Gathers Poppies Through Snowbanks

Pere Arthème Dutilly Does His Botanizing During The Long Cool Days of the Arctic Summer

FAR in the northernmost Canadian lands, where the cold polar sea laps coasts that are mostly sullen and inhospitable, the long day of the Arctic has brought spring at last. In the thin layer of soil that thaws above the ever-frozen level at a few inches beneath, flowers are beginning to bloom—delicate harebell, bold dandelion, Indian paintbrush that is a brawl of color, flaming Arctic poppy, and a whole constellation of others.

To this, his high-latitude botanic garden, now returns the Botanist of the Arctic, Pere Arthème Dutilly, of the Oblate Missions. He has been away from his Arctic for a winter and spring, while he worked up his collections and notes in the laboratories of the Catholic University of America in Washington, D. C. Now he is buckling up his last straps, and in a few days will be on a small steamer nosing its way along Labrador's forbidding face.

This summer he will botanize the region around the northern end of Hudson Bay. It is familiar territory; he has been there before. Pere Dutilly's botanizing trips have taken him along all the Arctic coasts of Canada: around Labrador, in Baffin Land, on the Keewatin Peninsula, across the long coast of the Northwest Territories, up the Mackenzie and Slave rivers. He has plucked Arctic poppies growing through the snow at Latitude 76 North on Ellsmere Island, and pulled up trees by the roots alongside the Alaskan boundary.

(That latter feat, by the way, was no Paul Bunyan exploit; the birch and willow trees of the Arctic coast never grow more than six inches high.)

Four years Pere Dutilly spent in the Arctic before he "came out" to where he could get at library and laboratory facilities, arrange his specimens and send them to the herbaria that are to house them, and get the Eskimo kinks out of his tongue with a little French and English conversation. He will come back again next fall, for he still has a lot of work to do in Washington.

He expects to write a book on the

plant ecology of the Arctic—ecology tells not merely what plants, but how they get along with the climate and their relations one to another. He has seen some interesting things that still await telling.

For example, there is the matter of foliage color. Arctic plants tend to be purple instead of green. The higher the latitude the deeper the color. Pere Dutilly can tell, from looking at another man's specimens, about how far north they grew. His rule might be summed up: "The norther, the purpler."

Plants, however, are not the whole of Pere Dutilly's interest. After all, he is a missionary, and a human being too. He loves his Arctic and the Eskimos among



SUMMER GARB

Pere Arthème Dutilly showing what the well-dressed young botanist should wear this summer when he goes flower seeking in the late Arctic afternoon (about 11 p. m. and still daylight).