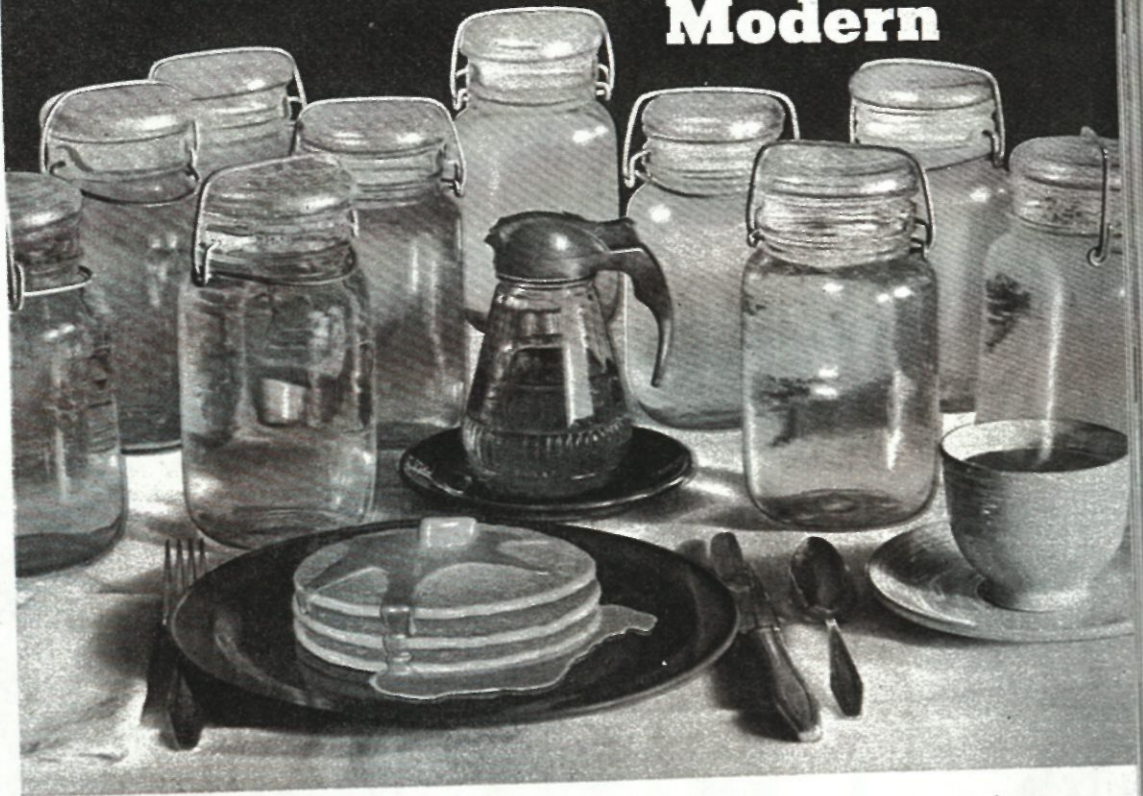


The Old Sugar House Goes Modern



Maple syrup and hot cakes! Food for a king! The 10 jars in the background contain sap right from the tree. It takes that much sap to produce the amount of syrup shown here. Below, Vermont youth "taps out" a maple the modern way

By William Gilman
Photos by Eleanor Gilman

DOWN ON THE FARM the Yankee trick of making maple syrup "ain't what she used to be." The maple tree itself is still a mystery, challenging scientists who don't know why its sap is so sweet and flows so temperamentally. But sugaring has gone modern, using mechanized equipment and pipe lines to convert the maple's juice into fancy-priced nectar.

In its fundamentals, this odd type of farming remains unchanged. From a hard-maple tree, between 30 and 45 drops of sap produce one drop of syrup for the great American pancake. If you have the tree, all you need is a tap-hole, a spout, a can, fruit jar or pail for collecting sap, and a pan for boiling it until a few drops on a spoon will "sheet" like jelly. That's finished syrup.

Anybody with maples in his yard has the makings of a worth-while springtime hobby. A dozen trees should net five gallons of syrup for pancakes, cake icings and candy, plus a few quarts to spare at Christmas.



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Douglas Aircraft Co. photo



POPULAR MECHANICS

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Pouring the sap downhill is a lot easier than the old method of hauling it with oxen. There are six miles of pipe on this sugar farm. Each main line is numbered and the markers are set high so snow won't hide them

Below, this is the end of the pipe line and the end of the sap, too, because here it is boiled down to syrup. There two sap houses produce 1000 gallons of syrup a year. Even the tree in the foreground has been tapped



Large bucket screws to pipe. Perforated pail, left, slips

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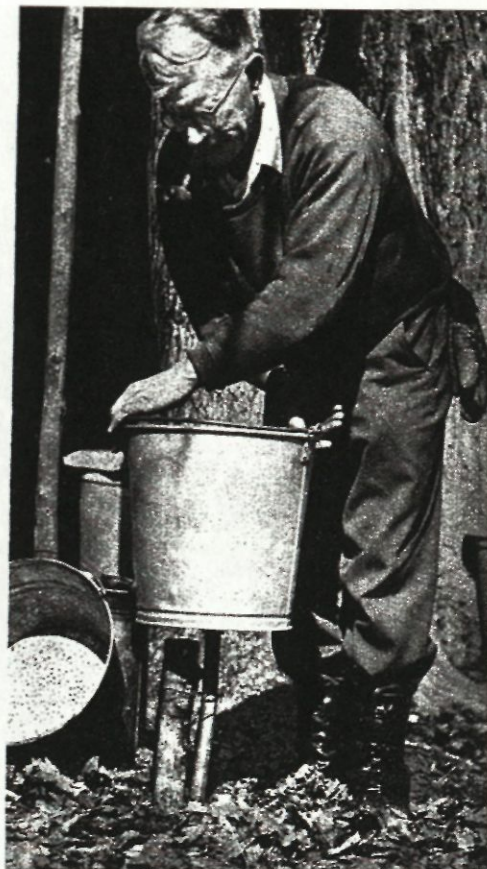
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Large bucket screws to pipe to serve as a funnel.
Perforated pail, left, slips inside to strain sap

But to the commercial syrup maker, the drip-drip-drip of sap into metal buckets hung on thousands of maples is sweet music to the ears and dollars in the pocket. He hangs at least 4000 buckets and aims to get 1000 gallons of syrup worth \$5000. It's all done in a hurry. Compared to other crops, syrup piles all the work into six weeks of hectic harvesting — there's no plowing, seeding or weeding necessary.

It takes a million drops of sap to make a gallon of syrup and that's why labor saving pays. A new device is the power tapper, replacing the breast drill and old-fashioned brace and bit for boring tapholes.

It's a portable gasoline motor equipped with shaft-driven bit that drills holes $\frac{3}{8}$ inch in diameter and $1\frac{1}{2}$ inches deep. Most are homemade. Some, mounted on war-surplus rucksack frames, are packed on the back. Others are held over the chest by shoulder straps.

When Wilson Clark of Wells, Vt., built one for his father's farm, he used a motor from a washing machine and handle bars from an old sled. He made aluminum castings for the chuck and pulley. With the rig he can "tap out" for 800 sap buckets in six hours. It takes two men, driving spouts and hanging buckets, to keep up with him.

That's only the first step. Most of the

work is in visiting a few thousand trees through snow and mud to empty the buckets daily during a sap run—then bring the "liquid sunshine" to the evaporator.

One canny farmer, Jay Gould of Middle Granville, N. Y., uses a tractor to pull the trailer carrying his collection tanks. He sticks to highway maples, usually higher in sugar content than woodland ones, over a route of several miles. For every dozen trees "rented," he returns a gallon of syrup to their owner and nets himself about eight gallons.

Most efficient method of horseless sugaring is the pipe line. Some operators have tried linking the sap hole right to the pipe by means of a gooseneck connection, but it hasn't worked as well as pouring sap into the line and letting gravity do the rest of the work. At Scott Nearing's mountain farm near Jamaica, Vt., six miles of pipe line—a fanning system of four main lines and their spurs—bring 35,000 gallons of sap down during a season.

Spaced 100 feet apart through the woods are standpipe Ts into which Nearing's men pour sap gathered from near-by trees. Buckets on the Ts serve as funnels.

Downhill, sap is boiled in two fireproof sugaring houses, each with a modern evaporator. A valve sends sap into either or both, when a big sap run is on.

Like other modern producers, Nearing doesn't allow sap to accumulate—that causes fermentation. Old-timers blamed bad sap on a swelling of the maple tree's buds. They called it "buddy sap." Scientists say it should really be called "buggy sap." The bacteria are not harmful to health, but cause a change in the sap's sugar composition, resulting in syrup that is too strong, and black instead of amber.

Holding late-afternoon sap for the next day's run caused much of this. Now, big operators have electrified sugar houses and they keep up their boiling into the night.

In a modern sugar house, much of the space is occupied by the evaporator—large ones are 5 by 16 feet. Sugaring has come a long way since the pioneers learned the art from the Iroquois Indians, who simply gashed a tree, caught sap in a hollow log and evaporated by throwing hot stones into the liquid.

The modern tin evaporator is a refined version of a shallow pan. It rests on a long, narrow furnace, called an "arch." In the firebox, a hungry fire devours cords of wood and it's a knack to know how hot the fire should be.

Unlike the mountain moonshiner who cooks corn mash and wants the alcohol in the vapor, the mountain syrup maker lets steam go up through a roof vent and cashes in on the residual liquid. Sap enters one



The old, and still reliable, way to tell when syrup has boiled enough is to see if it "sheets" when drained from this scoop. Below, Mrs. Helen Nearing helps out by running the evaporator

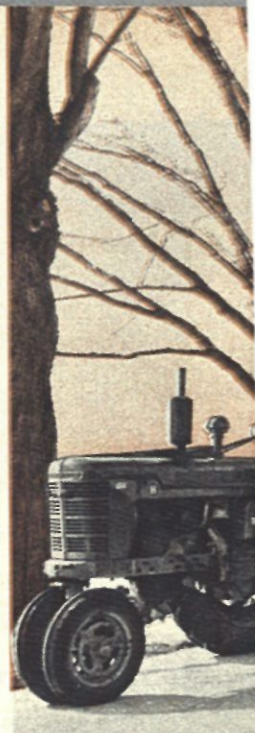
end, flows around several partitions of the pan, losing water as it moves.

A special hydrometer and thermometer record the finish point. Standard syrup weighs 11 pounds per gallon and boils seven degrees above water's boiling point. Many producers, however, admit they like to double-check by using the old sheeting method, too. Syrup is then strained through felt to remove mineral grit before it is graded according to color and stored in tins or barrels.

There is still room for improvements in the process and a fortune awaits the man who can figure out how to get rid of the water in the sap more quickly. Vacuum distillation has been tried. It boiled the sap quicker and at lower temperatures, but the resulting syrup had lost its famed maple flavor.

One improvement scientists are promising is a sweeter maple tree. Richer sap will mean less boiling to produce more syrup.

The tree most commonly tapped because of its superior sugar content is known as the sugar or hard maple. Its sap averages three percent sugar. Since pioneer days,



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Roadside trees are rich in sugar content. This farmer drives his tractor on the highway, picking up his crop

it has been a wild tree. But the University of New Hampshire has begun a program to grow better ones. After a long hunt for outstanding specimens, UNH men found one just off their campus and promptly named her Sweet Sue. Her sap contains nine percent sugar — three times average. They are now rooting cuttings from that tree under fluorescent light. Their goal is to populate farm lands with lots of Sweet Sues which will be set out in orchards the way pedigreed fruit trees are planted.

Meanwhile, although the maple is one of the best known of trees, scientists still don't know just what goes on inside the tree itself. They want to know why one sap season is good and another bad and why sap flows well only on a sunshiny spring day after a freezing night.

There are many oddities in the picture. It's ordinary belief that sap flows up a tree. But during tapping season, twice as much comes down as goes up.

One experimenter, using an ordinary steam gauge mounted at a taphole, found it registering 25 pounds of sap pressure per square inch inside the tree at noon. That's as much pressure as you carry in your automobile tires. At night, the sap pressure turns into suction.

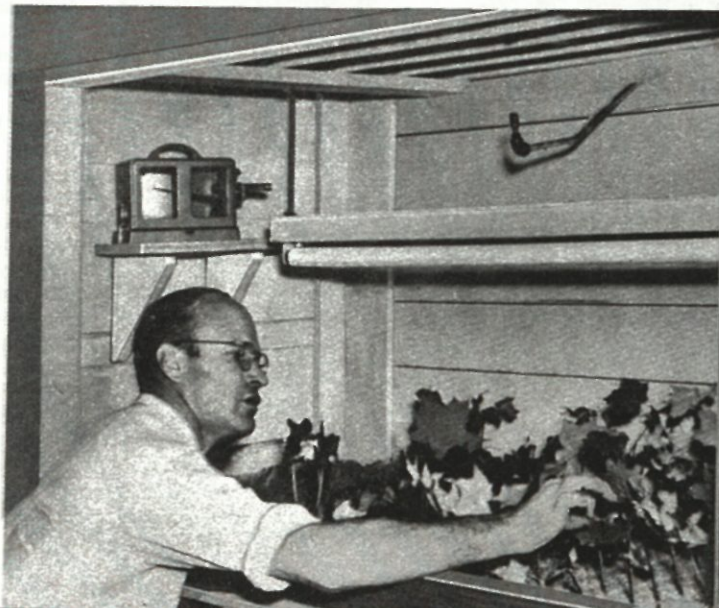
Even the log of a freshly cut

maple tree will work like a sap pump. UNH experimenters got sap from branches, logs, posts and trees standing upside down in tubs of water. Every night, the "dead" wood sucked in water and every day it gave forth sap through the taphole.

Researchers at the University of Vermont have gone even further. They cut limbs from a maple tree in March and store them in refrigerators.

In July or November, they take out a branch. It wakes up and starts right in flowing with March sap.

Dr. Stuart Dunn, botanist at the University of New Hampshire, is raising maple trees with three times as much sugar as the average



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