

Backyard Sugarin'

A COMPLETE HOW-TO GUIDE
FOURTH EDITION

RINK MANN

Photographs by Daniel Wolf



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Foreword

by Michael Farrell



I got my first taste of pure, delicious maple syrup while on a class field trip to central New York's Heiberg Forest in 2002. As a graduate student at the SUNY College of Environmental Science and Forestry, I couldn't believe it had taken me 24 years before I got a chance to see firsthand how maple syrup is made and enjoy it right off the evaporator on warm pancakes. I was hooked. One class field trip certainly didn't qualify me as a sugarmaker, but the next weekend I went home to Lake George to start tapping a dozen of my parents' trees. Over spring break, I spent my time collecting sap and trying to boil it down into syrup. After burning my mother's two best pots, she banished me from the kitchen. I had to try boiling the sap outside over a fire. To say my first batch ended up with a smoky flavor would be a vast understatement!

If I had known about *Backyard Sugarin'* then, things would have gone much better for me. While youthful enthusiasm is a great thing, it's also important to do your homework and be fully prepared before taking on a major project like this yourself. Having a step-by-step guide outlining the various materials you will need, advice on how to source them cheaply, and instructions on how to proceed in tapping, collecting, and boiling is invaluable to anyone getting started. To that end, reading this book is a great first step to ensuring your backyard sugaring operation will turn out much better than mine did!

I now manage Cornell University's Uihlein Forest—a maple syrup research and education center in Lake Placid, NY—and have spent the last decade immersed in the maple industry. From my impromptu backyard set-up, I jumped right into a 6,000-tap commercial operation with research and extension responsibilities. While I love my job and truly enjoy sugaring on a commercial scale, I fondly remember the days of tapping a few trees and trying to figure out how to make syrup myself. In my duties with Cornell, I work with a lot of beginners and people thinking about getting started in sugaring. I often recommend *Backyard Sugarin'* to them, as it is a valuable resource that can save people a great deal of time, aggravation, and money.

The focus on homemade evaporators and backyard boiling set-ups is particularly helpful to anyone contemplating building their own rig. The pride in making your own syrup is one of the main things that draws people to sugaring in the first place. If you can also make your own evaporator, using salvaged material that you didn't have to pay for, that is something to be even more proud of. *Backyard Sugarin'* has plenty of time-tested advice for making this happen and is the best resource out there in this regard.

It is important to remember, though, that food safety protocols and regulations have changed a great deal since *Backyard Sugarin'* was first published back in the 1970s. Thus, there are many recommendations throughout the book that may have been acceptable then, but don't live up to the standards we expect today. In particular, it is important to realize that *pure* maple syrup—and the sap that goes into producing it—should only ever come in contact with food-grade materials that don't impart any potential chemicals, flavors, or odors to the finished product. There have also been tremendous improvements in sap collection and processing technologies that are just as applicable to people making syrup in their backyard as they are for commercial operations. Therefore, although the book is useful as a starting point and you could certainly make delicious syrup following the advice

outlined in these pages (indeed, many people have), always remember there are countless ways to make your sugaring operation more efficient and productive—no matter how small an operation it is.

In short, *Backyard Sugarin'* is a great introduction on how to make your own maple syrup with a limited budget and a lot of ingenuity. I hope you enjoy reading it as much as I did, and I wish you the best in all of your future sugaring endeavors.

—MICHAEL FARRELL

Lake Placid, NY

June 2011

Backyard Sugarin'

Introduction



I suppose I got involved in backyard sugarin' the day my determination to make maple syrup ran smack dab into my good wife's determination that the boiling down *not* be done on the kitchen stove. I must say she has a point. You see, the main thing about making maple syrup is you have to boil off about 32 parts of water in the form of steam to end up with one part of maple syrup. (This is a reliable ratio for my part of New Hampshire, but 40 parts could be closer, depending on the location, weather, time of the season, and other mysterious factors.) That means that if you're boiling down a batch some Saturday afternoon on the kitchen stove and are aiming, say, for 3 quarts of syrup, you're going to put about 24 gallons of water into the air in the form of steam before the boiling's done. Unless you've got one awful powerful exhaust fan, you end up with water streaming down the walls and enough steam to impair visibility across the room. And, when things finally do clear, you're apt to find the wallpaper lying on the floor. Then too, even if the batch doesn't boil over on you, which it can, the sugar in the spray from all that furious boiling gets all over the stove and is harder than blazes to get off. So, if you want to maintain a measure of domestic tranquility, the best thing is to do your boiling—most of it anyway—outside, or in a garage or a shed if you've got one handy.

Anyway, the day I lost my kitchen privileges was the day I started figuring out in earnest what I might need to set up a proper evaporator in a little sugar house and get the equipment necessary to do the job right. I was soon up to my eyebrows in catalogues and books on the time-honored equipment and methods used to make maple syrup. This all made good reading, but the smallest evaporator I could find at that time was designed to handle up to 250 buckets, capable of producing about 75 gallons of syrup during the season, and it cost better than \$600. When I went to figure out the bucketage I'd need to collect enough sap to make it worth while to run the evaporator, plus the holding tanks, instruments and other gear, not to mention building a small sugar house to house everything in, I was looking at an investment well up into four figures. It became clear I'd have to get into the business of selling syrup just to make ends meet.

Having other business to attend to, I wasn't about to make that kind of commitment to sugarin', but I was just as determined to make my own syrup—say 3–4 gallons a year. I had my own sugar maples, plenty of firewood, an attraction to maple sugar like a bear has to honey, and enough Yankee (or maybe it's Scotch) blood in me to take pride in saving upwards of \$12 a gallon in the process.

So, the only solution was to improvise. I scrounged up an old 18" x 24" hotel baking pan, built a firebox under it out of cement blocks, with some used stovepipe sticking out the back, and produced a very satisfying batch of golden delicious right out there in the backyard.

That was just the beginning. During the course of the season I ran into, and then started searching out, other backyard operators. We always took time to inspect each other's rigs and to speak kind words about some particularly innovative piece of equipment, be it a rotating bent stovepipe to create a venturi draft effect, or a bathtub holding tank. Naturally we'd steal each other's ideas and make constant modifications in our own rigs during the season, and we'd swap theories on what kind of maples produced the sweetest sap and what methods should be used to tell when the syrup was ready to be "drawn off."

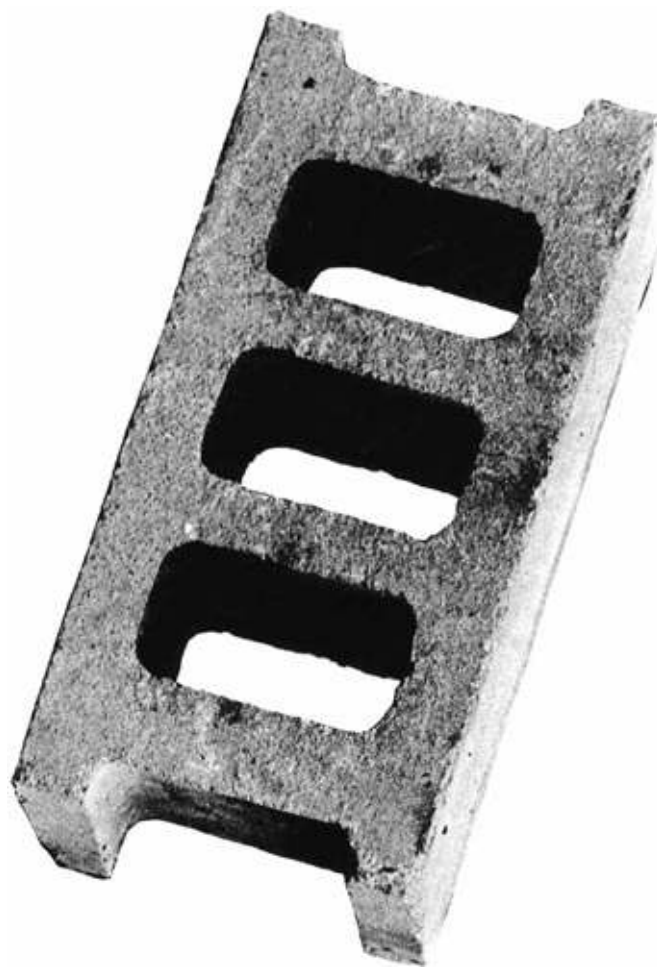
The real challenge in backyard sugarin' is to find ingenious ways to collect and boil down sap

without spending any money, and I must say I found a whole breed of like-minded people. Backyard sugarin' builds interesting friendships, a kind of fraternity, I suppose, born of a mutually parsimonious nature.

I like to think, too, that most backyard sugarers must have a little of the moonshiner's blood in them. And, there *are* a surprising number of similarities between boiling maple sap and distilling out the old mountain dew. In both cases you're separating water from something else. In the case of sugarin' you want what's left in the pan after the boiling, while with moonshining it's what comes off that counts. In both cases, too, you try to set up operations in a nice secluded spot, where you won't get laughed at for your mechanical eccentricities (in the case of sugarin') or arrested (in the case of moonshining).

In an earlier edition of this book, I spent a good deal of time describing, with pictures, some of the more ingenious contraptions being used for boiling down maple sap in the backyard, dealing less thoroughly with other important aspects of backyard sugarin'—like when and how to tap what kinds of maples, and some of the intricacies of boiling down sap without professional equipment. This time around I'm going to try to take the reader through the whole process, step by step, but still emphasizing, each step of the way, how you can get the job done without it costing an arm and a leg.

I am greatly indebted to my wife Louise, who, as I mentioned earlier, was responsible for getting me into backyard sugarin' through her gentle persistence about my not boiling on the kitchen stove, to the several backyard operators who so modestly allowed their sugarin' operations to be photographed, and of course to Dan Wolf, who has captured so well in photographs the essence of the backyard sugarin' industry.



Cement block, the backbone of backyard sugarin'

Planning Ahead



With backyard sugarin', one of the things you have to do is plan ahead.

Since the amount and type of equipment you'll need depends a good deal on the amount of syrup you're planning to make, the first thing to decide is just how greedy you are for the golden delicious—that is, how many quarts you want to end up with.

For purposes of demonstration, let's assume you've decided you want 5 gallons, or 20 quarts of syrup by the end of the sugarin' season, and that because you do have other things to tend to during the mud season, which is also sugarin' season, you can only do your boiling on weekends.

With that decision out of the way, we can make the following calculations (with the conviction that we'll get a few arguments about them from other backyarders):

- For each quart of syrup you want you'll need one tap hole in a sugar maple, assuming you collect all the sap and don't spill too much of it on the way to the evaporator. Thus, for 20 quarts, you're going to have to drill 20 holes, set 20 sap spouts and hang 20 buckets. Later on I'm going to argue that a good substitute for a metal sap bucket is a one-gallon plastic milk bottle. Therefore, if you accept that idea as a good money-saver, you ought to start saving up at least 20 milk bottles, better 30 or 40 to have ample spares. That requires getting started well in advance of the season.
- The number of maple trees you'll need depends on their size. You're not supposed to tap a tree under 10" in diameter, but you can put two taps in a tree over 18" in diameter and three in one that's over, say, 28". On a real big old maple you can hang even more buckets, but when I see some stately old maple festooned with five or six buckets it makes me think someone's bleeding it to death. So, I try to make do with fewer buckets on more trees. In any case, getting back to the 20-quart plan, you're going to need, as an example, four 3-bucket trees, three 2-bucket trees and couple of 1-bucket trees, or whatever other combination adds up to 20 taps. The next chapter of this book is going to deal with when, how and where to tap what kind of maples. Suffice it to say here that you should plan ahead, know what maples you'll need to tap and get permission to tap them if they don't belong to you.
- According to the generally accepted rule of thumb, a professional wood-fired evaporator will consume a cord of firewood for each 25 gallons of syrup being made. In case you don't know, a cord is a pile of wood measuring 8 ft. long, 4 ft. wide and 4 ft. high. Theoretically, therefore, you'd need 1/5 of a cord to produce your 5 gallons of syrup, but don't you believe it. Since you'll probably boil down on 4–5 separate weekends during the season and will be using a homemade evaporator, which can hardly match the efficiency of the professional rigs, you'll need probably half a cord of good, dry wood to make your 5 gallons of syrup. Now, in boiling sap you want a good, roaring fire, not a slow burner like in your living room fireplace. And it doesn't make a lot of difference what kind of wood it is just so's it burns well. You can even (and should) burn pine and other softwoods that you wouldn't burn in your fireplace. The pitch just adds to the heat. If you've got to buy your wood, buy hard or soft wood slab (the first slice off the log with the bark

still on it), and be sure it's dry, or buy it a year in advance so it will be. Put it near where you plan to set up boiling operations, and put something over it, so your woodpile won't be soaking wet or hardbound with ice and snow when it comes time to use it.

In my own case, being in the real estate business most of the time, I own some wooded lots, and in the first cool days of autumn I find it quite easy, and enjoyable, to cut down and drag out enough deadwood to more than meet my needs. That's also good woodlot management practice, so that if you don't own your own woods, someone who does would probably welcome your efforts to clean up his woods. I've never bought any wood for sugarin'.

Some sugarers I know collect discarded hardwood pallets and wooden crates at their jobs. Busted up, they make excellent evaporator fodder, to get you off to a fast, hot start. Mixed with your other wood as you boil, they help keep the fire hot. Old clapboards and other discarded wood from construction sites can serve the same purpose.

Whatever your sources, the thing is to figure your firewood needs and get it collected and under cover before the snow flies.

- Finally, give some forethought to how you're going to can and store your golden hoard.

For 20 quarts of syrup you'll want to save up enough containers during the year to hold that amount—preferably metal cans, although glass jars with screw-on tops are fine if they don't break when you put hot syrup in them. My own choice is to save up coffee cans, the ones that come with plastic lids for resealing. The 2-pound size holds a half gallon, so for 5 gallons of syrup you'd need to save up 10 two-pound coffee cans during the year.

Of course, if you're doing a production run for Christmas gift giving, the small lithographed cans or decorated plastic jugs (slightly cheaper) are kind of pretty and can be purchased in many country hardware or farm stores.

So, let's sum up the things you ought to be thinking about well in advance if you're aiming to make 5 gallons of syrup.

- Save up at least 20 plastic milk bottles or other containers to serve as sap buckets.
- Pick out your trees for tapping and get permission, if necessary, to tap them. You're going to drill 20 holes.
- Collect about a half cord of good dry wood, pile it near your planned evaporator site and cover it over.
- Save up 10 2-pound coffee cans with plastic lids, or something comparable for storing your syrup.

If you figure on making more or less than 5 gallons of syrup, adjust the above calculations accordingly.

There are other preparations that can be made in advance, too, like designing and collecting parts for your homemade evaporator, and perhaps whittling your own sap spouts, but these things can be done over the winter.

Or, you can do everything at the last minute, if you insist, but I can guarantee you a few frustrations, like having 35 gallons of fresh sap and your wood so wet that you can't get the sap boiling, or a nice pot of golden syrup and nothing to store it in. Don't say I didn't warn you.

Trees, Taps, and Saps



Figuring out what trees to tap, when to tap them, and just where and how to drill the hole and set the spout are important parts of backyard sugarin'. If you do these things carefully, it will increase the amount and quality of sap you'll get, yield a higher ratio of syrup to sap, which means less boiling, and may save you a lot of struggling through deep snow to taps that aren't worth the effort.

Selecting Your Trees

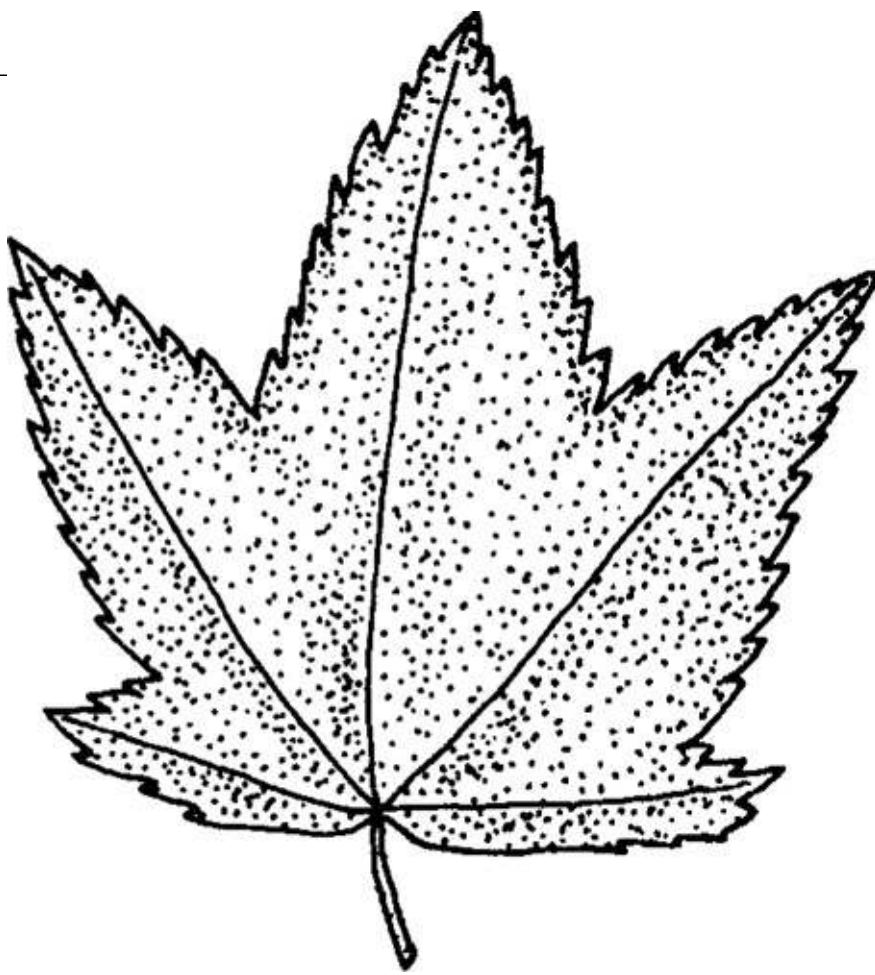
First off, let's talk trees. Naturally you wouldn't mistake a white birch for a maple, nor would you hang a bucket on a telephone pole (although I've seen that done to get a rise out of city folks). But, there are four different kinds of maple trees native to the northeastern United States, all of which produce spring sap flows, can be tapped and will produce maple syrup. These four trees are the Sugar Maple (*Acer saccharum*), also called the Hard Maple by furniture makers; the Silver (or White or Soft) Maple (*Acer saccharinum*); the Red Maple (*Acer rubrum*), also known as the Swamp Maple; and the Ash Leafed Maple (*Acer negundo*), more popularly known as the Box Elder.

The important fact is that the sap from the Sugar Maple contains about 3% sugar, whereas the sap from the other contains half to two thirds as much. Also, the syrups made from these other saps are darker and less flavorful, so that in total, confining your sugarin' to sugar maples means less boiling and better syrup.

The best way to identify the different maples is by comparing their leaves. This points up the advantage of selecting your trees in the summertime. On the next page I've included some simple drawings of the leaves of the four trees. The box elder is easily spotted, because each leaf is actually cluster of 3–5, maybe 7 little leaves instead of a single, multilobed leaf. Next easiest to eliminate is the Red Maple. Its leaf has basically three lobes, with maybe another small pair at the bottom, and it's quite serrated (jagged-edged). But the most prominent thing about the Red Maple is that it has something red going for it just about all year—reddish outer branches, bright red fall color and fairly large red buds at the end of the branches right through the winter.

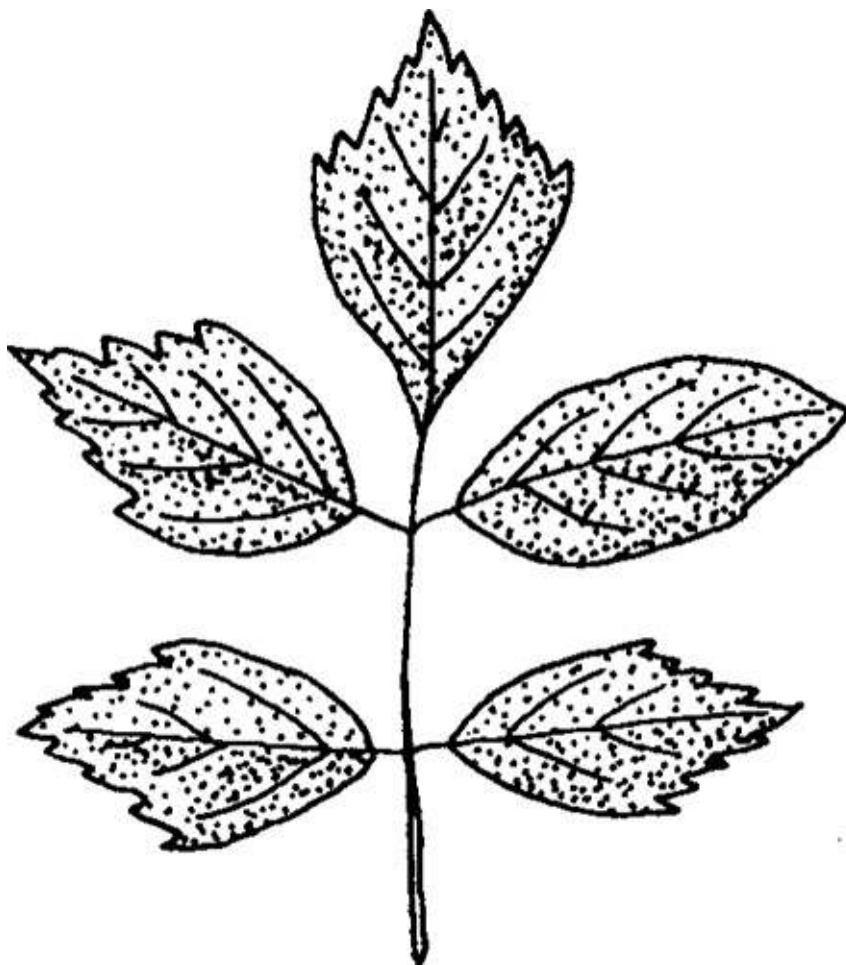
The more difficult comparison, usually, is between the Silver Maple and the Sugar Maple, because both have five-lobed leaves, and are about the same size. The tipoff is that the Silver Maple's leaves are more serrated, and there is a definite V sinus between the lobes. The Sugar Maple's leaves have few serrations, and there is a definite U sinus between the lobes, like those between your fingers.

If you have to pick your sugar maples after the leaves are down and buried under the snow, there are two ways it can be done, but they're too complicated to get bogged down with in this book. Best thing to do is to invite someone over for refreshments who does know. You'll find that sugarin' people are a gregarious bunch, full of free (if sometimes conflicting) advice. If you're still undecided after that, try to use those big old maples you find rather evenly spaced along the sides of most back roads. It's a sure bet they were planted there generations ago by a farm family that in those days relied on maple sugar for their sweetening needs. Look closely—you may even find the scars of old tapholes long since healed over.



RED MAPLE

3–5 lobes, well serrated, tapering slightly to ends. Bottom lobes nearly as wide as upper. Definite V sinus. Reddish hues.



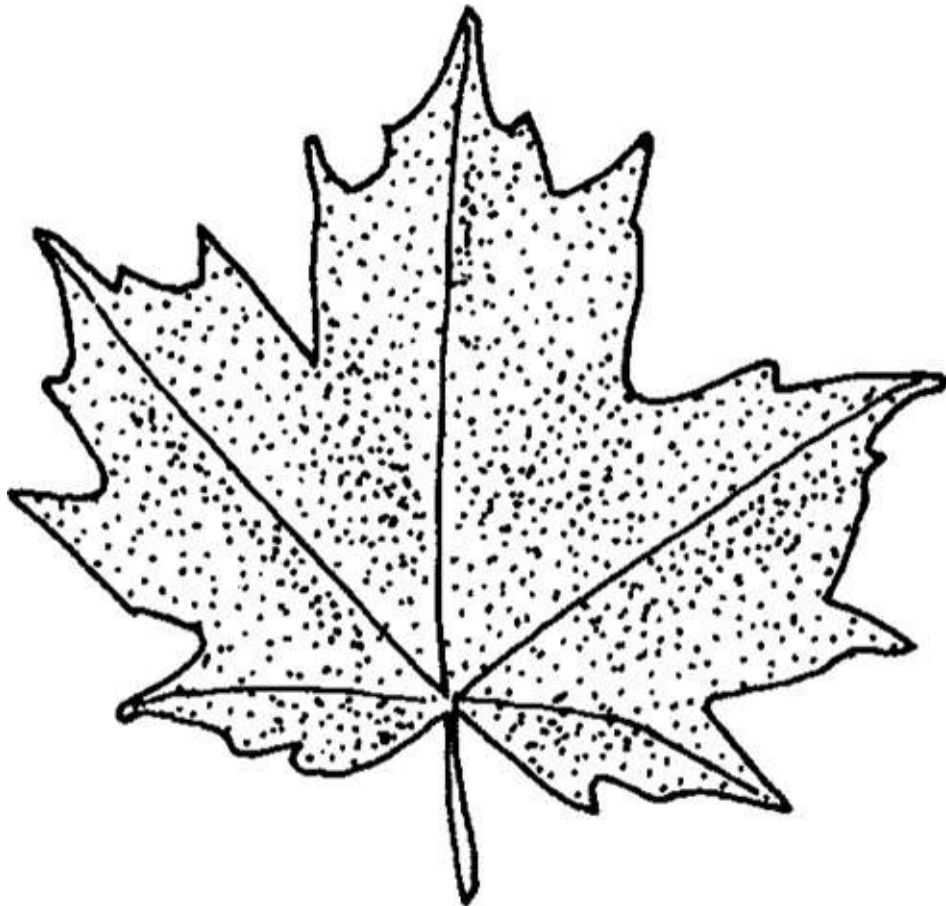
ASHED LEAF MAPLE

(Box Elder)—3-7 leaves in clusters. Usually serrated, sometimes not.



SILVER MAPLE

5 lobes, well serrated, definite V sinus. Silvery undersides. Top lobe tapers somewhat inward at base.



SUGAR MAPLE

5 lobes, little if any serration, definite U sinus.

In picking out your Sugar Maples, assuming you've got more than enough to give you the taps you're going to need to meet your production goal, keep these things in mind, too:

- The sap flows best in healthy trees with an abundance of branches. Avoid sparsely limbed trees or ones with a lot of dead branches.
- Pick trees that will be the easiest to get to, come sugarin' time, when there may be several feet of snow on the ground. That's why old timers put them along the roads.
- Since the sap will flow best on warm, above-freezing days, particularly sunny days, following below-freezing nights, pick trees, if possible, with open southern exposures, (e.g., the north side of east-west roads) so that the warm sun on the trunk of the tree will get things running as soon as possible each morning.

When, How, and Where to Tap

Sugarin' time is that time of late winter, call it early spring if you wish, when the temperatures drop below freezing at night, but climb well above freezing during the day, pushed up there by a sun which is now climbing higher in the sky, getting up earlier in the morning and lasting longer in the afternoon. The alternate freezing and thawing of the slowly disappearing snow gives it a granular texture, which skiers call corn snow and which they love to ski on in the warm sun. And, the native folk up country grumble about "mud season," get all worked up over the annual Town Meetin' and start tapping trees for their annual sugarin'. The arguments about just when to tap (combined with sage observations on the weather and past experiences) can be just as heated as the politics. If you tap too early and get an extended cold spell the taps can dry out, and you may have to rebores your holes. Or, if you wait too long, you may miss the first big sap run, which is prized for its high sugar content and fine quality.

I'd say the smart thing to do is to set a spout in one of your trees fairly early, and when you start getting sap flow on a day you figure is fairly typical for that time of year, go ahead and set the rest of the taps.

Here are the things you should pay attention to when you select where to drill the hole and how to set your spout:

- Since the sun's rays speed up the thawing out process each day, you'll get better runs on the southeast to southwest sides of the trunk.
- Try to drill directly over a large root or below a large healthy limb since that's where a lot of the sap is headed from and to, and stay away from tap holes of years past.
- If there's a lot of rough bark, it doesn't hurt to knock off an outer piece so you can get good wood to drill into.

- Use a 7/16" bit to drill the hole. This is the right size to take the standard metal sap spouts you can buy at hardware stores in sugarin' country, or a spout made out of a whittled down 1/2" dowel with a hole drilled down the center.
- Drill your taphole about 1-1/2" into good wood, which means maybe 2-1/2" including heavy bark. This isn't a critical measurement. Just be sure you're into good wood, where the sap flows, and have a hole deep enough to accommodate your spout. Drill the hole slightly uphill, so the sap flows outward, and keep turning the drill forward as you pull the bit out, in order to get as many shavings as possible out with the bit. On days the sap is running, you'll see it running out at you almost before you can get the spout in.



- Set the spout in the hole and tap it home with a *light* hammer tap (on the front of the metal crest if you're using a metal spout). The idea here is to set the spout snugly so it won't fall out of the tree, yet without splitting the maple wood above or below the taphole, where the sap would leak.
- Remember that if you're standing on top of a four-foot snowbank when making your tap holes at the beginning of the season, those taps may be seven feet off the ground near the end of the season when the snowbank has melted. It's hard to collect sap from buckets seven feet off the ground.



- Stop collecting sap and pull your taps when you: a) have made enough syrup to satisfy your needs; b) have run out of storage cans and/or your spouse's patience; c) find that the syrup is getting dark colored (the result of warm or fermenting sap) or less sweet; and/or d) notice that the sap has become cloudy or yellowish (although a cold snap can cause a return of clear sap). After awhile the sap just quits coming. There are no specific rules for pulling your spouts. Don't worry about the holes. They'll heal up by themselves, as they've done for generations.

Buckets and Pails

Conventional sugarin' calls for 13- or 16-quart sap buckets made of galvanized steel (in the old days, English tin, and before that wooden buckets). Galvanized buckets come with either flat or bowed covers to keep rain water and debris out, and they have a hole in the upper edge where you hang the bucket from a small hook that comes with the metal sap spout. Since you're going to get enough sap from each bucket to make about one quart of syrup, conventional buckets can be a hefty investment, unless you're ready to commit yourself to their use over and over again for many years ahead. Most backyarders, therefore, get around this expense by using almost any old container that will hold sap, from peanut butter cans to children's beach pails.

One of the most important developments in the backyard sugarin' industry was the advent of the one-gallon plastic milk bottle, known affectionately hereabouts as the Idlenot Dairy Low-Fat Sap Bucket (since that happens to be the dairy that supplies our milk). If you're any sort of milk drinking family, you can save up more than enough of these gallon milk bottles to provide you with all the sap buckets you'll need. Just rinse them out and hang them out in the garage by a rope threaded through their handles.



The way you hang one of these low-fat sap buckets is to cut a hole with a utility knife about 3/4" square just below the collar, which is just under the bottle top, and hang the bottle with the sap spout entering this hole and the bottle set down over the back of the metal crest on the spout. Leave the cap on. The bottle will hang there nice as you please, even in a strong March breeze.

Apart from eliminating the high cost of buckets, the Idlenot Dairy Low-Fat Sap Bucket has some very real advantages over conventional buckets. For one thing, except for the 3/4" hole, it is completely enclosed, so you don't get any debris or unwanted predators in the sap. For another thing, it's semi-transparent, so you can see from a distance whether or not it will be worth slogging through the snow to empty it. And, maybe best of all, when the season is over, you don't have to go to all the bother of washing and storing your buckets. You can just drop them off at your local recycling center and start with a fresh set of buckets next season.



The only drawback of the Idlenot Dairy Low-Fat Sap Bucket is its 4-quart size. However, on the kind of days you may have to make more than one collection—when the sun is bright on the snow and warm on your back, and the sap is drip-dripping like crazy—you'll welcome the extra trip back to your sugar maples.



Dealing with Frozen Sap

Since the maple sap flows when it freezes at night and thaws out in the day-time, you can expect to find frozen sap in your buckets if you leave sap in them overnight. Frozen sap presents both problems and opportunities.

The problem comes if you're using milk bottle buckets—the ice won't come out through that small bottle top. The problem is resolved by doing your collecting late in the day. That way there will be very little sap in the bucket to freeze up. If for some reason you forget and find your buckets frozen up solid, have a good extra supply of milk bottle sap buckets so you can swap empties for the full ones. It'll take the better part of a warm day for the frozen ones to thaw out.

Having extra bottles, incidentally, is a good way to do your collecting. You can carry in six empties and bring out six full ones, empty those in your holding tank and take them back in for six more full ones.

The opportunity in frozen sap is the opportunity to reduce your boiling time, and if you come out some morning and find a good layer of sap ice in your holding tank, you should take advantage of it. The ice actually is very spongy and is made up of frozen crystals of water that have separated out from the sugar, trapping the more sugary sap within the ice, something like a honeycomb. One of the ways the Indians and early settlers used to make syrup was by successive freezing of the sap, each time throwing away the ice, until the remaining liquid was usable as syrup. The problem with this method is that some sugary sap is always thrown out with the ice, so that this method is much less efficient than boiling. In any event, if you do find a couple of inches of ice in your holding tank, prop it up over your holding tank in some way so it drains well back into the tank, then pitch it out. You'll have saved yourself some boiling time.

Sap Storage

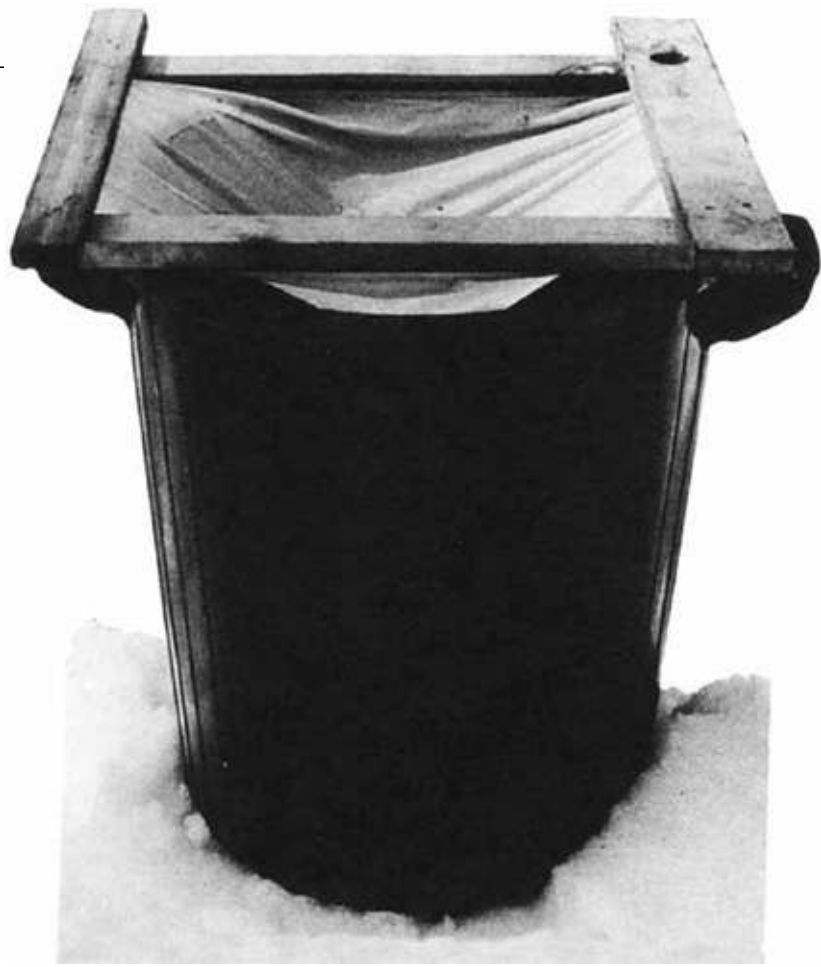
Maple sap, like cider or any fruit juice, can spoil, and care must be taken to keep it as cool as possible and not to store it too long before boiling it down. Sap which has “spoiled” has an unclear, slightly milky look, and if boiled down it will produce a dark syrup. Professional sugarers generally boil down sap within a day or two of its collection, if not the same day. If you’re a backyarder, with other things to do during the week and no real desire to sit up all night tending the evaporator, you’ll need to figure out not only how much storage capacity you’ll need for the sap collected during the week, but also where to store it with the least chance of spoilage.

Returning to the original example of wanting to end up with 5 gallons of syrup by the end of the season, and assuming now that you will fire up your evaporator for one boil-down on each of five successive weekends, count on producing one gallon each weekend, for which you will need 33 gallons of sap. Therefore, you will need at least that amount of storage capacity, and it would be wise to have 50 gallons of holding capacity to accommodate heavy sap runs.

A couple of plastic trash cans can make good holding tanks for an operation of this size, if they can be spared from their normal duties. Naturally, they should be cleaned out well, but be careful not to use harsh soaps or chemicals, which might affect taste. Remember that your sap will undergo extended boiling, which will take care of bacteria. If you use plastic trash cans or liners, however, you should be sure they are appropriate for water (sap) storage—that is, that no toxic substances might be released from the plastic into the sap. One major manufacturer of plastic trash cans informed me that while certain of its containers are made from materials which meet federal requirements for contact with food, others are made from recycled materials and are clearly marked with a warning against use with food or feed. If you are in doubt about your containers, call the manufacturer’s consumer affairs department. If you opt for galvanized trash cans, make sure there are no leaks and watch out for oily residue on the can that might end up in your syrup.

Other good holding tank ideas include 50-gallon drums, if you can find good clean ones which haven’t been used for some toxic material, or discarded water pressure tanks, which can be cut open, wire-brushed and painted with a *lead-free* rust proofing paint. I once saw a discarded bathtub being used as a holding tank. It was strung up between two trees, like a hammock! Whatever you do use, have a top for it. One tried-and-true kind of top can be made from a piece of cheesecloth over your holding tank. It keeps stuff from falling into the sap, like flying ashes from your evaporator, or bugs, which have a suicidal habit of diving into the sap. It can also be used to filter out bugs and debris which may have fallen into the sap during collection. Wet cheesecloth can be difficult to control, and unless you have plenty of hands to pour sap and hold the cheesecloth, you may want to nail or staple the cloth to a simple wood frame, as shown below.

And a final word of advice: always keep your holding tanks in a location that will be shaded all day long. The idea is to keep the sap as cool as possible, just as though you were dealing with milk. At the beginning of the sugarin’ season, when the temperatures are still rather cool day and night, there’s little problem, but by late March or April, as the weather warms up, it’s something to be mindful of.



Homemade Evaporators



Now that we've disposed of the task of collecting all that slightly foamy, faintly sweet and rather colorless looking sap, the next order of business is to convert it into that gooey, mystically sweet and golden substance called pure maple syrup. The process involves boiling the sap so that the water in the sap evaporates off in the form of steam, leaving the sugar behind in the boiling pan. Sounds simple, doesn't it, and it really is, although at certain stages of the process, particularly as you're getting your brew close to being syrup, there can be terrifying moments.

Remember, we're talking about starting with, say, 33 gallons of sap and ending up with 1 gallon of syrup. That's about 32 gallons of water to get rid of, which is a lot of steam, which is why wives can get angry at husbands who try boiling sap on the kitchen stove, which is why you're probably better off figuring out a way to do all or most of the boiling outside.

While it is possible these days to find small, ready-made evaporators for backyard sugarin', they are generally the same sort of rig you can put together yourself for far less money. I've seen 50-gallon drum evaporators, just like the ones in this book, selling for upwards of \$950. Quite a bundle, if you're only interested in producing a few gallons and have a little ingenuity.

As you know by now, this book deals with how to get the job done without investing a small fortune—in fact, any money to speak of—in evaporating equipment or other fancy apparatus. Therefore in this part of the book, we'll examine a selection of homemade backyard evaporators in the hope that the reader will find, or be inspired to invent, some rig that will satisfy his production requirements and/or meet his aesthetic or mechanical standards.

Engineering Principles of Backyard Evaporators

In boiling down sap, the idea is to get the job done fast by maximizing the amount of steam coming off the surface. You do that in two ways. First, you use an evaporator pan that's relatively shallow (6"–8") but with a lot of area, so as to have a large boiling surface area relative to the amount of sap in the pan. Second, you design the firebox to get as much flame as possible playing directly on the bottom of the pan. That means the firebox should be relatively shallow, too. And, since the flames tend to be swept backward toward the flue by the draft, rather than upwards against the pan, many backyarders build up the rear bottom of their fireboxes with sand so that the flames are forced to arch up against the pan, just like with professional rigs.

The firebox is constructed so that the pan (or pans) sits on the top, supported by the edge of the firebox, but sometimes it's built so that the pan can nestle down into the firebox. The reason for nestling is to protect the edges of the pan from the cold breezes, thus hastening the process. Or, if the pan does sit on top, you often find a row of bricks or something, set down along the edge of the pan to serve the same protective purpose.

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