Maple Syrup Making

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Agenda

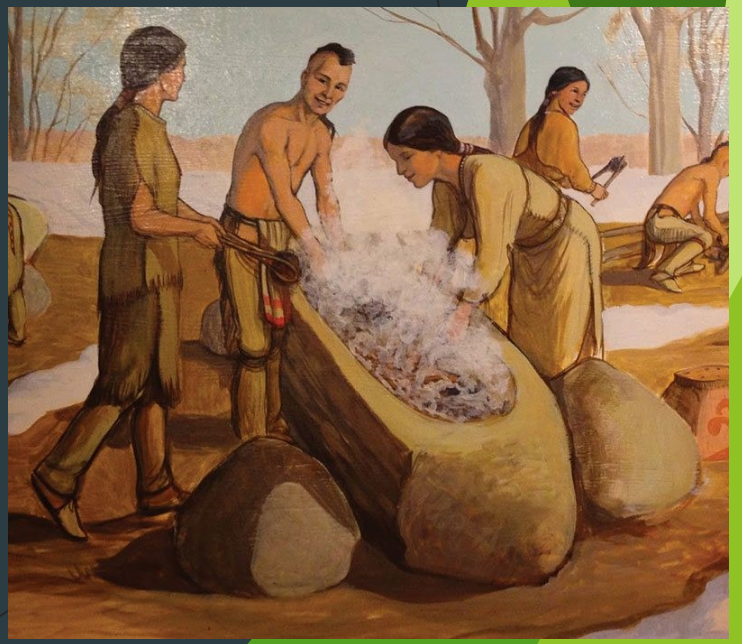
- Background
- History
- Maple Tree Identification
- Tapping and Collecting Sap
- Boiling and Producing Syrup
- Other Syrup Types

Maple Syrup

- Syrup made from the sap of maple trees
- Graded based on its color and taste
  - Grade A Light Amber ("Fancy"), Grade A Medium Amber, Grade A Dark Amber, Grade B
  - Lighter grades typically have a milder flavor
  - Darker grades of syrup are used primarily for cooking and baking
  - Syrup harvested earlier in the season tends to yield a lighter color
- In the United States, a syrup must be made almost entirely from maple sap to be labelled as "maple", and states such as Vermont and New York have more restrictive definitions

History - Indigenous Peoples

- First made by the Indigenous peoples of North America long before Europeans arrived
  - No recorded accounts of how maple syrup production began, but various legends exist
  - A woman, Moqua was cooking a cut of moose for her husband, the hunter Woksis. However, Moqua became preoccupied with her quill-work and let the pot boil dry. Realizing she did not have time to melt some snow she used some maple sap she had been saving for a beverage. Woksis was so impressed with the meal he broke the pot so he could lick the last of the syrup from the pot shards.
- Developed rituals around syrup-making, celebrating the Sugar Moon (the first full moon of spring) with a Maple Dance
- Reduced the sap to syrup by repeatedly freezing it, discarding the ice, and starting again
- Sometimes the sap was made to boil by placing hot stones in the mixture
- Many dishes replaced salt with maple syrup or maple sugar

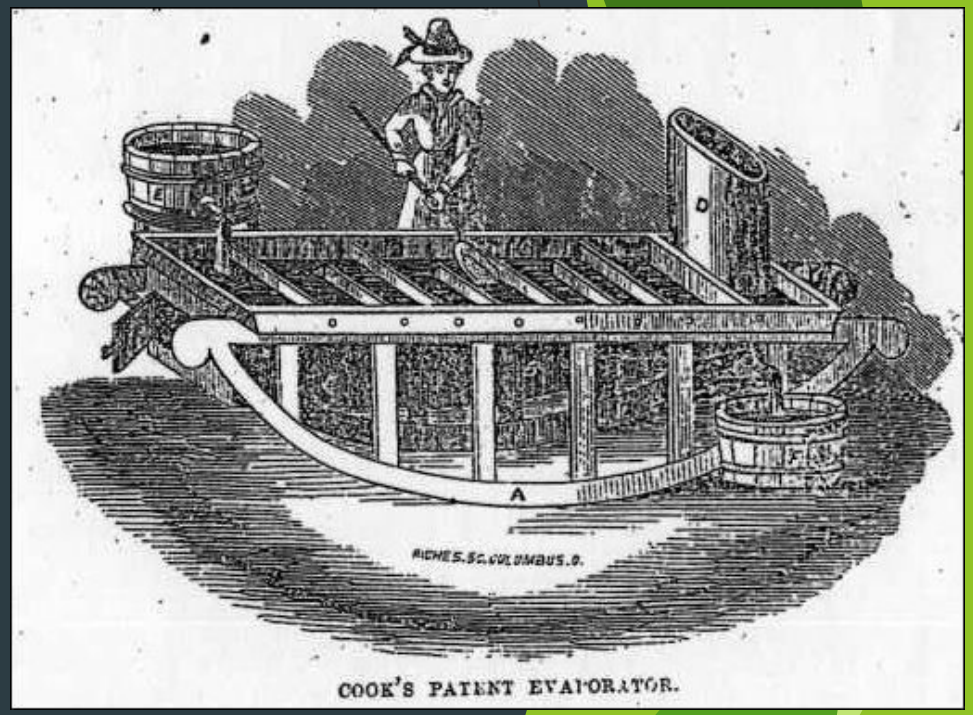


History – Early Europeans

- Local Indigenous peoples showed the arriving colonists how to tap maples during the spring thaw to harvest the sap
- Rather than making incisions in the bark, the Europeans drilling tapholes in the trunks with augers
- Prior to the 19th century, maple sap was used primarily as a source of concentrated sugar, in both liquid and crystallized-solid form, as cane sugar had to be imported from the West Indies
- Used wooden spouts and wooden buckets made from hollowed out sections of tree trunk
- Sap was transported back to the sugar camp in barrels, where it was poured into large metal vessels and boiled

History – 19th Century

- Syrup makers started using large, flat sheet metal pans which had a greater surface area for evaporation
  - Later baffles, covers, and flues were added to further improve efficiency
- The first purpose-built evaporator, used to heat and concentrate sap, was patented
- Cane sugar replaced maple sugar as the dominant sweetener in the US



History - 20th Century

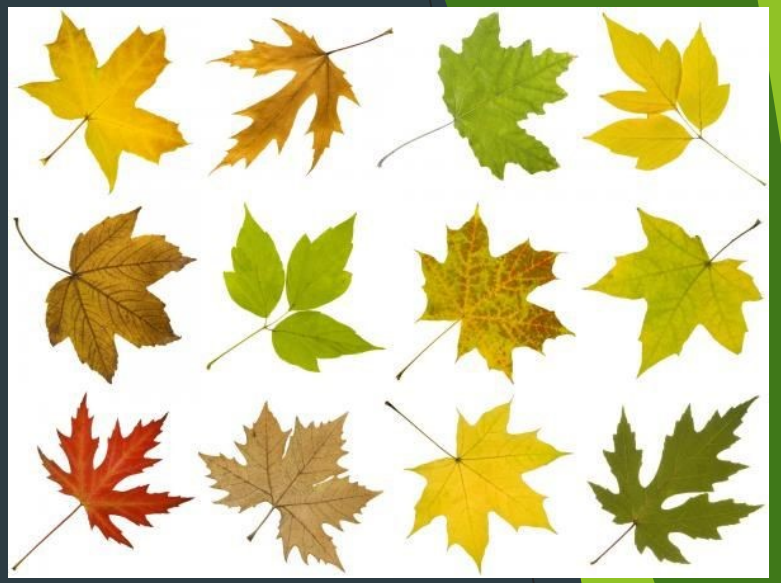
- Metal and plastic buckets began to be replaced with plastic bags, which allowed people to see at a distance how much sap had been collected
- Tractors were used to haul vats of sap to the sugar shack
- Due to the energy crunch of the 1970's several technological breakthroughs occurred to make syruping more efficient:
  - Tubing systems became widespread and vacuum pumps were added to increase the sap collection
  - Pre-heaters were added to evaporators to "recycle" heat lost in the steam
  - Reverse-osmosis filters were developed to remove a portion of water before the sap was boiled
    - Some producers obtained surplus desalinization machines from the U.S. Navy

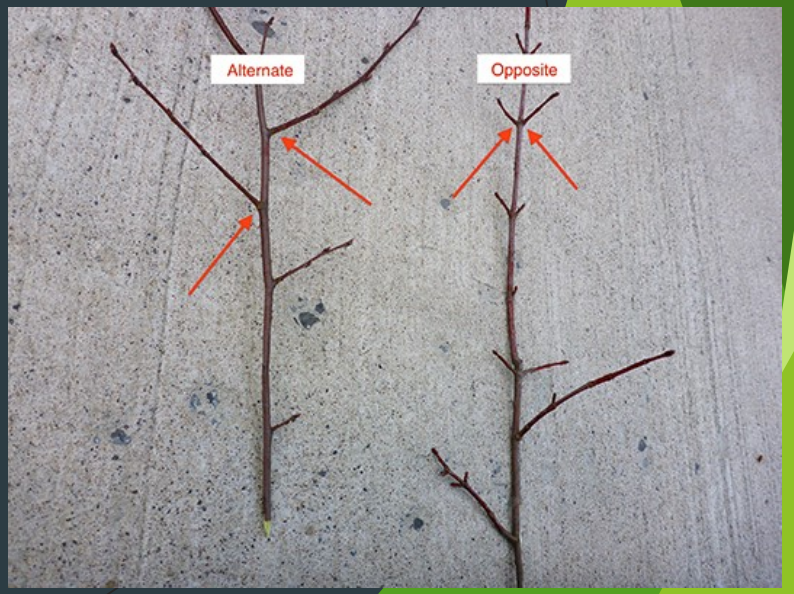
Maple Trees

- Three species of maple are predominantly used to produce maple syrup
  - sugar maple
  - black maple
  - red maple
    - shorter season because it buds earlier than sugar and black maples
- Other maples can be used to produce sap, but may have lower sugar content or produce cloudy syrup
  - Silver maple
    - one of the most common trees in the United States
  - Norway maple
    - introduced to North America in the mid-1700s as a shade tree
- When the night-to-day temperatures change from freezing to thawing, maple trees move sap from the roots to the branches

Identifying Maple Trees

- Easiest to do in the fall – maple trees have distinctive red or yellow autumn leaves
- Maples have opposite branching
  - Also Ash, Dogwood, and Horse Chestnut
- Unique seed/fruit called samaras



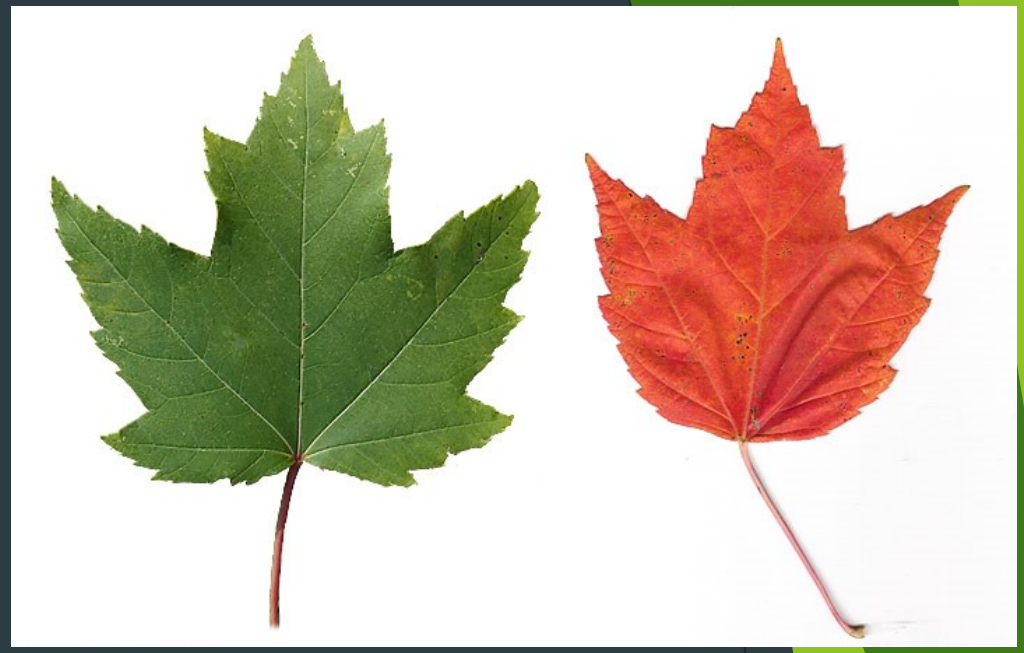


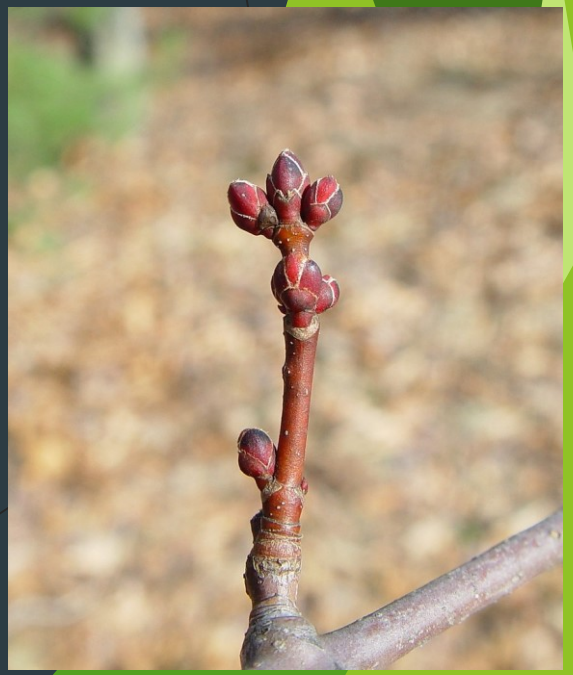
Sugar Maple

- Leaves
  - 3-5 inches wide
  - 5 lobes, with a smooth, curved edge
- Buds
  - Winter buds are pointed, slender, and brown, with three or more overlapping scales
- Bark
  - Smooth and gray when the tree is young
  - Irregularly furrowed, scaly, and dark gray on older trees

Red Maple

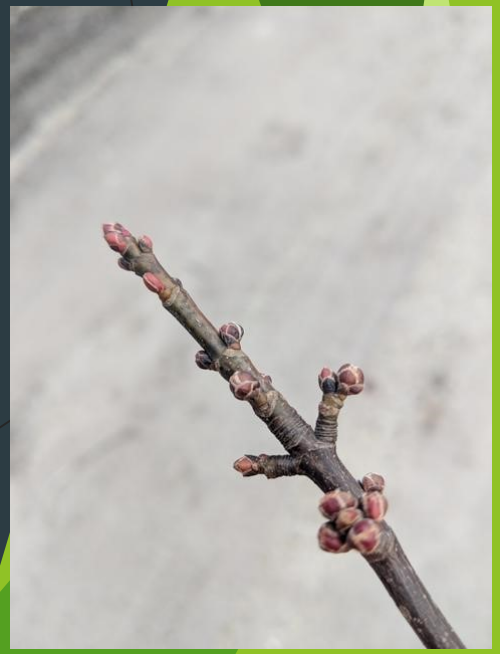
- Leaves
  - 3-5 lobes, with jagged edges
  - turn brilliant red in autumn
- Buds
  - Rounded with a distinctive red color
- Bark
  - Smooth and gray when the tree is young
  - Broken into plates on older trees





Silver Maple

- Leaves
  - 3–6 inches wide
  - 5 lobes separated by deep, narrow gaps
  - Distinctive silver underside
- Buds
  - Large, round, reddish buds
  - 3” long seeds, largest of all native maples
- Bark
  - Gray and thin and is very easy to break off



Norway Maple

- Leaves
  - Dark green in summer and yellow in the fall
  - Five lobes with shallow sinuses with a few long teeth
  - When broken off, exude milky white sap
- Buds
  - Broad, blunt buds
  - Red to Purple color
- Bark
  - Grayish black and furrowed

Tapping

- Number of taps depends on tree diameter
  - Less than 10 in: do not tap
  - 12 – 20 in: one tap
  - 20 – 25 in: two taps
  - Greater than 25 in: three taps
- Look for unblemished bark; do not bore 2 ft over or under or closer than 6 in from an old taphole
- Drill the hole at a convenient height, level and horizontal with no angle
- Use a sharp drill bit to minimize rough wood, which can reduce sap yield and cause sap quality problems

Tapping

- Tap the spout in lightly so that it is tight and cannot be pulled out by hand
  - don’t drive it in too hard and split the tree
  - Tap on warm days (above freezing) to minimize risk of splitting
- Attach bucket, bag, or tube to the tap
  - If using a bucket, be sure to cover it to keep out rain, snow, and other contamination
- Check the sap at least once a day and combine in a large storage container
  - Sap should be boiled within seven days of collection, less in warm weather
  - Can store sap in the fridge to extend the time between boils

Boiling

- Depending on sap sugar concentration need to remove 40-60 parts of water to get 1 part syrup
- Do not boil indoors without a stove vent fan or a dehumidifier
- Use a hobby-sized evaporator, an outdoor gas range, or an outdoor fireplace
- Do not fill the pan to the top, as it will boil over
  - Butter or vegetable oil rubbed on the rim can prevent
- As the sap boils down, add more to keep the depth at least 1 inch or it may burn
- Never leave boiling sap, it can quickly boil away and burn the pan.

Boiling

- Syrup is finished at 66-67 percent sugar content and 7.1 °F above the temperature of boiling water
  - Tip: measuring the temperature of the raw sap when it begins a rolling boil
  - a syrup hydrometer and testing cup can be more accurate
  - Concentrations below 66 percent can sour over time
  - Concentration above 69 percent can form sugar crystals in the bottom of storage containers

Reverse Osmosis

- Reverse osmosis (RO) is a water purification process that uses a membrane to separate ions, unwanted molecules, and larger particles from water
- Maple production uses reverse osmosis in “reverse” to separate pure water from the sap, resulting in a higher sugar concentration
- Hobby systems can remove about 50% of the water
- Commercial systems can remove 75-90% of the water
- Greatly reduces energy requirements for turning sap into syrup

Storing

- Filter syrup to remove “sugar sand” before packing through clean filter material such as wool or Orlon
  - If you don’t have filter material, the syrup can be allowed to cool for 12 hours or more for the sediment to settle and the clear syrup can be poured off
- Syrup should be packed hot (185 degrees F) into sterilized canning jars and sealed.
- Fill jars full so that there is little air in the jar
- Store your syrup in a cool, dry place. After a container has been opened for use, it must be refrigerated

Other Syrup Types

- Tree syrups
  - Birch syrup
  - Beech syrup
  - Walnut syrup
  - Hickory syrup
  - Sycamore syrup
- Other syrups
  - Cider syrup
    - concentrated from apple cider
  - Sorghum syrup
    - Pressed from sorghum grass
  - Molasses

Questions?

Resources and Information

- General how-to: https://extension.psu.edu/maple-syrup-production-for-the-beginner
- DIY Reverse Osmosis system: https://soulyrested.com/2019/01/08/build-your-own-reverse-osmosis-system-for-maple-syrup/
- Dendrology Fact Sheet (Tree Identification): https://dendro.cnre.vt.edu/dendrology/factsheets.cfm
  - Select Family “Sapindacea” Genus “Acer” to get info on maples
- Virginia Cooperative Extension offers a yearly Southwest Virginia Tree Syrup School in mid-November
- Virginia Maple Syrup Trail: https://virginiamaplesyrup.com/
  - Highland County Maple Festival: https://www.highlandcounty.org/maple-festival/
- Whitetop Mountain Maple Festival