



**North American
Maple Syrup Producers
Manual**

THIRD EDITION

**Produced by
The University of Vermont
in cooperation with
The North American
Maple Syrup Council**

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The University of Vermont



North American
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CHAPTER 2

HISTORY OF MAPLE SYRUP AND SUGAR PRODUCTION

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INTRODUCTION

It is the opinion of many modern consumers that maple syrup producers owe a debt of sincere gratitude to the Indigenous peoples of North America for discovering that sweet sap from maple trees could be collected and consumed. Written accounts from sixteenth-century French and English explorers describe the gathering and consumption of maple sap by Indigenous peoples. Despite early references to the collection and use of maple sap, the actual production of maple syrup or sugar through boiling and concentrating maple sap are curiously absent from early written accounts. The lack of such early

historic accounts has led some scholars to question whether Indigenous peoples invented maple syrup and sugar making before the arrival of Europeans. Other scholars point to the difficulties in manufacturing maple syrup or sugar with the technology available to Indigenous populations prior to the introduction of metal containers by Europeans. Historians and archaeologists have yet to find irrefutable evidence from the written or the archaeological record that Indigenous people were making maple sugar or syrup prior to the arrival of Europeans, which is not to say that it did not happen, just that the evidence is lacking at this time.

Similarly, the folklore of maple syrup often centers around the retelling of popular myths and legends of how Indigenous people came to know how to make maple syrup and sugar. As with any legend there is likely a kernel of truth buried somewhere in it, but the telling and retelling over time have embellished and polished the truth to a point where the information that has been passed down is relegated to the category of story or myth. Regardless of the exact timing of their origin or the precise

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process by which the first maple syrup and sugar was made, by the mid-1600s both new European arrivals and the Indigenous peoples of North America were gathering maple sap and boiling it down to create maple syrup and sugar and developing new traditions and a new springtime industry.

EARLY MAPLE PRODUCTION

For early colonists and settlers in North America, life was primarily a subsistence existence. Daily activities were focused on a small family farm that met the family's immediate need for food and shelter and produced a few items that could be either bartered or sold to provide money for things that could not be produced on the farm. All family members capable of working were involved in the cultivation of crops and raising of domestic animals as sources of food and clothing. Where maple trees were present, the collection of maple sap and subsequent processing into syrup and sugar contributed to the family's food supply and often produced some surplus that could be readily sold or bartered for other products.

The rural, farm-centered subsistence lifestyle soon developed into a seasonal pattern. Spring was the time for planting, followed by a period of cultivation and eventually the late summer-fall harvest. This was followed by winter, the time for fuelwood production and anticipation of the coming spring. The maple season in late winter was much anticipated as it signaled the end of a long winter and heralded the coming spring. Most of the maple sap that was collected was reduced to make maple sugar rather than syrup, resulting in custom of referring to the tapping and boiling season as the "sugaring season." Sugaring became an integral part of the farm experience. Occurring at a time of the year when other farm activities of necessity were slowed down by the last vestiges of winter, springtime activities in the sugarbush and sugarhouse caused many to view this as one of the most enjoyable times of the year. The overwhelming majority of maple sugar operations in the 1700s and 1800s were located in the Northeast and Great Lakes regions of the United States, and the adjacent provinces of Canada. However, limited quantities of maple sugar for home consumption were also once produced

across the Midwest up to the Plains, and as far south as Kentucky and Tennessee. The harsh winters in northern regions tended to keep people indoors for most of the season, and the opportunity to get out during periods of weather favorable for sap flow was considered a sure indication that spring was "just around the corner." In some communities, maple sugaring was a social event that involved gathering friends and neighbors who provided the many hands needed to run a medium- to large-sized operation. The work required was sometimes tedious and the hours were long, but the fruits of the labor were long remembered as maple syrup and other maple products found their way into many delicious foodstuffs, flavorings, and sweet treats prepared throughout the year. The sugarhouse, known as *la cabane à sucre* in Quebec, also served as a central location where family, friends, and neighbors could gather during the maple season for feasting, music, and dancing. These springtime gatherings and family trips to a sugarhouse remain a cherished cultural tradition in modern-day Quebec.

SAP COLLECTION AND PROCESSING METHODS

Methods of sap collection and evaporation have evolved and gradually improved over the centuries, but the fundamentals of the process remained unchanged. During late winter, temperature-induced physiological processes occur in maple trees such that wounding a tree results in a natural flow of sap that can be collected and processed into maple syrup. Native Americans tapped maple trees by making a rather rough gash through the bark in the trunk of the tree. Sap flowing from this wound was directed through a hollow twig or a flat slat made of cedar or basswood and into a birch bark or wooden container placed on the ground. Sap was collected and placed in large clay pots that were then heated over open fires to concentrate the sugar content of the sap. Occasionally, sap was concentrated by placing heated stones in the sap in the clay pots or hollowed-out wooden vessels. Heat from the stones boiled the sap, concentrating the sugars. Repeating the process several times eventually resulted in a thick syrup that could be poured in molds to cool or

be worked with a spoon or paddle as it cooled to form a grained sugar.

Early settlers, both French and English, initially followed the destructive tapping practices of Indigenous peoples by making gashes in the bark to create wounds through which sap would flow (**Figure 2.1**). Sap was collected in wooden troughs placed on the ground. These troughs were made of short, hollowed-out sections of split logs. Within a few years settlers modified their tapping practices so less wounding to the tree resulted. Metal augers were used to make a small hole in the trunk of the tree. In this “taphole” a round tubular wooden spout, or spile, was inserted to direct the sap into a collection container. The word *spile* probably comes from the idea that the spile was used to “spill” the sap from the tree into a container. These primitive spouts were small stem sections of sumac or elder that



FIGURE 2.1. Early sap collection practices used gashes cut into stems and chips of wood or bark and later small pieces of metal to direct sap into containers placed on the ground.

were hollowed out by removing the central core, or pith, (**Figure 2.2**). In the latter half of the 1800s commercially manufactured metal spouts replaced those made of wood. A variety of different designs were available from several different manufacturers with the earliest made of cast iron and later designs of folded or rolled sheet metal covered with less corrosive coatings like tin or zinc (**Figure 2.3**).¹ A



FIGURE 2.2. Primitive spouts were small stem sections of sumac or elder which were hollowed out by removing the central core or pith tissue.



FIGURE 2.3. Eventually commercially manufactured metal spouts replaced wooden ones, with a variety of different designs available from a several different manufacturers.

¹Although hollowed-out elderberry stems were used by settlers and are still recommended in some literature as suitable for maple spouts, they are not recommended. The twigs of elderberry contain a low-level toxin.

shift from wooden to smaller metal spiles led to smaller-diameter tapholes and more effective sap collection. Some incorporated a built-in hook to support either the wooden or later metal sap collection pail at the taphole as opposed to placing it on the ground. Over time the hand-operated brace and bit replaced the large-diameter auger as the standard tapping tool.

For many years the hand-powered brace was the standard tapping tool. However, power tapping units first appeared in the 1940s and 1950s and ultimately found their way into the sugarbush. The first were rather heavy gasoline-powered backpack units with a flexible shaft that drove a small bit held in front of the operator (**Figure 2.4**). Later, backpack units powered with bulky wet cell batteries became available. Though some producers still use a tapper consisting of a lightweight gasoline-powered drill, a high proportion of today's tapping is done with cordless handheld battery-powered drills.

Containers used for collecting sap have progressed from vessels made of bark and hollowed-out logs to wooden buckets (**Figure 2.5**) in the 1600s and 1700s, to metal buckets (**Figure 2.6**) in the late 1800s, and lastly to plastic bags and plastic pails from the 1950s to today. The size and design of sap containers have changed over time; however, all required at least daily visits during the sap season to collect the accumulated sap. In the early 1900s a sap collection system invented by William Brower was introduced using metal tubing that did not require a collection container at each taphole. Known in some



FIGURE 2.4. Gasoline powered tapper. (UVM LIBRARY SPECIAL COLLECTIONS)



FIGURE 2.5. Early wooden maple sap bucket.



FIGURE 2.6. Metal sap buckets. (UVM LIBRARY SPECIAL COLLECTIONS)

locations as the “gooseneck” system for the curved neck-like shape of some of the metal pipe (**Figure 2.7**), the Brower system was laid out in a dendritic pattern with lateral and main lines, like a modern plastic tubing system, carrying sap from the taphole to the collection tank. The gooseneck system did not gain wide acceptance because it was prone to leaks,

²<http://maplesyruphistory.com/category/george-cary/>



FIGURE 2.7. Early “goose-neck tubing system. (GIRARD)

was difficult to clean, required strict attention to grade (slope), and was more expensive than metal buckets, not to mention that it was easily damaged by roaming moose and deer, high winds, and falling limbs.²

The availability of new materials following the end of World War II led to the introduction of the plastic bag for sap collection in the early 1950s (**Figure 2.8**). Soon after in the mid-1950s, inventive engineers and sugar makers like George Breen, Nelson Griggs, and Robert Lamb began experimenting with flexible plastic tubing, taps, and fittings to transport sap from the taphole to the collection tank. Like the gooseneck metal tubing system, early plastic tubing used gravity to carry sap downhill directly from the tap hole to either a centrally located collection tank or right into the sugarhouse. This system eliminated the need for daily sap collection at the tree. Plastic tubing significantly reduced both the labor and equipment costs associated with sap collection and improved sap quality and sap yields. The development and addition of vacuum pumps to tubing networks in the early 1970s has since enabled producers to significantly increase sap yields and accelerate the movement of sap through the tubing network. Vacuum pumps



FIGURE 2.8. Plastic bags for sap collection. (UVM)

³A collection of maple history articles can be found at <http://maplesyruphistory.com/> and an archive of maple-related research in Vermont from the 1940s through 1970s is located at: <https://cdi.uvm.edu/collection/uvmcdi-uvmcdimapleresearch>.

also facilitated the installation of tubing in both flat and sloping landscapes.³ The adoption of tubing combined with vacuum has arguably been the maple syrup industry's most important improvement in the twentieth century.

In the earliest years of sugaring, sap was gathered and transported to the evaporation site by hand. Given that most operations were relatively small and had plenty of family or local labor on hand, this was not an insurmountable task. Gathering equipment often consisted of a couple of large wooden buckets suspended from a shoulder yoke. However, as operations increased in size, it became necessary to collect sap from several trees, empty the gathering pails into a gathering tank, and transport it to the evaporator. Initially this was done with a team of oxen or horses pulling a sledge or sled on which a wooden tub, barrel, or tank was mounted. Eventually many operators replaced the wooden tubs with metal collecting tanks (**Figure 2.9**), and the oxen or horses with tractors or crawlers. Where plastic tubing systems are used it is not necessary to collect sap directly from each tree. Rather, sap moves through the tubing system to a common collection point, preferably the sugarhouse. If it is necessary to

move sap, pumping systems are installed to transport sap from one location to another. For large operations, where sap is collected from one or more sugarbushes, trucks equipped with holding tanks are used to transport the sap.

Equipment used for boiling and evaporating sap has changed and improved over the years; however, the requirements of concentrating the sap and applying heat to develop color and caramelization in the syrup has not. Early settlers used metal cauldrons or kettles to boil the collected sap. These vessels were suspended from a pole or tripod over an open fire. As the amount of sap in the kettle was reduced by boiling, more sap was added. Eventually the concentration of sugar in the boiling sap was increased to reach the point of "finished syrup." The syrup produced by this method, although sweet, was strong flavored and dark because of prolonged boiling resulting from the continued addition of fresh sap. An innovation resulting in improved quality of the final product was the use of multiple kettles. Partially concentrated sap was transferred from one kettle to another as it progressively increased in sugar concentration. This process resulted in the production of lighter-colored syrup as the boiling



FIGURE 2.9. Early sap gathering with a tank on an animal-drawn sledge. (F. TANGUAY)

time required for sugar concentration was reduced. In the 1700s and most of the 1800s most of the sap was reduced to a thick syrup that was poured into molds or wooden kegs and cooled to form cakes, loaves, or block sugar (**Figure 2.10**) that could be broken up and pulverized into granulated sugar or reconstituted into syrup by adding water.

In the mid-1800s the large, shallow, flat-bottomed pan for concentrating sap was introduced. Mounted on a firebox called an arch (so called because of its shape) usually made of stone or brick



FIGURE 2.10. Most maple was primarily made into block or cake sugar well into the 1800s.



FIGURE 2.11. Boiling outdoors on a flat pan setting on a stone arch.

(**Figure 2.11**), this pan and the arch it sat on greatly increased the rate of boiling and evaporation. Expanding both the boiling surface and the area where heat could be applied made it easier for the operator to control the intensity of the heat generated by the cooking fire. By 1860 the continuous flow evaporator appeared on the scene. This was a modified flat pan equipped with series of maze-like sectional dividers (**Figure 2.12**) that allowed sap to enter at one end of the pan and become increasingly concentrated as it moved through the sections of the divided pan to become finished syrup that was “drawn off” at the other end (**Figure 2.13**). The advantage was more rapid evaporation and a “continuous evaporation” process that required less mixing of fresh sap and partially concentrated sap. The result was reduced boiling time and a higher-quality final product. This was a major improvement over the batch system used with both kettles and flat



FIGURE 2.12. Katherine Skinner boils on a continuous flow evaporator on a metal frame wood-fired arch in Westmore, Vermont, in the 1940s. (GAUTHIER)



FIGURE 2.13. An abandoned early continuous flow flat-pan evaporator with partitions.

pan in which boiling would take place for several hours before removal of the finished syrup.

One of the first evaporators to be patented and used in the maple industry was the Cooks Sugar Evaporator, patented to Daniel McFarland Cook on June 22, 1858. It was originally made to produce molasses or sorghum syrup. However, it was evaluated for maple syrup production and was soon accepted as a sap evaporator without a rival. Cook himself never manufactured the evaporator, instead selling the rights to produce it to several metal fabricators in different states.

Improvements in the efficiency of sap evaporators continued with the addition of flues to the continuous flow pan. This resulted in separating the evaporator into two individual pans, a front, or syrup, pan and a back, or flue, pan. The flue pan was a modified flat pan with several deep corrugations or individual wells in the bottom of the pan that increased the surface area to which heat was applied. The result was much more rapid boiling and evaporation. Partially concentrated sap flowed from the flue pan into the flat surface syrup pan where boiling continued and sap was brought to a proper finishing temperature. The quality of the finished syrup was substantially improved due to the shortened evaporation time.

From the beginning of maple syrup and sugar making up to today, burning wood has been the primary source of heat employed in the boiling process. Wood-fired evaporators continue to be most used today; however, other forms of heat have been

introduced in the twentieth century. Oil-fired burners were introduced in the 1940s and have been adopted by maple operations with larger evaporators and sugarhouses with more automated systems. Steam heat systems, requiring an external boiler, are beginning to see use as well.

The basic evaporator has remained unchanged since the development of the flue pan. However, several accessories have been developed over the years to increase evaporator efficiency. These generally attempt to use steam produced during evaporation to preheat incoming sap, thereby reducing the amount of both heat and time required for processing sap into syrup. One of the first such devices was a hood placed over the evaporator to direct the steam away from the evaporating surface. Later the sap preheater was introduced. Initially a series of coils was placed in the smokestack of the arch, and incoming sap could flow through these coils becoming warmed before it entered the evaporator. Improvements in a sap preheating device called a “Steam-Away®” led to placement of pipe sections on a suspended platform within the steam hood, allowing incoming sap moving through these pipes to significantly increase in temperature. These preheating devices have resulted in gains in evaporator efficiency. Modifications to increase the amount of air going into the firebox of wood-fired evaporators have also resulted in an increase in evaporator efficiency, as have modifications such as insulated arches and airtight doors, and preheating oil by running feed lines through the firebox to improve fuel atomization and combustion. Lastly, the electronics and computer age have led to the installation of sensors in evaporators and arches to monitor and automatically adjust temperatures, fuel, and sap and sugar levels and control syrup draw-off.

Evaporators were initially located in the open in the sugarbush, where kettles were suspended over open fires on tripods or log supports. This led to a shift to the use of pans supported on arches constructed of stones or bricks and fueled by wood collected from within the woodlot. Since the evaporators were outdoors, syrup producers were subjected to whatever type of weather was present. It soon became apparent that some type of shelter was desirable; thus

the “sugarhouse” came into being. The first shelters were nothing more than crude shacks or lean-tos in the woods built to protect the valuable pans and provide some shelter for the operators. These were followed by the construction of cabin-type structures that over time have come to be identified as sugarhouses (**Figure 2.14**). Initially these buildings were located in the woodlot, and sugarhouses are often still found there today; however, they are increasingly located in more accessible and convenient areas where utilities such as electricity and running water are available. Over time it also became more common to set up sugarhouses near public roads, where modifications in their structure enabled them to serve as not only production facilities but also outlets for marketing the finished product.

EARLY MAPLE INDUSTRY— 1700s AND 1800s

Consistent with the subsistence lifestyle of early settlers and colonists in the northeastern United States and Canada, maple syrup and maple sugar were the principal sweetening agents used in the home. The only other locally produced sweetening product was honey, although it was not as commonly available. Together maple syrup and honey found their

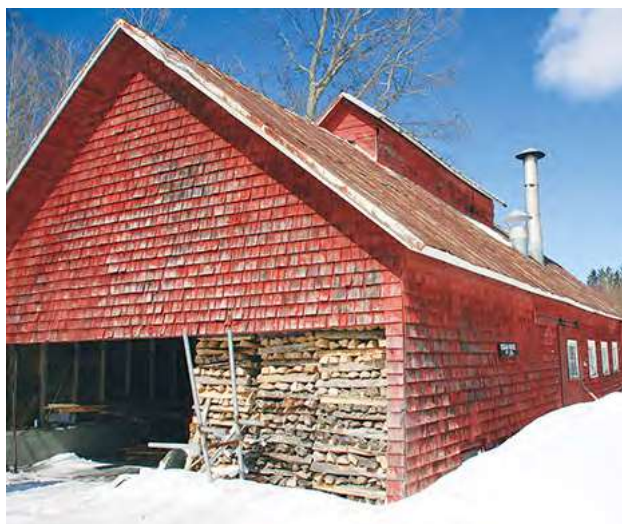


FIGURE 2.14. Early “sugarhouses” were cabin-type structures which, over time, evolved into the modern sugarhouse. This is “Sugar-House No.138.” of the Cary Maple Sugar Company in Danville, Vermont, from the early-1920s. (GRAHAM)

way into several prepared food products and were increasingly used in preserving, drying, and curing of many staple foods, including meats. Cane sugar, a rare and expensive commodity in the first half of the nineteenth century, was generally unavailable in most rural areas. When it could be obtained it was viewed and treated as a luxury product.

In the late 1800s maple equipment, which had been made by general metal workers in local communities, began to be manufactured by specialized equipment companies. While originally there were several such companies located throughout the northeastern United States and Canada, over time several of these companies discontinued production or merged with other operations. Some of these companies continue to operate and supply maple equipment for the industry today.

Maple syrup producers first began keeping reasonably good production records in the mid-1800s.⁴ Much of what was produced at that time was maple sugar, with only modest amounts of the maple harvest made into syrup. This was likely due primarily due to ease of storage and transport of a solid compared to a liquid.

Maple products, especially maple sugar, continued their dominance as the principal food sweetener in some regions until after the United States Civil War. Following the war, improvements in production techniques and transportation resulted in larger quantities of cane sugar becoming available and in the reduction of its price. As a result, many urban residents increased their use of cane sugar and decreased their use of maple sugar. The reduced demand for maple sugar forced the industry to find and promote new uses for their products, which led to an increase in the amount of maple syrup marketed primarily for use as a topping for pancakes, waffles, and other similar foods.

In the latter part of the nineteenth century, syrup packers came on the scene, providing a sales outlet for maple producers. These companies purchased syrup from many maple producers, then

⁴Graham, G. 2016. Maple Syrup Production Statistics—An Updated Report to the North American Maple Syrup Council. Ohio State University Extension. 30 pp. <https://mapleresearch.org/pub/grahamstats2016-2/>

packaged and marketed syrup under their own brand and label, developing regional and national markets for table syrup in the process. Most of these packers were blending pure maple syrup with corn syrup, then called glucose, and cane sugar to create maple-flavored syrups that undercut the price of pure maple syrup. George C. Cary and the Cary Maple Sugar Company provided another place for maple producers to sell their product when he convinced the tobacco industry to use maple sugar as a flavoring agent. Sales to the Cary Company were especially popular with Vermont and Quebec producers, who continued to make more maple sugar than syrup in the 1890s and early 1900s. For about 50 years the tobacco industry was a large consumer of maple sugar, using it for flavor and aroma enhancement of different tobacco products.

The first of several maple producer organizations were formed in the 1890s. In the beginning the goals and objectives of these state and regional associations were to work together to address their concerns regarding false labeling and the sale of what they called adulterated syrup, as well as to share ideas among members and focus collective efforts on addressing common production problems.

Improvements in evaporator design and sophistication, greater ease of railroad shipping, and the increased availability of sheet metal in the late 1800s enabled the rise of a great number of specialized maple sugaring equipment companies in both the United States and Canada. As the industry progressed into the twentieth century, many of the smaller companies were bought out and absorbed by an ever-shrinking handful of large equipment manufacturers. A few of these large equipment companies continue to operate and supply maple equipment to the industry today.

MAPLE INDUSTRY— 1900 TO WORLD WAR II

In the early part of the twentieth century maple production continued much as it had in previous years. Small family-operated farms dominated the rural landscape, and the production of pure maple products was an integral part of the diversified agricultural operation. Higher-grade excess syrup

was sold to neighbors or to urban residents who did not produce their own syrup, and lower-grade syrup was sold to packers and syrup buyers for bottling and blending and tobacco flavoring. As something of a precursor of the major maple enterprises that would later emerge, the first large-scale maple syrup operation appeared in the Adirondack region of New York with the Horse Shoe Forestry Company tapping as many as 50,000 trees and making syrup in nearly 20 large evaporators. Other producers expanded their operations to take advantage of the simplicity of selling in bulk to single wholesale syrup or sugar buyer like the Cary Company.

Maple producers were concerned about the adulteration of pure maple syrup and the difficulty of competing with syrup blenders that were selling large volumes of cane and corn syrup mixed with smaller amounts of maple syrup and falsely labeling this more easily and cheaply produced commodity as pure maple syrup. These adulteration concerns were partly addressed with the introduction of the Pure Food and Drug Act of 1906, which resulted in regulations requiring more truthful and accurate labeling of ingredients. This legislation forced the large syrup blenders with national markets to truthfully declare that their syrups were a combination of cane or corn and pure maple syrup. While the Act helped clean up the false advertising of some blenders, it did not prevent the blending of maple with other syrups. Companies and brands like Towle's Log Cabin from St. Paul, Minnesota; Burlington, Vermont's Welch Brothers; and the New England Maple Syrup Company out of Boston continued to manufacture blends with some amount of pure maple syrup, and in doing so, these companies purchased a significant volume of lower-grade maple syrup.

Maple producers recognized the value of coming together as a unified voice when addressing the actions of government that affected them as well as to share ideas and pool resources for sales and marketing. There was also a desire to work together to cut out the middleman syrup buyer and packer and to pool resources for sales and marketing. Some states and provinces simply formed statewide and provincial maple producers' organizations at this time, while others formed formalized sales and

marketing cooperatives through which members sold the bulk of their maple syrup and sugar. Most co-ops proved unsuccessful in the end and were discontinued due to insufficient capital, poor management, and low participation; however, others like the Producteurs de Sucre d'érable de Québec, now known by their brand name Citadelle, have survived and continue to operate.

The voices of industry were heard, and support and assistance for maple producers through federal, provincial, and state agricultural departments and university Extension offices appeared in the first half of the twentieth century. The resources and organization of these offices were directed toward practical industry research and testing of new technology. They also provided hands-on guidance and expertise and addressed broader industry issues such as the wider adoption of syrup grading based on federal, state, and provincial color standards.

World War II had a significant impact on the maple industry. With shipping and transportation limited by the war effort, and some commodities redirected to assist in feeding the troops, the supply of cane sugar was limited and eventually cane sugar was rationed. The result of rationing was an increase in demand for maple syrup and sugar. Demand was so great that the government placed price controls on maple syrup, limiting the price per gallon to \$3.39. Similarly, production by maple producers for home consumption also increased. The immediate impact of limited supplies was a reduction in the amount of syrup available for the wholesale market. Some markets, such as the tobacco market, were eventually lost, even though rationing was removed following the war.

Manufacturing of maple syrup making equipment, most notably evaporators, tanks, pails, covers, and syrup tins, largely ground to a halt during World War II with sheet metal supplies being diverted to the production of equipment and supplies that supported the war effort. As a result, the maple industry began to experience a gradual shift to bottling syrup in glass containers and smaller, more shelf-friendly sizes for consumers in urban markets. In addition, the improved prices for hardwood lumber in the 1940s, led many sugarbush owners to cut down and

sell substantial portions of their maple woods, setting the maple industry back even further.

MAPLE INDUSTRY—WORLD WAR II TO THE 1990S

Following World War II, significant changes occurred in many aspects of both rural and urban life, and technology advanced at a pace unparalleled at any time in the past. Transportation facilities have improved, a significant migration of people from rural to suburban areas has occurred, and a reduction in the number of family-focused, diversified farms typical of previous times has also taken place. Specialization has occurred in many agricultural operations, including maple production, and with it, the number of maple producers has declined. However, many of those remaining have increased the size of their operations and, in more than a few instances, have developed their maple syrup operation into a full-time business with the production of many maple sugar products derived from maple syrup and the establishment of both local and national retail markets.

During World War II and in the years preceding it, maple production in the United States and Canada was relatively equal. In the first few decades following the war, maple syrup production in Canada remained relatively constant while the United States saw an immediate decline to the point of producing half as much syrup as Canada. Overall, the production levels of the entire maple industry were at their historically all-time lows due to changing consumer palates and the loss of formerly profitable markets like the tobacco industry and a drastic reduction in the amount of maple syrup used by the blended table syrup industry.

Packaging maple syrup for retail and direct sales took a giant leap forward in the late 1940s with the introduction of cans in 1-gallon sizes down to single pint sizes featuring attractive color lithographed maple sugaring scenes. Packaging and syrup sales were further improved in the early 1970s with the introduction of food-grade plastic containers shaped and colored like antique ceramic jugs. A third wave of packaging came in the 1990s with the increased availability and variety of fancy glass

containers that showcased the color and clarity of maple syrup, becoming very popular for gift giving and with tourists.

The post-war period also witnessed experimentation with new models of production such as the central evaporator plant in which multiple owners of maple groves tapped and sold their raw sap to a single nearby sugarhouse or syrup plant, similar to the model of a cheese factory or dairy cooperative. As promising as this model was, woodlot owners and syrup producers found its administration to be cumbersome and a distraction from the work of making syrup, and it failed to take off.

The continued adoption of new power tools and machinery on the farm spilled over to the development of useful new tools for the maple syrup industry. Gasoline- and battery-powered tapping machines were introduced in the 1940s and 1950s, replacing the centuries-old brace and bit and greatly speeding up the tapping process each spring. By the end of the 1950s tractors and trucks had almost completely replaced the use of animal power for sap gathering in the sugarbush.

Changes were witnessed in the design and location of sugarhouses with the modernization of sap gathering and incorporation of more efficient evaporators and arches. In addition, greater attention to and enforcement of food production and food safety regulations led some producers to make a shift away from the romantic, simple wood framed and sided sugarhouse with a cupola on top nestled in the sugarbush. In its place was a less distinctive industrial or barn-like structure designed to comply with local construction and sanitary codes, equipped with electricity and running water, and situated near the residential dwelling and other farm buildings in a wooded area alongside an improved roadway.

In the last several decades, improvements in technology have greatly affected the maple syrup industry. Many of these technological advancements have originated from research designed to increase production efficiency while conserving energy. Included are such advances as the widespread use of plastic tubing sap collection systems, increasingly sophisticated sap collection vacuum systems, improved spout and tubing sanitation practices, closer attention to tapping

techniques, reverse osmosis sap sugar concentration systems, and sap preheaters and similar evaporator modifications to increase heat transfer to incoming sap. Until very recently, little research has focused on the impacts of such changes on flavor development. There have been changes in evaporator design to use forced draft wood-burning systems, automated draw-off equipment for finishing syrup, application of pressure-filtering systems for syrup filtration, and a variety of automated canning and bottling equipment for packaging syrup. New containers for packaging maple syrup for retail market sales have also been developed, including many that are made of food-grade plastic.

While the number of maple syrup operations associated with small subsistence-type farms has declined, another significant class of maple producer has emerged in recent years. The number of individuals who live in rural areas but who do not depend on farm activities as the primary source of their livelihood has increased. Many of these rural residents, although employed elsewhere, have access to a maple woodlot. Each winter they tap a few or several trees to produce their own pure maple syrup. While the total amount collectively made by producers of this type is not large, the actual number of individuals involved is very significant and represents an increasingly common source of pure maple products in many rural areas. With the promotion by the provincial government of a switch from pails to plastic tubing and vacuum systems, the producers in Quebec experienced a significant increase in their maple syrup production in the 1980s and 1990s. With production levels over twice as high as those in the United States, Canada and the Province of Quebec took their place at the head of the table of the maple syrup industry. Efforts at international cooperation and integration of support, research, and marketing in the maple industry gave birth to the North American Maple Syrup Council in 1959 and the International Maple Syrup Institute in 1975, two cross-border organizations working to improve and promote the industry.

In the late 1980s and early 1990s, the government of Quebec took the maple syrup market in a new direction with the decision to mandate that all

bulk sales of maple syrup in the province be carried out by a single, centrally run cooperative organization known as the Federation of Quebec Maple Syrup Producers (Fédération des producteurs acéricoles du Québec). With the aim of stabilizing market prices and controlling surplus and overproduction, a strategic reserve of maple syrup was established. Prices paid for bulk syrup in the province were fixed by the Federation and producers were assigned production quotas to better align supply with demand. In the 2000s Federation resources were further employed to push the industry to expand existing markets and develop new markets and maple products.

MAPLE INDUSTRY—2000 AND BEYOND

With the arrival of the twenty-first century, improvements in sap collection and processing enabled maple operations to generate products of the highest possible quality. More sophisticated and knowledgeable consumers now pay greater attention to how the food products they buy are made and where they come from. Consistency in quality, absence of impurities or contaminants, and safety of food products have become primary concerns of many consumers. As demand for pure maple products has increased, production has increased in both the U.S. and Canada (Figure 2.15)

The maple industry is not immune from these consumer concerns. In recent years the increased production of and growing demand for pure maple syrup and syrup-derived products has fueled significant advances in research, technology, and materials that continue to improve the manufacture of maple equipment, resulting in the increased production of quality maple products. The possibility of low levels of lead in finished syrup and syrup-derived products has resulted in a change in methods of manufacture for maple sap and syrup production and processing equipment. Much of the older processing equipment formerly used by many producers has been replaced. Stainless-steel evaporators and related sap and syrup handling equipment are now manufactured using lead-free solder or welding. Syrup is packaged in food-grade containers made of materials that will not impart off-flavor or otherwise result in product degradation.

Another concern related to maple products and their production has to do with their classification as “organic food materials.” In the past several years increasing concern has developed related to food quality and purity. Among consumers there is a perceived but not necessarily research-proven perspective that “organically produced” foodstuffs are superior in both quality and nutritional value to

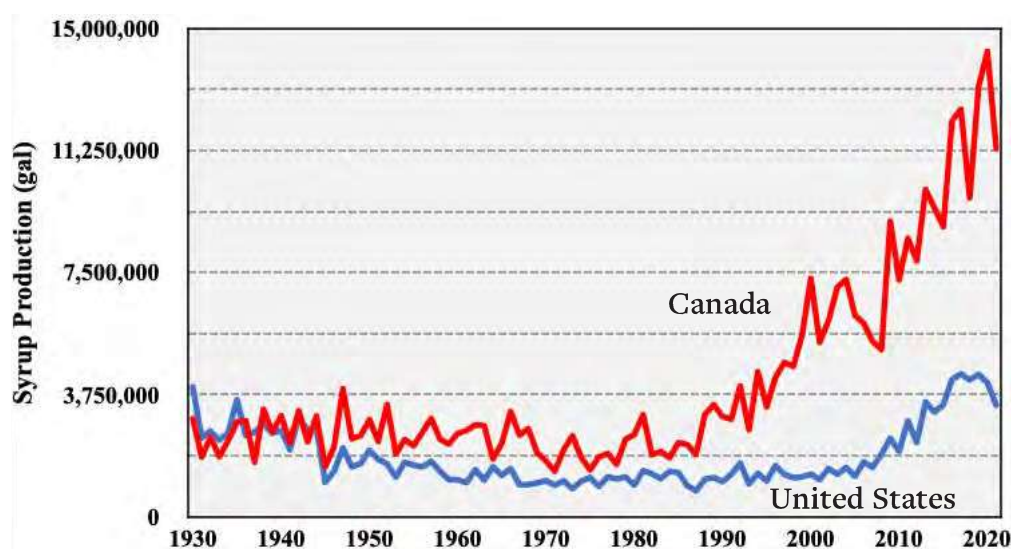


FIGURE 2.15. Production of maple syrup in the U.S. and Canada from 1930 to 2021. SOURCES: GRAHAM, G. 2016. MAPLE SYRUP PRODUCTION STATISTICS. OHIO STATE UNIVERSITY EXTENSION., USDA NATIONAL AGRICULTURAL STATISTICS SERVICE, STATISTICS CANADA.



foodstuffs produced using “inorganic fertilizers or pest controlling products.” In the minds of some, the growing popularity of foods identified and certified as organically produced is more likely a reflection of the power of a marketing that capitalizes on the fact that these products command higher prices rather than a reliable indication of food, safety, quality, or purity. Producers of pure maple products have taken advantage of this marketing opportunity, and many have promoted maple syrup and sugar products through organic food marketing outlets. In so doing, they satisfy a more demanding segment of the population while increasing economic returns.

While many aspects related to sap collection, processing, packaging, and marketing have changed substantially in recent years, the purity and wholesomeness of maple syrup and related products remains the same. It is this same wholesome flavor, quality, and image that will continue to satisfy the needs and wants of maple consumers. With significant improvements in production processes continuing to evolve from technological innovations applied to the maple industry, and the popularity of pure maple products among consumers, the future of “pure maple” would seem certain. Opportunity to produce and enjoy this unique North American product should continue, if not expand, in the future.