

AN EVALUATION OF ICONOGRAPHIC AND WRITTEN
SOURCES IN THE STUDY OF A TRADITIONAL
TECHNOLOGY: MAPLE SUGAR MAKING

by Anita Campbell

L'auteur évalue l'utilité des sources iconographiques dans l'étude des techniques traditionnelles, en comparant un ensemble de ces sources avec des documents traitant de la fabrication du sucre d'érable. Les deux types de références fournissent des données précises et détaillées, les sources iconographiques l'emportant en ce qui concerne la description des outils (style, forme) mais le cédant aux textes pour ce qui est des instructions relatives aux méthodes et techniques. L'étude a démontré que les compétences de l'artiste ou de l'auteur revêtaient une plus grande importance que le type de référence comme tel. De plus, dans l'étude des techniques traditionnelles, il est évident que le chercheur a intérêt à consulter la plus grande variété de sources possible.

Introduction

The purpose of this paper is to evaluate the contribution of iconographic sources to the study of a traditional technology, maple sugar making, by comparing information from such sources with information from written sources. The eight iconographic and seven written sources chosen for the study date from the eighteenth and nineteenth centuries except for one from the early twentieth century. A number of these sources are of special interest in that they refer to or illustrate innovations in the traditional methods of maple sugar making. The comparison is



Fig. 1. Cornelius Kreighoff, Cabane à sucre au Canada.
(Photo: Public Archives of Canada, neg. no. C-11041.)

This lithograph by Krieghoff appears to represent a family group employed in all the steps of maple sugar production. Sap runs from a long, undetailed spile into a wooden trough. A man or boy empties a trough into a wooden bucket while another man empties a bucket into a large wooden reservoir barrel located immediately outside the cabin. The cabin, portrayed as a three-sided, plank structure supported by a frame of poles, has a slightly sloped roof with a hole through which the smoke and steam escape. Inside the cabin a large kettle with a bail handle is suspended over the wood-burning fire. The handle is looped over a horizontal pole which in turn rests on the forked ends of two vertical poles, one of which is placed on either side of the fire. A man, possibly the father, is tending the contents of the kettle with a long-handled utensil while a woman, possibly the mother, is holding a bowl from which she appears to be extending, with her free hand, some of the bowl's contents. Outside the cabin are an axe and a few pieces of wood while to the left a child is in the process of transferring the contents of a wooden bucket into sugar moulds with a short-handled, wooden ladle. The bucket and four square wooden moulds, one of which is divided into four sections, rest on an improvised bench.

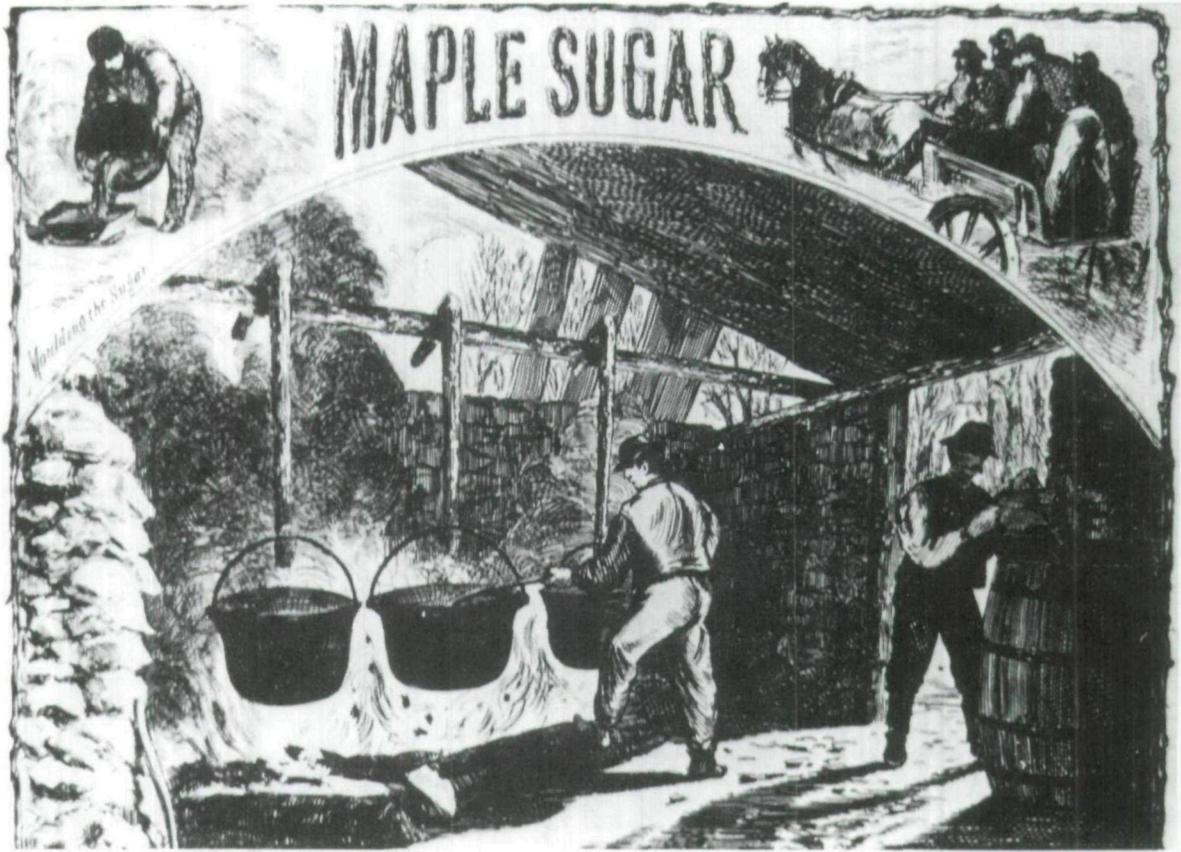
based on four steps in the maple sugar process: tapping the tree, transporting the sap from the tree to the location of boiling, boiling down the sap to syrup and sugar, and moulding the sugar.

Iconographic Sources

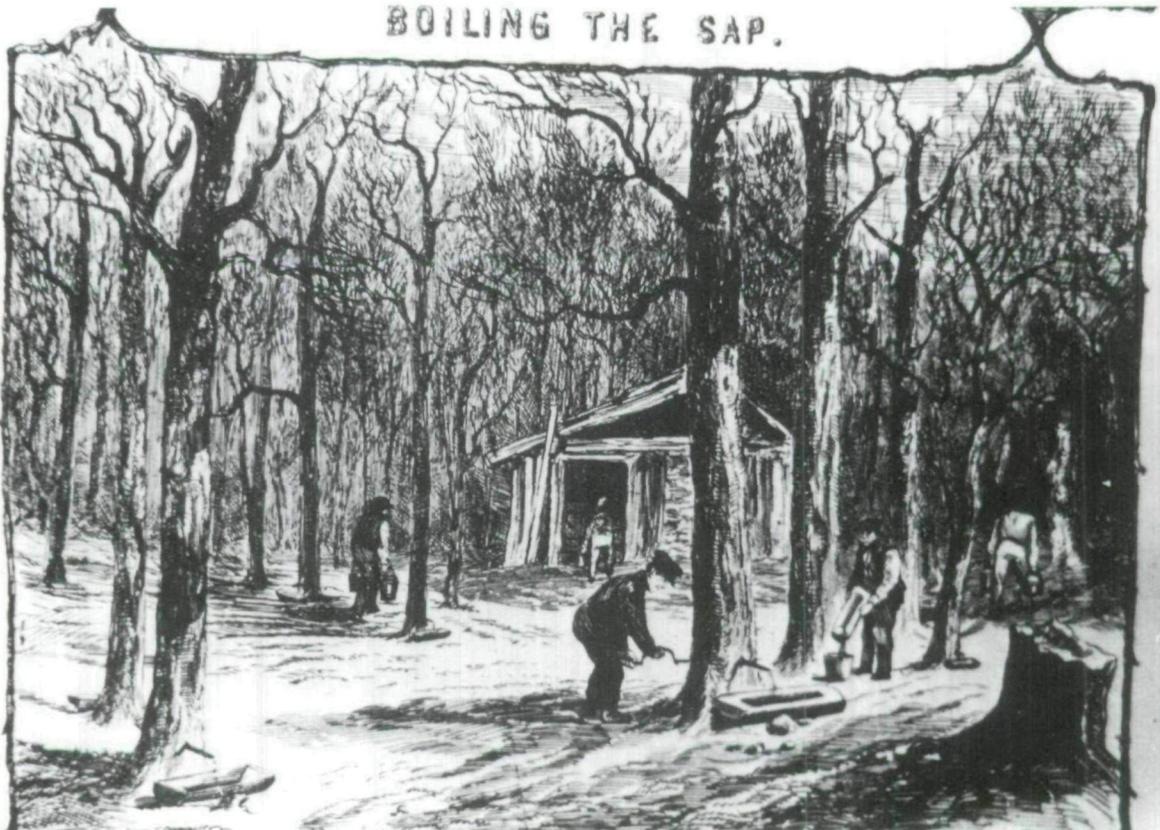
Of the numerous iconographic sources which depict the traditional methods of maple sugar making, eight works were chosen because they portrayed contemporary techniques and equipment. Although several later artists such as Clarence Gagnon, Horatio Walker, and J. Edmond Massicotte also depicted the fabrication of maple sugar, their works were not included because they tended to illustrate techniques which were no longer contemporary but considered traditional at the time.

The earliest iconographic source to be described is Kreighoff's Cabane à Sucre au Canada (fig. 1). Except for uncertainty concerning the activity of the woman, who may be testing the readiness of the sugar or simply illustrating its consistency, the artist's rendition appears to be accurate. Kreighoff has been criticized for being a townsman and thus not intimately familiar with the subject of his works and for incorporating European culture and articles into his paintings.¹ However, European prototypes of maple sugar equipment did not exist to copy and Kreighoff's accurate depiction implies that he had a good knowledge of the process.

Six of the iconographic sources, all dating from the 1870s, are from the Canadian Illustrated News and L'Opinion Publique, English and French editions of a journal printed by a Montreal publisher.² The artists working for these journals were illustrators employed to draw accurate renditions of newsworthy events before photography was commonly used. We can assume that in many cases the illustrator was at the site, as indicated in an article which accompanied figure 2 and stated that "our artist having occasion recently to be present at one of these sugar-making:



BOILING THE SAP.



in the bush at Ste. Genevieve took the opportunity of making a few sketches which we reproduce....".³ All of the illustrations were full-paged, black and white etchings or engravings of the artists' sketches. It seems likely that the illustrations were published soon after being sketched as all of them appear in the sugar-producing months or shortly afterwards.

Figure 3 is confusing in that it presents several possible interpretations. First, the two kettles may be an attempt to represent two steps in sugar production: the boiling down of the sap over a fast fire and the boiling down of the syrup to sugar over a slower fire. However, perhaps Edson was simply illustrating the presence of two kettles which, in turn, revealed two types of suspension or one suspension frame which was out of order. The presence of the cabin with kettles placed in the open is also confusing. Edson may have been attempting to illustrate the replacement of old types of equipment with new, an interpretation supported by the kettles' unused appearance and the presence of

Fig. 2. Anonymous, "The Maple Sugar Season -- Manufacturing the Sugar in the Bush at Ste. Genevieve" in the Canadian Illustrated News (6 May 1871). (Photo: Archives du CÉLAT, Université Laval, neg. no. D.C.8 [12].)

The lower illustration shows a man tapping a tree with a brace-and-bit or auger. Sap is running from long spiles into troughs. One man is emptying a trough into a bucket while several other men are carrying buckets by hand towards the sugar cabin. The cabin is depicted as a crudely constructed structure of poles and planks which appears to be enclosed on all sides and to have a peaked roof. The upper scene portrays the interior of the cabin. A man is emptying a bucket into a wooden reservoir barrel which is located next to the door. Three medium-sized kettles hanging over an open fire are being tended by a man holding a long-handled utensil. The kettles are suspended by wooden brimbales hooked over a horizontal pole which rests on top of the cabin wall. Smoke and steam are escaping from the open area below the peaked roof. An axe rests against an unidentified stone structure next to the fire. A small scene in the upper right corner, entitled "Moulding the Sugar," depicts a man pouring syrup from a small kettle into a large, rectangular-shaped mould resting on the ground.



Fig. 3. Allan Edson, "A Sugar Bush" in the Canadian Illustrated News (11 May 1872). (Photo: Archives du CÉLAT, Université Laval, neg. no. D.C.8 [29].)

In the centre of the scene a substantial, permanent sugar cabin and a smaller auxiliary building are illustrated. The cabin appears to be built of planks and has a steeply sloped, peaked roof which supports a built-up chimney or vent. Pails or buckets are suspended from some trees and in the background a man appears to be carrying two buckets by means of a yoke. Outside the cabin are two kettles, apparently not in use. One kettle is suspended from a three-sided pole frame, as in figure 1, while the other is suspended by a slanted pole resting on a tree stump. The means of suspension is indicated by a thin line which may represent a chain. Grouped in the same area are other buckets or pails, a trough, and an axe in a wood pile.

an unused trough. Again, he may have been trying to illustrate both the exterior of the cabin and the activities inside. Although Edson's depictions of the equipment and the cabin appear to be correct, it is difficult to determine the techniques used because of the ambiguity of the artist's rendering.

E. Haberer's depiction of the tapping process is also confusing (fig. 4). One tree has several small tubs or buckets at its base. A small receptacle appears to be attached to the tree over one of the tubs but this could also represent the end of a larger receptacle placed at the base of the other side of the tree. A man at another tree is pouring sap from a small tub into a larger tub or wooden bucket. There may be a spile projecting from this tree but if a receptacle is present under it, it is hidden from view. The artist's depiction of the sugar cabin is ambiguous. It is shown as a very crude pole and plank shelter which is open at the roof and at least one side. Two kettles appear to be sunken as only their handles are visible while the means of their suspension is not evident. A wooden reservoir barrel outside of the cabin is also slightly sunken. The confusion in this illustration suggests that Haberer viewed and illustrated a procedure which he did not entirely understand. This may explain the poorly defined cabin as well as the proliferation of vessels below a tree which has no definite evidence of spiles. However, nothing is obviously inaccurate and the man-drawn sledge is very clearly depicted.

Figure 5, like figure 3, offers several possible interpretations. The presence of the kettle as well as the feu de roche may be an attempt to illustrate the replacement of old techniques by new. However, it may also illustrate two steps in sugar fabrication, the boiling down of the sap to syrup by means of the feu de roche and the boiling down of syrup to sugar in a small kettle over a smaller fire. The last example from the Canadian Illustrated News, by illustrator J. Weston (fig. 6), is an attempt to portray all the steps in sugar production. Except



Fig. 4. E. Haberer, "Making Maple Sugar in Canada" in the Canadian Illustrated News (20 March 1875). (Photo: Archives du CELAT, Université Laval, neg. no. D.C.9 [6].)

for the confusion presented by the vaguely portrayed trough, this illustration clearly and accurately depicts the fabrication of maple sugar. Henri Julien's illustration in the 31 May 1877 issue of L'Opinion Publique (fig. 7) is similar in style to Weston's.

These illustrations indicate that in spite of problems with interpretation iconographic sources contain much information on all aspects of maple sugar production. Several sources indicate that the tree was tapped using an axe or a brace-and-bit, while figures 6 and 7 provide good illustrations of the sloped gash. Although spiles are often shown, their small size makes it difficult for the artist to show details of shape or material. Krieghoff (fig. 1) and the anonymous illustrator (fig. 2) represent the spiles as long, thin lines while Weston (fig. 6) sketches what may be long tongues of wood and Barraud (fig. 5) depicts short, round-looking spiles. Julien, however, manages to provide excellent illustrations of spiles in both his works: thin, slightly hollowed tongues of wood in figure 7 and long, wooden, trough-shaped spiles in figure 8. The placement of hollowed wooden troughs used for collecting the sap is abundantly illustrated and Weston (fig. 6) shows details of their construction. Figure 4 depicts the use of wooden tubs in place of troughs. The first illustration to show a pail or bucket suspended from the tree is Edson's (fig. 3) and he may have been trying to emphasize the new method by also illustrating an unused trough. The sugar camp depicted by Barraud (fig. 5) appears to be open to innovation, as indicated by the feu de roche and the used of buckets, together with short spiles, suspended from the tree. However, Julien depicts the use of a trough in the twentieth century (fig. 8). In summary, although a brace-and-bit were used to tap the tree by some sugar-makers, the hatchet was still common in 1880. Wooden tongues or trough-shaped spiles were also common but shorter spiles seem to have been used with suspended pails or buckets. Troughs made from hollowed, split logs were used into the twentieth century while suspended, wooden buckets were used in the early 1870s.



Fig. 5. A.T. Barraud, "Maple Sugar Making" in the Canadian Illustrated News (26 April 1879). (Photo: Archives du CÉLAT, Université Laval, neg. no. D.C.9 [32]).

In the foreground a small, unsheltered kettle is suspended over a wood-burning fire by a short chain which is attached to a slanted pole resting on a short, Y-shaped, upright pole. In the centre ground is a feu de roche. The arch is made of stone while the chimney is of bricks with a cylindrical, metal flue. Resting on the arch is a shallow evaporating pan as well as a square-shaped, sap-feeding container. The structure is protected by a crude plank roof. A man appears to be feeding a log into the end of the feu de roche from a small plank structure which apparently houses the firewood. Nearby a man is shown chopping wood. A wooden reservoir barrel is located next to the feu de roche. Also depicted in the illustration are short spiles and wide-bottomed wooden pails suspended from the trees.



Fig. 6. J. Weston, "Sketches in the Sugar Bush", in the Canadian Illustrated News (17 April 1880). (Photo: Archives du CÉLAT, Université Laval, neg. no. D.C.9 [23]).

"Manufacturing Troughs" (upper left) shows one man splitting logs while another, who is holding a small axe or hatchet, displays a completed trough. The presence of hollowed and unhollowed, cut and split logs further demonstrates the technique. In "Tapping Trees" (lower right) a man is using a mallet or hammer to strike what can assumed to be a spile into the base of a sloped gash in the side of a tree. An axe and a trough rest at the base of the tree. "Gathering Sap" (lower left) shows a long, undetailed spile projecting from a gashed tree and a man emptying a trough into a wooden, tub-like bucket. "Gathering Sap on Snow Shoes" (upper right) depicts a man on snowshoes transporting two barrel-shaped wooden buckets by means of a yoke. In the background a man is pouring the contents of a bucket into what appears to be a large, long trough. The central scene, "Boiling the Sap," illustrates a crude three-sided plank shelter. The top of the walls appear to be open and the vent on the sloped roof is built up. Within the shelter two large and one smaller kettle are hooked by brimbales to a horizontal pole which rests on two vertically placed forked poles. Outside the cabin are two wooden reservoir barrels, a man chopping wood, and possibly a reservoir trough.

Methods of transporting the sap from the collecting receptacle to the boiling-down container are well illustrated and depict several techniques. The earliest and simplest method, emptying the trough into a wooden bucket and transporting it by hand to the reservoir barrel, is illustrated in figures 1 and 2. Figures 3 and 6 imply that sap was transported in the same manner but with the aid of a yoke. Figure 4 depicts the transfer of the sap from a small collecting tub to a larger tub, to the upright barrel on the man-drawn sledge, and finally to the reservoir beside the shelter. Julien's 1877 illustration (fig. 7) shows the transfer of the sap from the trough to a wooden bucket, to a horse-drawn reservoir, and finally to the reservoir by the cabin, while his later work (fig. 8) depicts the same methods but with the additional use of the yoke.

The illustrations also provide details about the objects used for transportation. The containers in figures 4 and 6 resemble wooden tubs more than buckets while figure 7 is the first to provide definite evidence of the use of a metal bucket. Figure 7 also portrays in detail the yoke and the special buckets used with it; the barrel-shaped buckets in figure 4 may also be a special type. Although not numerous the examples of man- and horse-drawn sledges are clearly illustrated in some detail. A large wooden barrel, which is assumed to serve as a reservoir for collected sap, is shown in all sources except figure 3. The use of a long trough-shaped reservoir is suggested in figure 6.

The iconographic sources provide some evidence of an evolution in the means of transporting sap: hand-carried buckets, a yoke, man-drawn sledges with unstable, vertically-placed reservoirs, and finally a horse-drawn sledge with a horizontally-placed reservoir. Also, the sources reveal that metal buckets were used in 1877 but that wooden ones were still in use in the twentieth century. However, details about the objects are often lacking and illustrations such as figures 2 and 3 make it impossible to determine what the objects are made of. As well,

it has been necessary to make several assumptions during the interpretation of the procedures which may not be correct. For example, the viewer cannot be certain that the large barrel so frequently illustrated is a sap reservoir. Also, when several modes of transportation are illustrated, the viewer can only assume the order of their use or that no other unillustrated steps were used as well.

The first item to be analyzed in the boiling-down process is the sugar cabane. Most sources depict the boiling-down procedure taking place inside or immediately outside the cabin or shelter. The three-sided plank shelter appears to be a popular variety and is shown by the earliest source as well as the latest (figs. 1 and 8). These crudely built shelters all appear impermanent in nature. The one in figure 4 is similar in its appearance of impermanence and its crudeness although it is of indeterminable shape and may be sunken. Figure 5 shows only a roof protecting the feu de roche. The cabin in figure 2 is the first enclosed, permanent-looking shelter illustrated though it too is crudely constructed from upright planks and poles. Figure 3 is the only source in which the cabin is depicted as a permanent, well constructed building. Figures 3 and 5 both illustrate auxiliary buildings which probably were used to store wood.

The cabins and shelters were used to protect the fire, to provide storage, and, as illustrated in figure 7, to house the sugar-makers. All were constructed of planks and pole frames, materials abundantly available in the sugar bush, and had means to let the smoke and steam escape. Several styles are illustrated although the simple, three-sided shelter appears most frequently. The style of shelter constructed seems to have been dictated by desire or need rather than date since a substantial cabin is depicted in 1872 (fig. 3) while a three-sided shed is illustrated in 1907 (fig. 8). However, it should be noted that the three-sided shelter as well as the roof in figure 4 allow the artist to show the inside and the outside of the shelter at the same time and it is possible that this would affect his choice of cabin style.

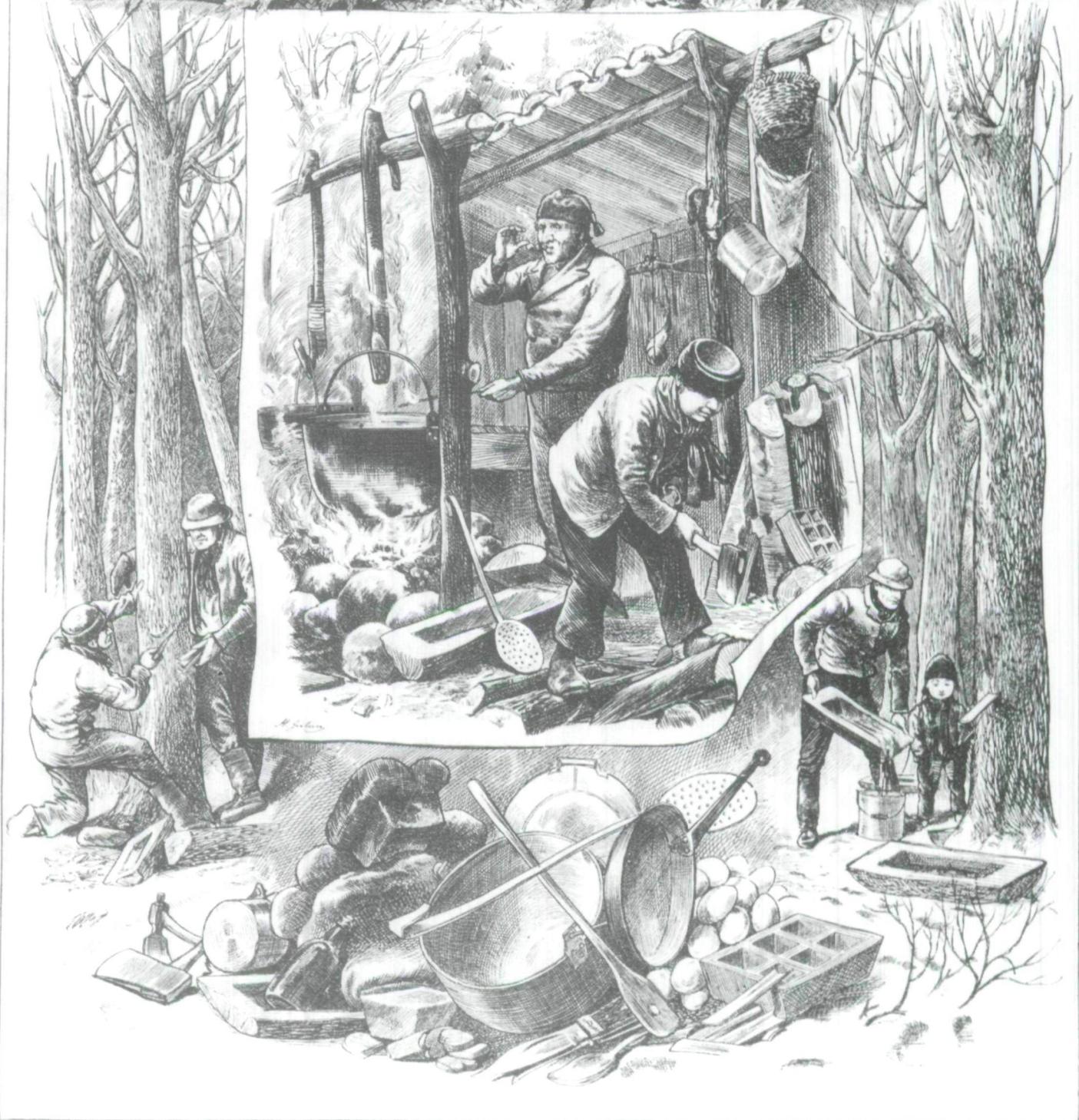


Fig. 7. Henri Julien "Fabrication du sucre d'érable en Canada" in L'Opinion Publique (31 May 1877). (Photo: Public Archives of Canada, neg. no. C-65854.)

In one scene a man is tapping a tree with what appears to be an axe or hatchet held at a slant while another man holds the spile to be inserted in the gash. In another small scene a man empties a wooden trough into what appears to be a metal bucket while a child watches. A third scene depicts a man emptying the contents of a bucket into a hole in a horizontally-placed wooden reservoir barrel mounted on a horse-drawn sledge. In another two women are shown filling moulds; one is pouring sugar from a large spoon into a rectangular-shaped, six-sectioned wooden mould. To the side is a small fire consisting of a Y-shaped, upright pole on which rests a slanted pole. From this hangs a hook but the kettle seems to have been removed from the fire and placed on the ground by the women. A man appears to be resting in a three-sided shelter depicted in the background. A wooden reservoir barrel and three kettles suspended over a stone-surrounded fire are portrayed outside the shelter. The major central scene illustrates the shelter and the fire in more detail. Outside the shelter two kettles are suspended by wooden brimbales to a three-sided frame of horizontal and vertical poles. The fire is surrounded by rocks. A man is depicted chopping wood. Hanging from or resting by the cabin walls are a rifle, powder horn, basket, bag, metal bucket, wooden trough, mould, and a long-handled skimmer with a perforated, disc-shaped head. At the bottom of the page are grouped various tools and articles: large metal kettle, metal pail or bucket, frying pan, six-sectioned wooden mould, long-handled skimmer which appears to be of metal, wooden testing spatula with a hole in its centre, hatchet or hammer, wooden trough, knife, large spoon, wooden spiles which are long and slightly hollowed-looking in shape, and provisions including eggs and bread.



Fig. 8. Henri Julien, "Le temps des sucres" (1907; Collection Jacques Simard) in Robert-Lionel Séguin, "Petite et grande histoire de la cabane à sucre," Vie des Arts 45 (hiver 1967), p.42.

This is particularly interesting because it clearly shows a yoke used in transporting sap. The wooden buckets appear to have been specially constructed for use with a yoke since instead of bail handles they have wooden pegs to which the yoke can be securely hooked. Also well illustrated are long, trough-shaped wooden spiles, wooden collecting troughs, and a horse-drawn sledge carrying a horizontally-placed collecting barrel. Indistinctly displayed in the background are a shelter, a reservoir barrel, two kettles, and a man chopping wood.

Variations are less frequent in illustrating the fire and kettle. All the sources show large, footed or unfooted kettles which vary from one to three in number. Figures 6 and 7 seem to illustrate the use of several sizes of kettles at the same time. There are two suspension systems. The first and most prevalent consists of a frame made from two vertical Y-shaped poles on which rests a horizontal pole. Figure 2 portrays a variation in which the horizontal pole rests on top of the cabin wall. The other system, shown in figures 5 and 7, consists of a kettle attached to a slanted pole which rests on a short Y-shaped pole. The fire used here seems to indicate, especially in figure 7, the further boiling-down of syrup to sugar as a separate step. This second step may also be indicated in figure 3 where a similar two-sided frame is portrayed. Brimbales, usually wooden in appearance, are the most frequently illustrated means of suspension although chains also appear to have been used. Krieghoff (fig. 1) illustrates the awkward arrangement of suspending the handle of the bucket directly on the horizontal pole. The importance of maintaining the fire is emphasized by the frequent presence of a wood pile and axe or of a man chopping wood. The large rocks surrounding the fire in figure 7 and the fact that it may be sunken in figure 4 suggest various ways of protecting the fire. Finally, the feu de roche in figure 5 clearly indicates that by 1879 this system was well developed but may have been used in conjunction with the open fire and kettle arrangement.

The only good representation of the tools used in the boiling-down process are found in Julien's 1877 illustration (fig. 7) which depicts in detail the long-handled metal utensil with a large, perforated, disc-shaped end probably used as a skimmer. He also illustrates a palette which has a hole in its centre for testing the readiness of the sugar. Julien is also the only artist to illustrate eggs which were sometimes used as a clarifying agent. Other illustrations indicate the use of a long-handled utensil for stirring the contents of the kettle, but usually the ends of these utensils are hidden from view as they are immersed in the kettles.

The iconographic sources offer general information and some details on the boiling-down process. Information about the sugar cabane has already been summarized. The feu de roche was in use by 1879 but the use of a large kettle suspended over an open fire continued into the twentieth century. The kettles were most frequently suspended by using a three-sided pole frame and wooden brimbale, objects which could be easily obtained in the sugar bush. All of the illustrators indicate the importance of the fire. Several of the illustrations imply that two steps were involved in the boiling-down procedure, that of boiling sap to syrup and, in a smaller kettle over a smaller fire, boiling syrup to sugar. Except for the two shown in detail in figure 7, the tools used in the boiling-down procedure are not well illustrated, nor is it possible to determine the material and volume of the kettles.

The moulding process is well illustrated in figures 1, 2, and 7 which all depict approximately the same process. In one instance (fig. 1) a child fills the moulds while in another (fig. 7) it is the work of two women. This work is done on the ground or on an improvised bench. Figures 2 and 7 imply that the sugar is still in the kettle in which it was boiled down, while figure 1 shows the sugar in a wooden bucket. A wooden ladle and a spoon are used in figure 1; in figure 2 the sugar is poured directly from the kettle into the mould. Square- or rectangular-shaped moulds, sometimes sectioned into four or six parts, appear in figures 1 and 7. The large, rectangular-shaped mould in figure 2 appears to be of bark rather than wood. Two types of sugar are implied -- that which is liquid and poured into the moulds to form cakes and a granulated form which must be ladled into the moulds.

Written Sources

Writings on the exploitation of maple sap are numerous and date as early as the seventeenth century.⁴ Of the seven chosen for comparison with the iconographic sources, four are excerpts from memoirs of visitors to Canada, two are memoirs of North American inhabitants, and one is a journalist's report.⁵ The earliest is the memoir which Peter Kalm, a Swedish professor of natural history who visited Canada in 1749, presented to the Royal Academy of Sweden. Another is the journal of an unidentified French soldier, known as J.C.B., who lived in North America from 1751 to 1761 and who is noted for presenting the view of an ordinary person. Also chosen were the memoirs of Isaac Weld, an educated Irish traveller who visited Canada from 1775 to 1777. A critical observer, Weld not only described maple sugar fabrication but also suggested how it could be improved. The fourth memoir, by Lieutenant W.O. Carlile and Colonel Martindale, dates from the late nineteenth century. Accounts written by North American inhabitants are by Elizabeth Thérèse Baird on maple sugar production on the Detroit River and by Nicolas-Gaspard Boisseau who lived from 1765 to 1842. Boisseau's memoirs provide information which is "presque exactement le procédé en usage jusque dans les dernières années du dix-neuvième siècle."⁶ The last source is an unidentified Canadian reporter who quoted extensively from Bouchette in a 1871 issue of the Canadian Illustrated News.

The method of tapping tree is well described by almost all the writers. Three refer to axe-produced gashes. J.C.B. states that "on fait une entaille au bas, à la hauteur de trois pieds environ en forme de talus;"⁷ Carlile and Martindale mention a "deep slit through the bark of the tree about two feet from the ground,"⁸ while Boisseau states that "ils font avec leur hache une entaille oblique de quatre pouces sur deux."⁹ Weld states that "piercing a hole with an auger in the side of the tree, of one inch or an inch and a half in diameter, and two or three

inches in depth, obliquely upwards"¹⁰ was the preferred method since the less mangled tree lasted longer. However, he adds that the most common method was to cut a gash with an axe since the sap flowed faster and the busy farmer could finish his sugar making in less time. The descriptions of Peter Kalm and the CIN reporter imply the use of a brace-and-bit or an auger instead of an axe.¹¹

The name and description of the spile vary. Kalm mentions the incision of an auget. J.C.B. describes it in more detail, mentioning the incision of "une lame de couteau ou un morceau de bois taillé de la même manière,"¹² while Boisseau refers to "un petit morceau de bois de huit pouces de long, sur un de large, qui est fait en façon dalle (qu'ils appellent goudrilles)."¹³ Weld describes the placement of a spout, apparently wooden, at the bottom of the cut. The CIN reporter refers to a "slender spigot" while Carlile and Martindale describe the more modern use of a "small, semicircular tin trough" although they add that small wooden spouts were still used in some sugar camps.

Unlike the spile, the sap-collecting receptacle is not well described. It is termed a "grand vase" by J.C.B., a "chaudière" by Kalm, and simply a "vessel" by Weld. References to the use of a wooden trough are more frequent and precise. Weld suggests the use of a "small wooden trough" and Boisseau provides a short description of its fabrication -- "ils font des auges de deux pieds de long, sur dix pouces de large."¹⁴ Carlile and Martindale again mention the use of new modes of equipment: "In many sugaries small wooden spouts and 'dug-out' wooden troughs are used instead of the tin troughs and buckets."¹⁵ They also refer to "tin buckets and tubs" with "close-fitting covers."

In summary, the written sources provide a good description of the tapping procedure. A drilled or augered hole was used as early as the late eighteenth century although axe cuts, often on a slant, were still made in the late nineteenth century. The approximate distance of the cut from the base of the tree and the

exact measurement of the size of the cut or the hold drilled are indicated. Spiles were found in the form of a small trough, a knife blade, or wooden slabs shaped like knife blades; wooden spiles are mentioned several times while the first reference to metal spiles is in 1873. The eighteenth century sources are vague in their descriptions of sap-collecting receptacles and imply the use of everyday vessels. The use of a wooden trough is first mentioned in the late eighteenth century and it seems to have been the most common receptacle used for the purpose until the 1870s when reference is made to tin troughs or large buckets.

Baird does not describe how the sap is transported and Kalm and Carlile and Martindale mention it only briefly. Boisseau states that "sur les cinq heures après-midi, ils charoyent l'eau dans des seaux, à leur cabane, et ce en raquette."¹⁶ Weld indicates that the common practice of transporting the sap by hand hindered profitable sugar production and he suggests improvements such as the use of wooden troughs, wooden tub reservoirs scattered throughout the grove, and cleared avenues through the trees which would allow the passage of carts carrying a collecting vessel. Weld indirectly refers to the use of horses in discussing the problem of carrying food into the woods; Boisseau, however, states the impossibility of using horses: "ce [provisions] qu'ils transportent sur une petite traine à leur cou, étant impossible d'y aller avec des chevaux." Modern collecting techniques are inferred by the CIN reporter who mentions the use of tubes of bark or saplings to transport the sap. The only direct reference to the use of a reservoir for sap storage is by Boisseau who states that "ils mettent cette eau dans des cuves ou bariques." To summarize, the written sources indicate that transporting the sap was a problem, that it was often carried by hand, and that snowshoes were sometimes needed. Since maintaining horses was difficult and in some places impossible, man-drawn sledges were sometimes used. However,

improvements were being considered in the late eighteenth century and by the 1870s it seems that piping or tubing systems were starting to appear.

The sources describe a variety of structures in which maple sugar making took place, including the use of one's home, crude temporary shelters, and large permanent cabins. They were constructed from materials readily available in the sugar bush and frequently had roof openings to allow for the escape of smoke and steam. Weld implies that families who made maple sugar sometimes boiled it down in their homes while his suggestions for improvement involve the construction of "mere sheds" in which to boil down the sugar and the erection of a "few huts" to house the workers. Boisseau briefly describes a small, round cabin in which "le haut au milieu est à jour de deux pieds"¹⁷ for the escape of the steam and smoke. He implies that it was about twenty feet in area and, from the context, it is assumed to be temporary. Baird describes what seems to be a permanent cabin which houses the sugar making as well as the sugar makers and is constructed of poles and small trees enclosed with sheets of cedar bark. This cabin, approximately thirty feet by eighteen feet, has a large door at each end, platforms, an open, peaked roof, and a large, central fire which extends to within six feet of the doors. Carlile and Martindale refer to rough sheds made of branches, birch bark, and fir tops; they also mention "log huts."

The actual production of maple syrup and sugar is described in detail in the written sources. Weld, J.C.B., the CIN reporter, and Carlile and Martindale all basically state that the sap is boiled down until it becomes syrup. If a sugar loaf or cake is desired it is boiled longer and poured into a mould. If granulated sugar is desired the syrup is boiled even longer and constantly stirred.

According to Baird the boiling-down of sap to syrup takes twenty-four hours and a brisk fire must be kept going at all times. Two women tend the process and their major concerns are to keep

the sap from boiling over and from burning; the first is accomplished by dipping a hemlock branch in the kettle and the second by transferring the contents of each kettle to another kettle when it is boiled down halfway. The syrup is stored in barrels until it is time to make the sugar. It cannot be done in one step because boiling sap to syrup requires a brisk fire while boiling syrup to sugar requires a slow fire. For sugar cakes three gallons of syrup are boiled down and poured into moulds. For granulated sugar two gallons of syrup are cooked and stirred for a longer time and then packed in a "mocock" while warm.¹⁸

Kalm describes two methods of boiling down the sap. The first is to boil the sap until it is difficult to stir at which point it is removed from the fire and stirred energetically until "il n'est pas tout à fait refroidi."¹⁹ The sugar is then put in moulds. The second method is similar to the one mentioned by Baird and consists of boiling down the sap in several smaller kettles and then transferring the contents to one large kettle. When the sugar is boiled adequately it is removed from the fire and stirred continuously, so that the contents will not burn or stick, until it resembles "un sucre brun farineux ou mouscouade." However, if loaves or solid pieces are desired, the stirring is stopped while the sugar is still in a liquid state and poured into the moulds.

Boisseau provides similar instructions. A full kettle is boiled until it is reduced to syrup. To keep it from boiling over it is stirred continuously with a "spatule ou palette" until it becomes sugar. It is then quickly carried from the fire, placed in the snow, and stirred until it stops boiling. It is then placed into moulds with a "gamèle ou cueiller."²⁰

Weld is the only author to mention the addition of clarifying agents, including lime, egg whites, and blood, to the boiling syrup. He also states that the addition of milk or egg whites is agreeable to the taste. Kalm, on the other hand,

states that the sugar "n'a pas besoin d'être mélangé à aucune autre substance pour épaissir. Il provient uniquement de la sève de l'érable et est entièrement pur."²¹ Carlile et Martindale suggest passing the sap through flannel strainers to produce a purer product.

Several methods for testing the readiness of the sugar are described. Kalm mentions observing the foam diminish or cooling a small amount of the boiling sugar, but adds that a person with experience knows with ease the moment when the sugar is done. Boisseau describes the use of a special spatule or palette which has a hole in its centre. When one blows on the hole, the syrup will form a dry ball if it is cooked sufficiently. Carlile and Martindale state that the sap is ready if it becomes crisp and hard when poured on the snow. Baird does not describe a technique but mentions that boiling down the sugar was difficult work and was always done under her grandmother's immediate supervision.

The utensils and containers used in the boiling down process are described in some detail while two of the authors note the method of suspending the kettle over the fire. According to Baird,

At each corner of the fireplace were large posts, firmly planted in the ground and extending upwards about five feet or more. Large timbers were placed lengthwise on top of these posts, and across the timbers extended bars from which, by chains and hoops, were suspended large brass kettles, two on each bar...²²

The CIN reporter indicates that a beam from which to suspend the kettle was made by a "spar laid across between the 'crotches' of two neighbouring trees." Both methods are based on the same principle although Baird refers to a permanent arrangement while the reporter describes a temporary one.

Kalm refers to an iron or copper "chaudron" in various sizes as the vessel used in boiling down the sap. J.C.B. mentions

"grandes chaudières" and Boisseau states that a "grand chaudron de 10 seaux" was transported into the woods. Baird writes of the use of "four large brass kettles," the reporter describes the use of a "potash kettle or other convenient utensil," and Carlile and Martindale mention "large iron boilers." Evidently one or several large kettles of copper, brass, or iron were used to boil down the sap. However, some of the descriptions present problems of interpretation. It can only be assumed that a "potash" kettle is of cast iron and that a "grande chaudière" is a chaudron. Also, a boiler could be interpreted as either a kettle or an evaporating pan.

Kalm refers to the use of a spoon for stirring and testing the syrup. Baird states that the stirring was done with a long paddle which looked like a "mush-stick" while Boisseau provides a description of a "spatule ou palette de bois franc...qui est percée au milieu."²³ He also mentions the use of a gamèle -- a pannikin or tin can -- or a spoon for transferring the sugar into the moulds.

Moulds are described in all the sources. Kalm mentions the use of "bols ou autres plats selon la forme désirée."²⁴ J.C.B. states that the sugar was put in "des jattes de bois où elle se durçit en forme de pain rond"²⁵ while for sugar from the late runs small, chocolate-like tablets were made. Although not describing moulds directly, Weld states that the sugar was most frequently seen in loaves or in thick, round cakes. The CIN reporter describes wooden or birch bark vessels of various sizes and adds that tin moulds were in general use. Boisseau and Carlile and Martindale also refer to birch bark moulds of various sizes. Boisseau adds that they were prepared by a boy and left in the snow for about half an hour at which time the sugar forms were removed and left to finish drying on planches aérées. Only Baird refers to decorative wooden moulds: "for the sugar cakes a board of basswood is prepared, about five or six inches wide, with moulds gouged in, in the form of bears, diamonds, crosses, rabbits, turtles, spheres, etc."²⁶

Comparison of the Iconographic and Written Sources

Both iconographic and written sources provide abundant, though different, information on the techniques and tools used in the traditional methods of maple sugar fabrication. They indicate that the axe and the brace-and-bit or auger were both used in tapping trees and that the axe continued to be used at least into the 1870s. However, the written sources give more detail -- the dimensions of the cut, the size, depth, and angle of the drilled hole, and the distance of the cut from the base of the tree. The iconographic sources can provide only an approximate idea of the size of the cuts or their distance from the base of the tree and information such as the upward slope of the drilled hole is impossible for them to depict. The writers also provide more information on the shape, dimensions, and material of the spiles, since objects that small were difficult to depict in detail, with the exception of Julien's close-up (fig. 7).

Collecting troughs are well described in both sources with the written sources also giving dimensions and the number of troughs made. Less precise information is available about other containers though the written sources imply that everyday vessels were used as sap-collecting receptacles earlier than troughs and Carlile and Martindale refer to covers and tin troughs and buckets. However, the illustrations do inform the viewer that these other containers were made of wood, were varied in style, and were sometimes suspended from the tree.

The important step of transporting sap from the tree to the boiling-down container is hardly mentioned by the writers, except for Weld and Boisseau, while it is a popular subject for the artists who have illustrated several modes of transportation in detail. The writers do not mention the use of a yoke and even descriptions such as "petite traine à leur cou" or "ils charoyent l'eau dans des seaux...et ce en raquette" give no information on the type of sledge or toboggan, the type or

material of the seaux, or the style of the snowshoes. Even Weld's account is largely a suggestion for improvement, not a description of what he observed. Only the CIN reporter in 1871 mentions the use of piping or tubing, an innovation which is not depicted in any of the illustrations, even those dating after 1871. Julien's 1877 illustration (fig. 7) is the only source to indicate the use of metal pails or buckets for transporting sap.

The presence of a wooden barrel close to the fire is illustrated by all but one of the artists and is almost ignored by the writers. However, the viewer can only assume that this illustrated barrel was a sap reservoir; it might also have been used for storing syrup, as mentioned by Baird.

Two authors give detailed descriptions of the sugar cabin -- the shape, dimensions, and materials used, the presence of a roof vent, and the interior arrangement. Reference to the use of the sugar maker's home is also found in the written sources. However, the variations in shape and size of the cabin and the methods, materials, and general crudeness of construction are more clearly indicated by the iconographic sources even though they are not well drawn in many cases. The same is apparent in comparing the means of suspending the kettle. Baird and the CIN reporter provide excellent descriptions of the procedure, yet the illustrations provide the same information more accurately and with much less possibility of confusion.

The iconographic sources clearly depict large, footed and unfooted kettles but do not indicate either their material or volume. The written sources are more specific in these details but tend to be ambiguous when terms such as "potash" or "boiler" are used.

Although the writers mention a "slow," "brisk," or "bon" fire, they seem to take the fire for granted. The artists not only depict the fire, including the use of the feu de roche, but also emphasize its importance by illustrating a wood pile or a man chopping wood.

The procedures followed in boiling down maple sap to syrup and sugar are much better described in the written sources. Boisseau, Kalm, and Baird in particular provide information on the length of the process, precautions taken to avoid boiling over or burning, ways of testing the readiness of the sugar, the production of two kinds of sugar, and various other procedures. The use of clarifying agents is also discussed.

In comparison most of the iconographic sources simply portray one or more kettles being tended with a long-handled utensil. Additional information must be inferred and is open to interpretation. For example, the suspension of more than one kettle over the fire, especially when they are of different sizes as in figure 6, may indicate the process of emptying partially boiled-down kettles into other kettles, as described by Baird and Kalm. On the other hand, the artist may simply be illustrating the presence of several kettles over the fire. As another example, figure 5 and possibly figure 3 may indicate the practice of boiling down the sap to sugar in two stages, requiring two fires, as described by Baird. However, the presence of two fires in figure 3 and the portrayal of both a feu de roche and a kettle in figure 5 could also have other interpretations (see pages 5, 7). Julien more definitely indicates the use of a fast and a slow fire in his illustration of moulding (fig. 7), but the eggs shown in the same work could be interpreted either as a clarifying agent or as provisions for the sugar makers.

Most of the information available on tools used in the boiling-down process is provided in Julien's 1877 close-up (fig. 7). Many writers adequately describe the tools but Boisseau's reference to a "spatule ou palette de bois franc...percée au milieu..." is not as informative as Julien's illustration of the same thing. However, Julien has not informed the viewer how and for what purpose the tool is used. Problems of interpretation are again present in Baird's description of a "long handled paddle which looks like a mush-stick." Without knowing what a mush-stick looks like the description is of little value.

Interestingly, both types of sources indicate that moulding the sugar required little experience since Boisseau mentions that a young boy prepared the moulds while Krieghoff illustrates a young child filling the moulds. Both sources also indicate that the sugar could be poured or spooned into the moulds. The methods shown in the illustrations suggest two kinds of maple sugar -- loaf sugar which could be poured and dry, granulated sugar which had to be placed in the moulds with a utensil. Written sources describe different kinds of moulds including bowls, birch bark vessels of various sizes, basswood boards with gouged-out shapes, and tin moulds. The iconographic sources do not indicate the same variety but do provide details of a sectioned wooden mould.

Both iconographic and written sources indicate that new modes of fabrication were being introduced long before the end of the nineteenth century and that sugar producers were at least thinking of improvements in the late eighteenth century.

The artists illustrate the use of the feu de roche and of metal pails or buckets while the writers mention tubing and piping, tin moulds and troughs, covered containers, and the use of felt to strain the syrup. Since innovations are shown or mentioned in conjunction with traditional methods and traditional methods continue to be described long after references to innovations, it is evident that the traditional and the new were used simultaneously and that the adoption of new methods was gradual and inconsistent.

Neither source provides detailed information on the type of sugar camp represented and the personnel involved in sugar making. Figure 1 seems to illustrate a family group while figure 7 may be suggesting it by the presence of women and a child. Weld refers to families who were involved in sugar production. Baird implies the presence of a family group augmented by many of the local inhabitants but also adds that three men and two women were employed to do the work. Baird describes a five-mile journey to a permanent sugar camp while Boisseau refers to an

impermanent camp some distance in the forest. The illustrations suggest both permanent and impermanent sugar camps and the presence of a man-drawn sledge may indicate the camp's inaccessibility. However, little else can be extracted from the iconographic sources on the type and location of the camps represented.

Evaluation of Sources

Iconographic sources have several important limitations which hinder their usefulness in studying a traditional technology. A major hindrance is the artistic rendition itself. No matter what the medium, the depiction of details or the representation of texture or material is difficult. The problem is reinforced if engravings have been made from the sketches as is the case in the illustrated news journals. Distortion is increased even more if the researcher is working from a reproduction of the original, especially if it is a black and white reproduction of a coloured original or if the original has been reduced in size in the reproduction. Artistic liberties, such as exaggeration of size, affect the information presented. For example, the observer cannot be sure if the three-sided shelter was a very common style or if the artists preferred it in order to portray simultaneously both the inside and the outside of the cabin.

Another limitation is the inability to illustrate small objects or details and objects which are not entirely visible. For example, the viewer is not informed of the shapes of utensils shown dipped in the kettles. Nor is it possible for the sources to indicate that the hole drilled in the tree slants upwards.

The iconographic sources are limited in the information they can provide on volume and exact measurements and dimensions. Only relative or comparative information is available on size and distances and this is affected greatly by the artist's technique and use of perspective. Also, it is possible that an artist may increase the size of a small object to aid in its depiction. Such distortion may be evident in some of the illustrations of spiles.

Another obvious shortcoming is the difficulty of depicting types of material. The presence of wood is often successfully shown but it is not possible to indicate the type of wood used. In the same manner metal can be successfully illustrated, as in figure 7, but a specific type of metal is not possible to represent, at least not in a black and white illustration. In many cases, however, it is not even possible to determine whether an object is made of wood or metal.

The major limitation of iconographic sources is in interpreting the objects and procedures illustrated. This problem is very apparent in the various interpretations which can be made from figures 3 and 5. Further, to interpret correctly the various steps and procedures portrayed the researcher must have previous knowledge of maple sugar fabrication. For example, even though figure 7 carefully illustrates a palette with a hole in it, its function cannot be properly interpreted unless it is known from other sources that it was used to test the readiness of the syrup. It is of interest that the short titles used in figure 6 aid in proper interpretation.

However, the iconographic sources also have advantages for the researcher. Most important is the information they contain on shape, style, method of construction, and arrangement and relation of parts of an object, details which can be described in written sources only with difficulty. The use of artistic devices such as close-ups also assist the viewer. Finally, iconographic sources do provide evidence about the procedures and techniques involved in a traditional technology although intelligent interpretation is necessary to extract the information.

Written sources also have a number of limitations. Even a very detailed written description of an object cannot indicate its exact style and shape and may even confuse the reader. This is apparent to some extent in the descriptions of the cabin or of the means of suspending the kettle. Writers also tend to forget to mention the obvious or everyday, a very serious limitation

in understanding a traditional technology. For example, the importance of transporting the sap or maintaining the fire is almost ignored in the written sources. Although the written sources are capable of providing exact dimensions or measurements, or information on the type of material used, more often than not the writer does not include these useful details. The interpretation of very general words such as "vessel" or "utensil," or of very specific but uncommon words such as "mocock" or "mush-stick" is another problem.

On the other hand, written sources provide time and duration. We are informed by two precise, though contradictory statements that it takes twenty-four hours for the sap to boil down to syrup and that "il faut deux bonnes heures de cuisson pour la former en sirop et deux autres heures pour le sucre...."²⁷ The sources indicate when the sap season occurs as well as very specific times such as the transportation of the sap to the place of boiling at five o'clock.

The written sources are also able to describe processes which are difficult if not impossible for the iconographic sources to depict and to describe them in proper order. For example, Boisseau informs the reader that the cabin is built first, then the troughs are made, and when conditions are right the trees are tapped.

Cause and function are also more evident in written material which, for example, may not describe the man-drawn sledge in detail but can inform the reader why it was used. Similarly the writers explain why the axe continued to be used even though the auger or brace-and-bit was less harmful or why it was necessary to stir the sugar constantly. The urgency of the process, the need for care and cleanliness, the necessity of hard work, and the proper weather conditions are also described in written sources as are other aspects of maple sugaring such as the uses and marketing of the final product.

The sources chosen for this study may not always have depicted or described the subject clearly, but nothing appears to have been intentionally distorted. It should be emphasized that a more random selection of sources could have lowered the overall quality of the content and thus greatly altered the final evaluation. Only sources which were judged to be fairly accurate and detailed were considered in the initial selection while a number of others of dubious value were discarded. In many respects both iconographic and written sources are equally helpful to the researcher studying a traditional technology, the degree of usefulness depending not on the type of source but on the ability of the individual artist or author.

It is apparent that iconographic sources can include large amounts of detailed and accurate information on the tools and techniques of a traditional technology. Although written sources can describe many more aspects of a technology and can more easily provide information on procedures, iconographic sources are more useful in describing the objects used. It is also apparent that when studying a traditional technology the researcher should use as many types of sources as possible since each has its weaknesses as well as its advantages.

NOTES

1. Raymond Vézina, Cornelius Kreighoff (Ottawa: Éditions du Pélican, 1972), pp.185, 188.
2. Marius Barbeau, Henri Julien (Toronto: Ryerson Press, 1941), p.39.
3. Canadian Illustrated News, 6 May 1871.
4. Benjamin Sulte, Mélanges Historiques (Montréal: G. Ducharme, 1921), p.38.

5. Pierre Kalm, Mémoire adressé à l'Académie Royale de Suède. Cited in Joseph-Noël Fauteux, Essai sur l'Industrie au Canada sous le régime français, vol. 2 (Québec: Proulx, 1927);
- J.C.B., Voyage au Canada dans les Nord de L'Amérique Septentrionale fait depuis L'An 1751 À 1761 (Québec: Léger Brousseau, 1887);
- Isaac Weld, Travels through the States of North America, and the Provinces of Upper and Lower Canada during the years 1795, 1796 and 1797, vol. 1 (1807; reprint New York: Johnson Reprint Corporation, 1968);
- Lieut. W.O. Carlile and Col. Martindale, Recollections of Canada (London: Chapman and Hall, 1873);
- Elizabeth Thérèse Baird, Reminiscences of Early Days on Mackinac Island, 1802. Cited in Marius Barbeau, "Maple Sugar: Its Native Origin," Royal Society of Canada Transactions, 3d ser., vol. 40, section 11 (1946), pp.83-86;
- Nicolas-Gaspard Boisseau, Mémoires de Nicolas-Gaspard Boisseau (Lévis: n.p., 1907);
- Canadian Illustrated News (hereafter CIN), 6 May 1871. (The work cited may have been Joseph Bouchette, A Topographical Dictionary of the Provinces of Lower Canada [London: Longman, Rees, Orme, Brown, Green and Longman, 1832].)
6. Fauteux, Essai, p.400.
7. J.C.B., Voyage, p.150.
8. Carlile and Martindale, Recollections, p.45.
9. Boisseau, Mémoires, p.82.
10. Weld, Travels, p.381.
11. Fauteux, Essai, p.258; CIN, 6 May 1871.
12. J.C.B., Voyage, p.150.
13. Boisseau, Mémoires, p.82.
14. Ibid.
15. Carlile and Martindale, Recollections, p.45.
16. Boisseau, Mémoires, p.82.
17. Ibid.

18. Barbeau, "Maple Sugar," pp.84-85.
19. Fauteux, Essai, pp.397-400.
20. Boisseau, Mémoires, pp.81-83.
21. Fauteux, Essai, p.398.
22. Barbeau, "Maple Sugar," p.84.
23. Boisseau, Mémoires, p.82.
24. Fauteux, Essai, p.400.
25. J.C.B., Voyage, p.100.
26. Barbeau, "Maple Sugar," p.85.
27. Boisseau, Mémoires, p.82.

BIBLIOGRAPHY

In addition to the sources mentioned in the notes and captions, the following works were also consulted:

- Barbeau, Marius. Painters of Québec. Toronto: Ryerson Press, 1945.
- Brissot de Warville, J.P. New Travels in the United States of America 1788. Translated by M. Soceanu Vamos and D. Echeverria. Cambridge, Mass.: Harvard University Press, 1964.
- Chateaubriand, François-René de. Travels in America, 1791. Translated by R. Switzer. Lexington, Ky.: University of Kentucky Press, 1969.
- Dupont, Jean-Claude. Le Sucre du Pays. Montréal: Éditions Leméac, 1975.
- Fellows, Myrtie. Maple-Sugaring, The Way We Do It. Brattleboro, Vt.: Stephen Greene Press, 1972.
- Séguin, Robert-Lionel. La Civilisation Traditionnelle de L'"Habitant" aux XVII^e et XVIII^e siècles. Montréal: Fides, 1967.

Séguin, Robert-Lionel. Les Moules du Québec. Musée National du Canada, Bulletin no. 188. Ottawa: 1963.

_____. "Petite et Grande Histoire de la Cabane à Sucre." Vie des Arts 45 (hiver 1967), pp.40-45.

Snell, J.F. Maple Sap Products and the Canadian Standards. London: Vacher and Sons, Ltd., 1914.

Spencer, J.B. L'Industrie du Sucre D'Érable au Canada. Ottawa: Ministère Fédéral de l'Agriculture, 1913.

Vaillancourt, C. Nos Érablières. Québec: Ministère de l'Agriculture, 1927.