

THE HARRY ARMSTRONG BARN:

A DATE WITH THE PAST

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MAD Lab Report 2005-05

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Abstract

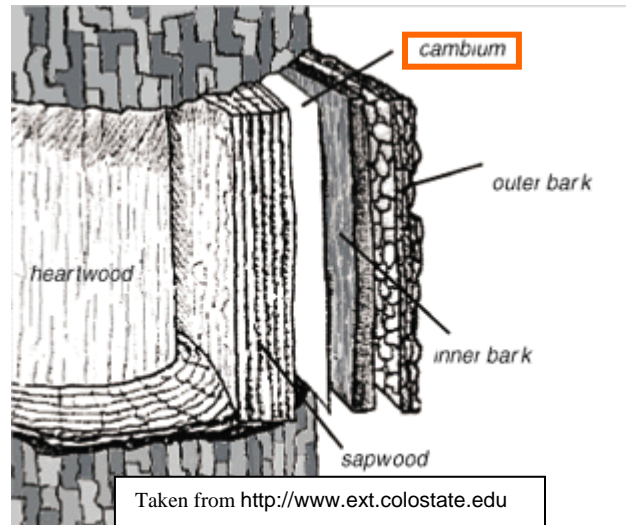
This project consisted of dating a barn of undetermined age, that was hypothesized to be of Acadian origin by the owner Harry Armstrong. The barn is located in the town of Falmouth, Nova Scotia. Increment core samples were taken from beams and joists with a standard coring tool. The samples were glued and secured in mounting canes and given laboratory identification numbers. The cores were sanded to enhance the ring boundaries, and excess wood from the samples was utilized for wood identification in a Scanning Electron Microscope (SEM) analysis. Three types of wood were determined to be predominant in the structure: *Abies balsamea* (balsam fir), *Pinus strobus* (white pine) and *Picea* sp. (probably red spruce). From a dendrochronological analysis, it is clear that the trees used in the building of the barn were cut between 1767 and 1770. Since it was not usual for wood to be cut and stored for a long period of time, the barn was most probably built in 1771.

Introduction

Dendrochronology

Dendrochronology is the study of tree rings and is based on a very simple process. In trees and shrubs, just under the bark, layers of cells are produced by a tissue called the cambium. On the outer side it generates the bark and on the inner side it forms wood. In seasonal climates such as in Canada, the growth of those layers slows and ceases with the harsh season. Therefore, each annual layer of wood or ring can be distinguished, thus making it measurable.

Moreover, each annual ring is representative of the environmental conditions in which the plant grew: in favorable conditions the tree produces a wide ring and in adverse conditions a narrow ring. Applications are far reaching and include climatology, ecology, forestry, archaeology, biogeography, and geomorphology. For this study we will be using the annual growth rings to date a barn that is suspected of being Acadian from the pre-deportation period, i.e. before 1755. Advantages of this method are 1) it is a non-destructive method of dating buildings and 2) it is accurate to the year.



History

The first Acadian settlement was established in 1604 at Sainte-Croix Island an area that had been inhabited by Mi'kmaqs for thousands of years. The first winter at

Sainte-Croix proved itself too difficult for the Acadians to continue settlement in the area, thus it was abandoned and relocated to Port-Royal (1605). There the fertile flood plains of the Fundy tidal basin provided the agricultural foothold the colony required. Also with the help of knowledge transferred to the French by the Mi'kmaqs, they were able to adapt to their new environment and survive the harsh winter conditions. After the successful colonization of Port-Royal, more colonies were established in Beaubassin (1672)



and Grand-Pré (1682). Territorial wars between France and England would ultimately lead to the Acadian deportation that took place between 1755 and 1763. Today there are Acadian communities throughout Atlantic Canada (see map, previous page). At this point in time there are no dated pre-deportation Acadian houses found in the area. In light of the 400th anniversary of the first Acadian settlement in 2004, there has been a significant emphasis on Acadian culture and heritage. The discovery of a pre-deportation building would not only be highly significant for Acadians but for the Maritimes and Canada as well.

The Harry Armstrong barn

This project consisted of dating a barn of undetermined age, but possibly of Acadian origin. It is owned by Harry Armstrong and is located in the town of Falmouth, Nova Scotia (see map, previous page). The Acadians had settled at the junction of the



Avon and Sainte-Croix rivers around 1685, an area they called Piguit (Brun, 2005). In 1759, the dykes near the barn were destroyed during a storm and the high ground where the barn is currently located was almost an island. The current barn is composed of two sections: a larger newer addition and a smaller older section suspected of having been built before the Acadian deportation (see photo at left). The Planters arrived in the area in 1760 and it is known that some Acadian buildings were still standing at some site in the Piguit region

(Brun, 2005). Investigations by Bernard LeBlanc (personal communication) supplied evidence that an Acadian barn and house were allotted to the Planters owning the concession in 1760 where the Harry Armstrong barn is now (appendix).

The objective of this project is to date the age of the older section of the Harry Armstrong barn and to confirm or infirm it's pre-deportation Acadian origin.

Fieldwork and methods

Fieldwork

A field trip was conducted in March of 2005 to Falmouth Nova Scotia where sampling was conducted on the Harry Armstrong Barn. Samples were taken from beams and joists with a standard dendrochronological increment coring tool. The location of the samples were detailed in a site report, were given a local



number and placed in plastic straws for protection, storage and transportation.

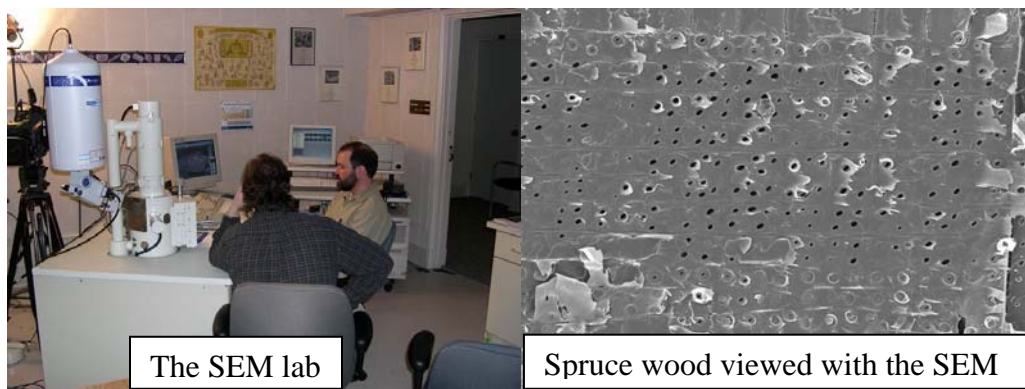
Sample treatment and laboratory work

The samples, already naturally dried, were glued and secured in mounting canes and given a laboratory number. After the glue dried, the cores were then progressively sanded from 120 to 600 grit sandpaper to enhance the ring boundaries (Fritts 1976).

The measurement of ring widths was completed using the WinDendro™ tree ring scanning system available in the Mount Allison University Dendrochronology Lab (MAD Lab, <http://www.mta.ca/madlab>) to a precision of 0.001mm. The use of this semi-automated measuring program was essential in reducing sources of error. The data was then saved in Microsoft Notepad™, transferred to Microsoft Excel™ then utilizing the program DeltaGraph™ each sample's growth was plotted and graphs were produced. Each individual graph displayed growth curves that were to be used in the crossdating process. Crossdating is a technique that compares growth patterns of an unknown age - in this case the tree-ring series taken from the Harry Armstrong barn - to that of a known age. The latter, called a reference chronology, was taken from the Christ Church (Karsdale, Nova Scotia) tree-ring data.

Crossdating not only requires the measurement of tree rings but also the use of the same species of wood. It was previously determined that the construction of the church was made with spruce. Therefore, it was important to know if the type of wood used in the construction of the barn was also spruce.

Excess wood from samples, not required for the measuring process, was utilized for wood identification and taken to a Scanning Electron Microscope (SEM) at the Mount Allison University Digital Microscopy Lab. Anatomic structures of the samples were observed at various magnifications, and diagnostic characteristics were sought. Wood samples were also viewed under a dissecting microscope to search for the presence or absence of resin ducts to distinguish the type of wood. For example, spruce and pine have resin ducts where fir has none; also resin ducts from white pine are bigger than those of spruce.



Finally, crossdating was made by comparing ring-width curves of spruce samples from the barn with that of the Christ Church using graphs and a light table.

Results

The SEM results along with the resin duct identification using the dissecting microscope in the MAD Lab enabled three types of wood to be determined as predominant in the structure: *Abies balsamea* (fir), *Pinus strobus* (white pine) and *Picea* sp. (spruce). The sample segregation according to species shows that four samples of the Harry Armstrong Barn were spruce. They were therefore compared to the Christ Church samples for crossdating. We also attempted dating the other samples and we were successful in doing so.

Examples of matching patterns are displayed in the next three graphs (Figures 1, 2 and 3) which show a strong correlation with the late 1760s being the harvest date of trees that were used to build the old part the barn.

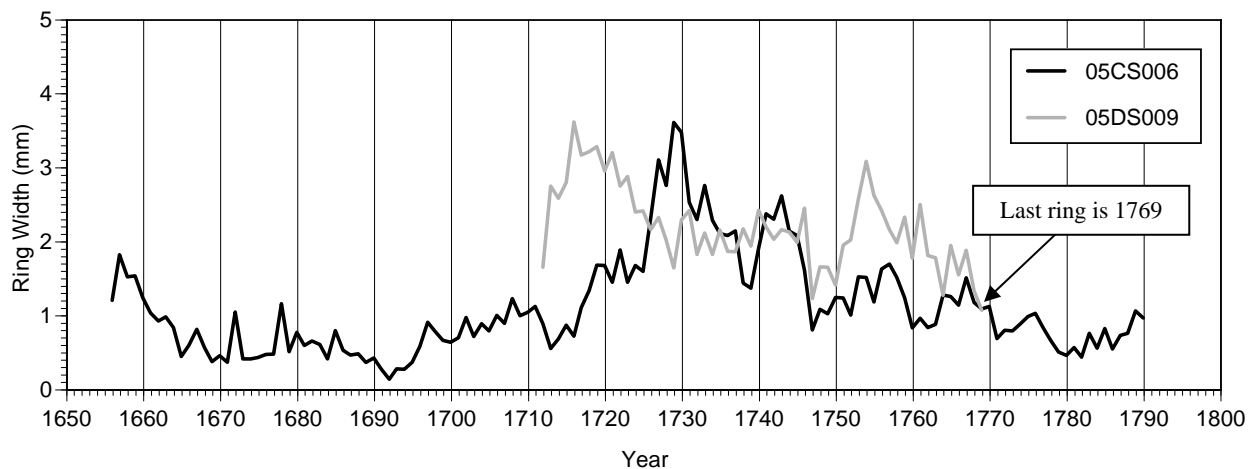


Figure 1: Matching patterns of growth curves from the Christ Church (05CS006) and a spruce sample from the Harry Armstrong barn (05DS009).

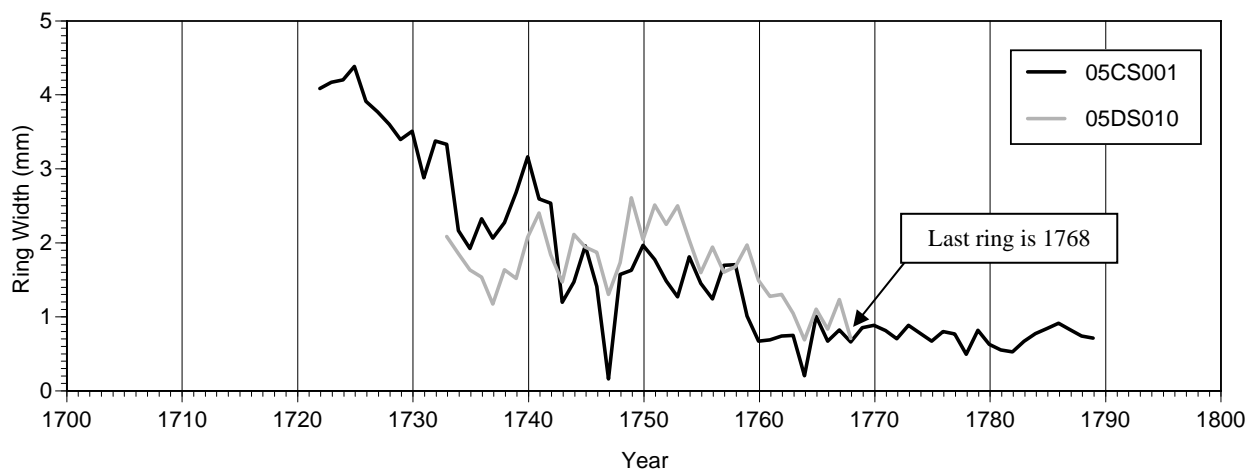


Figure 2: Matching patterns of growth curves from the Christ Church (05CS001) and a spruce sample from the Harry Armstrong barn (05DS010).

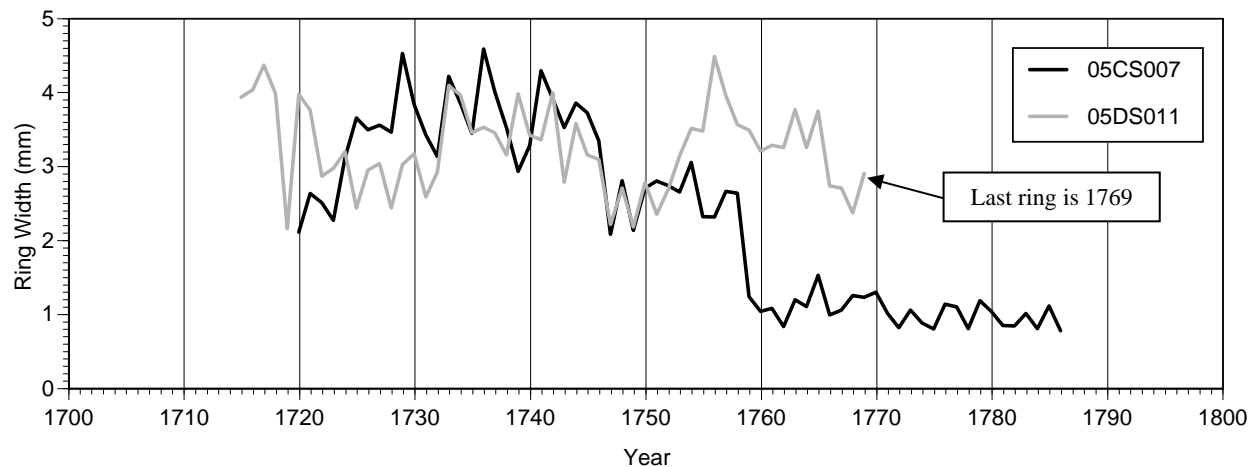


Figure 3: Matching patterns of growth curves from the Christ Church (05CS001) and a white pine sample from the Harry Armstrong barn (05DS011).

Results of the wood identification and the crossdating of all samples are summarized in table 1 below. Note that some samples had missing rings. That is why no cut date could be determined for them.

Table 1: Wood identification and crossdating results from the Harry Armstrong barn samples.

Lab number	Field number	Species	Position in house	Last ring status	Last ring date	Cut date
05DS001	HA1-1	White pine	Wall post	missing rings	1757	
05DS002	HA1-2	Fir	Ceiling/wall beam	last ring present	1769	1769
05DS003	HA1-3	Spruce	(not noted)	missing rings	1759	
05DS004	HA1-4	Fir	(not noted)	last ring present	1770	1770
05DS005	HA1-5	Fir	(not noted)	last ring present	1769	1769
05DS006	HA1-6	Spruce	Ceiling beam	last ring present	1767	1767
05DS007	HA1-7	Fir	Ceiling beam	one ring missing	1769	1770
05DS009	HA1-9	Spruce	(not noted)	last ring present	1769	1769
05DS010	HA1-10	Spruce	Post	missing rings	1768	
05DS011	HA2-11	White pine	Ceiling beam	last ring present	1769	1769
05DS012	HA2-12	Fir	Ceiling beam	missing rings	1765	
05DS013	HA2-13	White pine	Inner wall post	last ring present	1770	1770

From the dendrochronological analysis, it is clear that the trees were cut between 1767 and 1770. Since it was not unusual for wood to be cut earlier and left to dry to avoid any distortion of the lumber, the barn was most probably built in 1770 or the year after.

Conclusions

With the information garnered by crossdating, the **date of harvest** has been determined as **1767-1770**.

It is further hypothesized that the trees were harvested in the late fall or winter, because the final growth ring on the samples, when present, is a complete year's growth. It is also felt the logs after being felled were allowed to "sit" for some time while construction began perhaps in the spring of 1771. Therefore we hypothesize the **year of construction** for the Harry Armstrong Barn to be **1771**. This excludes its' potential Acadian pre-deportation origin, but is a witness of early Planters colonization of the Falmouth area.

Finally it is important to realize the necessity to identify buildings of this class and period of construction. These heritage buildings can easily be misidentified and torn down because of redundancy. It was the great hope of this project team to confirm this building's unique heritage as well as its lineage. It is further hoped that this research will lead to the discovery of further buildings of this type and genre in the Falmouth area.

Acknowledgments

The research team would like to dedicate this work to the late Mr Harry Armstrong and his son Mr Richard Armstrong. We would also like to thank Leadership Mount Allison, Dr Kathleen Flanagan and the MAD Lab for their support. The Mount Allison University Biogeography class of winter 2005 contributed to the whole process.

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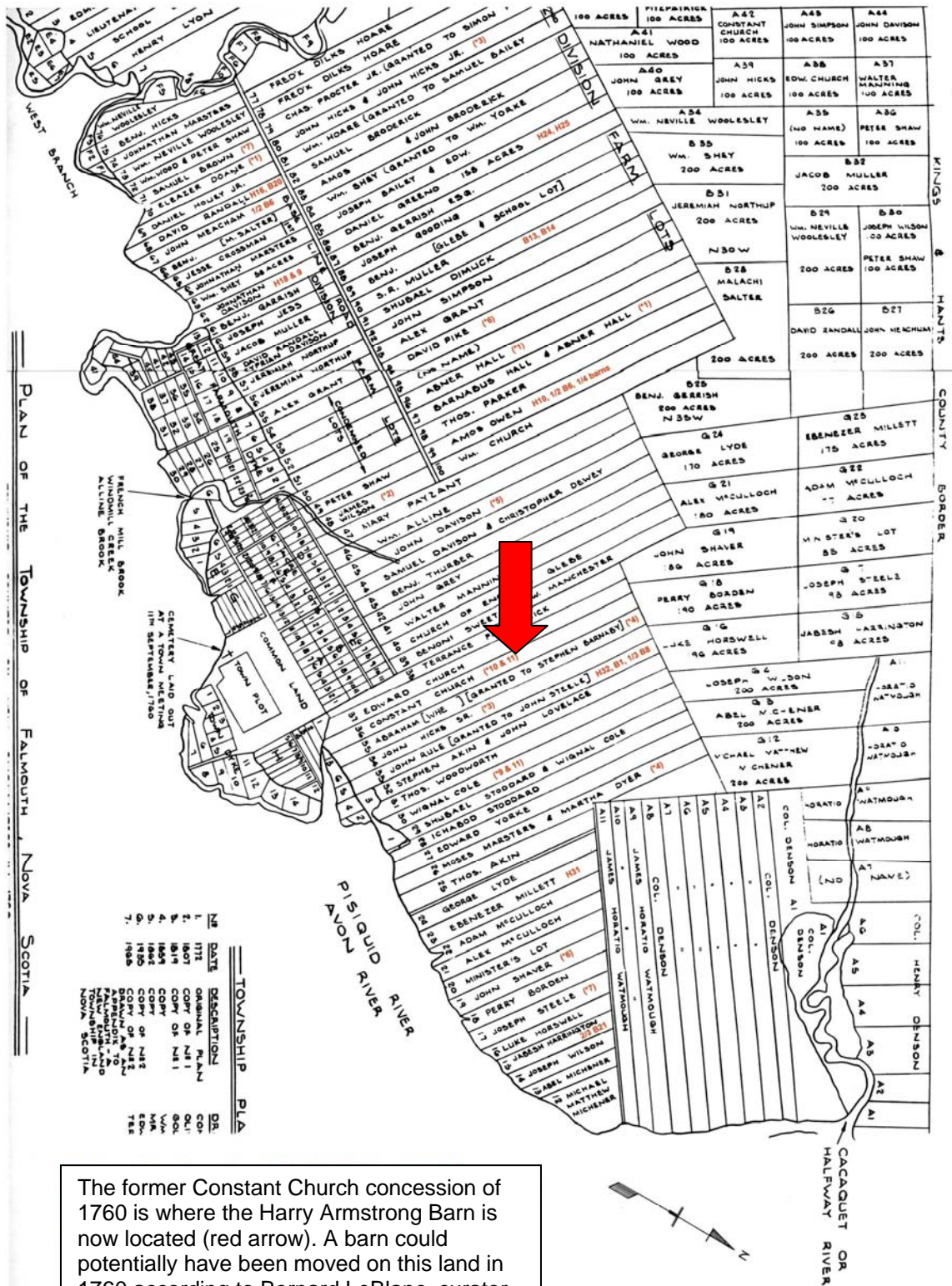
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Appendix



The former Constant Church concession of 1760 is where the Harry Armstrong Barn is now located (red arrow). A barn could potentially have been moved on this land in 1760 according to Bernard LeBlanc, curator of the Musée Acadien, Université de Moncton (personal communication).