

The Richardson Site Revisited: Examination of Plant Remains and Dates from a Late Pickering Site

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The Richardson site has proven difficult to place culturally and temporally within the Early Ontario Iroquoian tradition. In revisiting this problem, a sub-sample of unanalyzed water-screened material from the 1976 investigation was selected from features within House 1 and Midden 1 for examination and the recovered floral material was counted and identified. My results confirm those of Robert Pearce, who originally excavated the site, that maize was the only cultigen present. I conclude, however, that the site was most likely occupied only during the winter months and not, as previously thought, on a year-round basis. To clarify the temporal placement of the Richardson site two radiocarbon assays were performed. When calibrated and combined with the previous radiocarbon dates from the site, at least two occupations are suggested. Early Ontario Iroquoian people were using the natural resources of the site area at about A.D. 1100. Radiocarbon dates and the archaeological evidence also support a main occupation date of the Richardson site at A.D. 1300-1400.

The role of migration and diffusion in the introduction of cultigens and origins of Iroquoian society is an active area of study and debate within Ontario archaeology (Crawford et al. 1998:125). Based upon ethnographic and archaeological sources, maize (*Zea mays*), beans (*Phaseolus vulgaris*), cucurbit (*Cucurbita pepo*), sunflower (*Helianthus annuus* var. *macrocarpa*), and tobacco (*Nicotiana rustica*), none of which are native to Ontario (Crawford et al. 1998:125), are known to have been grown before contact in southern Ontario (Fecteau 1985:iv).

Archaeological evidence for maize is rare on sites in Ontario between A.D. 600 and 1000 (Fecteau 1985:130). During the second half of the early agricultural stage, from A.D. 800 to 1000, maize is found both on Glen Meyer and Pickering sites (Fecteau 1985:126). The earliest diagnostic kernels recovered from Glen Meyer sites have been clearly identified as Eastern Eight-Row corn (Crawford et al. 1997:117). However, Eastern Eight-Row corn is found archaeologically in large quantities only after A.D. 1000 on these sites (Williamson 1990; Crawford et al. 1997:115).

After the period A.D. 1000-1300, maize (*Zea mays*) is consistently present on Early Iroquoian sites (Fecteau 1985:131). Some archaeologists argue, however, that the practice of horticulture

was limited in scope during this period (Williamson 1990:313). Despite the fact that maize has been recovered from every excavated early Pickering village site "it is not really until the fourteenth century, or in post-Early Iroquoian times, that intensive use of cultigens is evident" in the archaeological record (Williamson 1990:306).

Between A.D. 1000 to A.D. 1300, other cultigens are also present on sites in varying quantities (Fecteau 1985:138). The last stage of the agricultural period, A.D. 1300 to A.D. 1650, is characterized by a substantial increase in the number of sites yielding preserved cultigens (Fecteau 1985:139). During the Uren and Middleport stages (ca. A.D. 1300 to 1400) the permanent settlement patterns begun during the Glen Meyer and Pickering stages continue with a marked increase in the number of sites in which preserved maize is recovered and which are also located on sandy upland areas near a source of water (Fecteau 1985:146-7).

The Richardson Site Excavation and Re-analysis

The Richardson site (BbGl-4), excavated nearly 30 years ago and containing substantial quantities of corn in the absence of other cultigens, was

originally defined as an early Pickering site and placed in a ninth century context. New evidence requires a re-evaluation of its temporal and cultural setting. Located at the boundary of Northumberland and Durham counties, approximately eight kilometers southeast of Rice Lake, the Richardson site was initially thought to be an early Pickering village occupied on a year-round basis. Excavation of the site was undertaken primarily as an extension of the Trent Valley Archaeological Survey, which was carried out between 1967 and 1969. During the 1976 excavation of the Richardson site (Figure 1), two longhouses were partly excavated, two separate palisades were discovered and a small midden was excavated (Pearce 1977b:15). Six hearths were discovered within House 1 (Pearce 1977b:18).

Floral Analysis

Analysis of the light fraction flotation filters by Rudy Fecteau under the supervision of Prof. McAndrews revealed a number of botanical remains, including raspberry (*Rubus*), spikenard (*Aralia*), lamb's quarters (*Chenopodium*), catchfly (*Lychnis*), smartweed (*Polygonum*), sumac (*Rhus*) and elderberry (*Sambucus*) seeds, as well as butternut (*Juglans*) fragments (Pearce 1977b:59). The only known cultigen recovered from the Richardson site was charred maize, represented by kernels. Based upon the recovered floral assemblage, it was concluded that the inhabitants of the Richardson site had a mixed economy, with corn horticulture and a variety of native plants supplementing an established hunting and fishing tradition in the area. The remaining heavy fraction from the water-screened material from the excavated features was only recently analyzed (Murphy 2006).

From the schematic drawing of House 1 (Figure 1), it appears that the settlement followed typical early Iroquoian longhouse patterns, with a central row of six hearths surrounded by small post moulds, internal support post moulds, and refuse and storage pits (Pearce 1977a:60). Only the water-screened material from features with a direct association with House 1 was examined for this study, providing a sample size of eleven features.

The methods described here include only identification and interpretation; methods of recovery have previously been described (Pearce 1976a, 1977a). After the selection of the sample size, the previously water-screened heavy fraction from the excavation features from House 1 was sifted through a series of nested sieves with aperture sizes ranging from 2 millimetres to 850 micrometres. Following Pearsall's (2000) recommendation, a two-layer split between the sampling fractions, one greater than two millimetres (>2mm) and one smaller than two millimetres (<2mm), was employed. Hand sorting, the most common method of processing sieved material, was employed. Hand sorting of the two size fractions for each sample was done to separate out the relevant archaeological material, charred botanical remains, from inorganic material and modern organic contaminants such as rootlets and small twigs (Pearsall 2000:100). The sieved samples were sorted mechanically into several categories: bone, shell, charcoal, carbonized floral material, pottery and inorganic material.

The results from the water-screened material were similar to the results from the original analysis done by Rudy Fecteau, with the finding that maize was the only cultigen present at the Richardson site (Tables 1 and 2). No seeds from weedy species, such as spikenard, lamb's quarters, catchfly, smartweed, raspberry or elderberry seeds, which were previously identified in the 1976 analysis, were recovered in any of the water-screened samples selected for this study.

It was noted, however, that the majority of the preserved kernels from the water-screened material were fragmentary, unlike the previous study, which reported a majority of kernels largely intact. In addition, a number of different native species were discovered, albeit in small quantities, from the flotation samples. None of these same species was recovered from the water-screened material. In contrast, a large number of charred and uncharred sumac seeds were recovered from the water-screened samples but not the flotation samples. This could be attributed to the large size and density of sumac seeds.

Prof. J. McAndrews, in assisting in the identification of the recovered floral material, noted

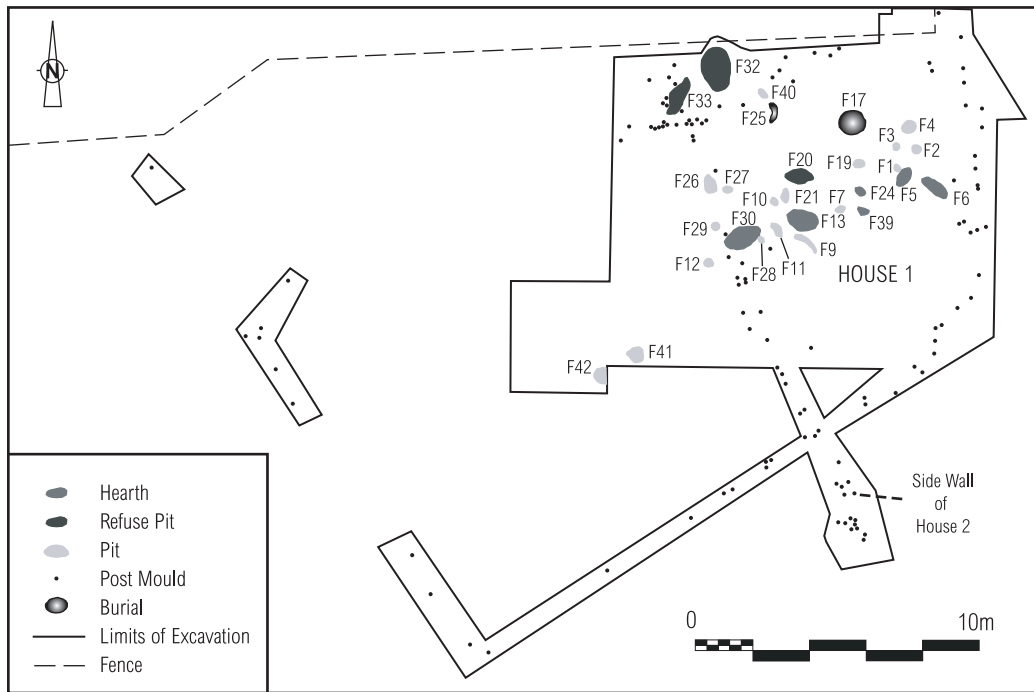


Figure 1. House excavation area at the Richardson site (after Pearce 1977a:17). Midden 1 is located approximately 15 metres south-east of House 1.

Table 1. Total floral remains from both the Fecteau (1976) and Murphy (2005) studies.

Plant Species	1976 Flotation	2005 Water-screened	Total
	Light Fraction	Heavy Fraction	
Spikenard (<i>Aralia</i>)	3	0	3
Lamb's quarters (<i>Chenopodium</i>)	3	0	3
Catchfly (<i>Lychnis</i>)	1	0	1
Smartweed (<i>Polygonum</i>)	7	0	7
Sumac (<i>Rhus</i>)	8	137 uncharred, 49 charred	194
Raspberry (<i>Rubus</i>)	89	0	89
Elderberry (<i>Sambucus</i>)	5	0	5
Corn (<i>Zea mays</i>)	93	2 whole kernels, 33 half & 95 fragments	223
Butternut (<i>Juglans</i>)	11 shell fragments	3 shell fragments	14

the masticated nature of some of the charred maize fragments from the water-screened material, indicating that these fragments had potentially passed through the human, or possibly canine, digestive system. Although different parts of dried maize were known to have been used as a fuel source, in this instance it would appear that dung, containing undigested particles of maize, was being utilized as a fuel source within House 1. This would enhance the chance of preservation of these maize fragments and would be one possible explanation for the presence of charred maize fragments in pit features inside House 1.

In general, the examination of the water-screened material from House 1 yielded many carbonized maize kernels and charred and uncharred sumac seeds. A bias could be seen from both recovery techniques. The relatively larger macro-botanical remains, such as sumac seeds, are not readily recovered during the flotation process and no small seeds, such as raspberry, elderberry, smartweed or spikenard—and only three nut shell fragments—were discovered from the water screened material. Combining these two recovery methods can increase the size of the known floral assemblage. Thus, the water

Table 2. *Recovered floral remains by feature.*

Feature	Feature Type	Filter Screen 1976	Water Screened 2005
F2	pit	indeterminable	none
F3	pit	indeterminable	half a kernel and one fragment of charred corn and 5 uncharred sumac
F5	hearth	indeterminable	4 uncharred sumac
F7	pit	indeterminable	1 corn fragment, 1 uncharred sumac, 3 butternut shell fragments
F8	ash pit	1 corn kernel	3 corn fragments, 1 uncharred sumac
F9	pit	3 raspberry seeds, 1 elderberry seed	6 corn fragments, 9 uncharred sumac
F10	pit	1 corn kernel	N/A
F11	pit	1 corn kernel	9 corn fragments, 4 charred sumac, 4 uncharred sumac
F17	pit	4 raspberry seeds, 3 sumac seeds, 3 lamb's quarters seeds, 1 corn kernel	N/A
F19	pit	none	2 corn fragments, 2 whole corn kernels, 14 charred sumac, 31 uncharred sumac
F20	refuse pit	3 raspberry seeds, 1 sumac seed, 1 smartweed seed, 1 corn kernel	14 corn fragments, 28 charred sumac, 73 uncharred sumac
F21	pit	3 raspberry seeds, 1 corn kernel	3 half corn kernels, 6 corn fragments, 2 uncharred sumac
F27	pit	indeterminable	1 half corn kernel, 9 corn fragments
F32*	refuse pit	2 sumac seeds, 25 raspberry seeds, 1 elderberry seed, 23 corn kernels	not examined
F33*	refuse pit	2 sumac seeds, 4 raspberry seeds, 1 elderberry seed, 18 corn kernels	not examined
Midden 1	midden	3 spikenard seeds, 1 catchfly seed, 7 smartweed seeds, 36 raspberry seeds, 2 elderberry seeds, 6 corn kernels	28 half kernels, 44 corn fragments and 3 charred sumac, 7 uncharred sumac

*not included in total

screened and flotation material together reveal that the inhabitants of the Richardson site had a mixed economy, which consisted of maize horticulture, but was supplemented by other native species, such as raspberries, elderberries, spikenard, lamb's quarters, and butternuts.

Temporal Placement of the Richardson Site

There is some contention among Ontario archaeologists whether Pearce was correct in his interpretation in placing the Richardson site within the early Pickering Phase, at about A.D.

850. A radiocarbon date of 635±80 B.P. obtained from an undisturbed pit context within House 1, was rejected by Pearce (1976b) (Table 3). He argued that it was "archaeologically unacceptable since Richardson falls early in the Pickering sequence" (Timmins 1985:85), largely based upon his interpretation of the recovered ceramic material. Pearce also rejected this date as it was considered outside the known temporal range of the Pickering Branch at the time, with the latest accepted date then being from the late thirteenth century Bennett site (Pearce 1977a:59).

As Pearce thought his 635±80 B.P. date indicated a discrepancy in the site dating, he sent a

Table 3. *Uncorrected and calibrated radiocarbon dates from the Richardson site.*

Feature	Radiocarbon Age (B.P.)	Sample No.	Calibrated Age (1 σ)	Relative Probability (1 σ)	Calibrated Age (2 σ)	Relative Probability (2 σ)
F11	510 \pm 70	TO-12243	1318-1352	0.278	1291-1512	0.984
			1390-1450	0.722	1601-1616	0.016
F20	635 \pm 80	I-9651	1286-1329	0.436	1245-1245	0.001
			1340-1396	0.564	1252-1437	0.999
M1	950 \pm 60	TO-12244	1025-1058	0.282	991-1213	1.0
			1065-1068	0.022		
			1071-1155	0.696		
F25	1120 \pm 80	I-9871	783-788	0.022	688-1038	1.0
			815-843	0.119		
			859-997	0.825		
			1005-1012	0.034		

charcoal sample from a burial context for assay. This sample produced a date of 1120 \pm 80 B.P. which was accepted by Pearce as consistent with the Richardson ceramics and a relatively early placement within the known Pickering sequence. In fact, this is the earliest recorded radiocarbon date in southeastern Ontario for the Pickering branch (Timmins 1985:85; Pearce 1977a:59). Hence, paradoxically, the Richardson site has produced both the earliest and latest known radiocarbon dates for a Pickering branch site in southeastern Ontario.

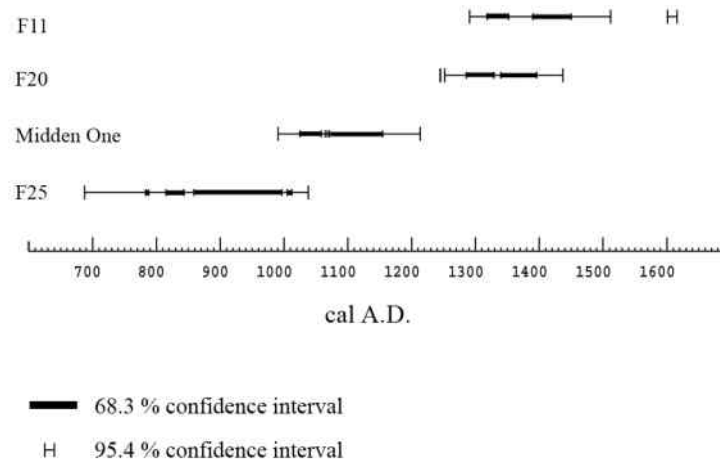
To further clarify the temporal placement of the Richardson site within the Early Ontario Iroquoian sequence, and to provide results comparable with the initial investigation, two samples of wood charcoal from the original excavation were sent to the University of Toronto's IsoTrace Laboratory for normal precision AMS (accelerator mass spectrometer) quick-turn-around radiocarbon dating. Pretreatment for humic acid was requested for both samples. Both samples were corrected for natural and sputtering isotope fractionation, which was measured using the $^{13}\text{C}/^{12}\text{C}$ ratios. The radiocarbon dates were calculated using the Libby ^{14}C half-life of 8033 years (Beukens 2005:2). Visual inspection suggested the carbonized material was free of fungal or bacterial contamination and contained relatively few rootlets and dirt particles. The choice of carbonized material for dating purposes was limited. It was also noted that the site was possibly exposed to commercial fertilizers from past agricultural activities. Several large pieces of wood charcoal wrapped in tinfoil from the 1976 excavation from Midden 1 were selected (total weight, 6.3 g). Pearce suggests that this midden

was contemporaneous with House 1, based upon matching rim sherds found in both locations (Pearce 1977a:24). Specifically, "[a] large portion of a ceramic vessel was excavated in situ in the middle at a depth of 30 to 40 cm, and 2 rim sherds from different locations within House 1 fit this vessel" (Pearce 1977a:24). The other sample was taken from Feature 11, classified as a small pit inside House 1. Two samples of carbonized wood charcoal, both from the secure context of Feature 11, were combined into one sample (16.5 g).

As in the initial investigation of the Richardson site, the two radiocarbon dates generated from wood charcoal from Midden 1 and F11 produced what initially appeared to be conflicting results.

Significantly, both radiocarbon dates came back much later than the previously accepted radiocarbon date (1120 \pm 80 B.P.) upon which Pearce based his placement of the Richardson site. For Midden 1, a later date of 950 \pm 60 BP was obtained, likely corresponding to a date range of cal A.D. 1025-1058 and 1071-1155 at 68.3 percent confidence (1 σ). For F11, a later date of 510 \pm 70 B.P. was obtained, likely corresponding to a date range of cal A.D. 1318-1352 and 1390-1450 at 1 σ . Radiocarbon information is shown in Figure 2 and Table 3 for all four samples—calibrated date ranges corresponding to areas under the probability curve for 1 σ and 95.4 percent (2 σ) confidence intervals, as calculated by the CALIB 5.0.2 programme using the intercal 4.14c data set (Stuiver et al. 2005). Calibrated ranges indicate the existence of two or three clusters of dates. A single cluster is represented by the considerable overlap in the distributions for F11 and F20. The dates from Midden 1 and F25 show slight overlap, which may indicate either one or two events.

Figure 2. Radiocarbon dates from the 2005 Richardson site re-analysis.



Explanation of Radiocarbon Dates

Recent recalibration of Early Iroquoian radiocarbon dates (Smith 1997a) has revealed an interesting pattern—most dates calibrate to the twelfth or thirteenth century. For those sites with more than one date, the characteristic pattern is a spread of thirteenth-century dates and an eleventh-century date or earlier (e.g., Boys, Elliott, Force, Grafton, Richardson: all have calibrated dates in the thirteenth century, in coherence with ceramic seriation dates (Warrick, 1990, pp. 176-180), but they also have one or more anomalous dates in the ninth-eleventh century range) [Warrick 2000:437].

The Grafton site (BaGm-9), a multi-component Pickering site, excavated in 1995 and 1996 by York North Archaeological Services, produced fourteen radiocarbon dates from the wood charcoal. They show a similar pattern to the one Warrick describes, with dates ranging between cal A.D. 790 and 1285 (Dibb 1997:10-12). Like Richardson, a human burial produced an early radiocarbon date of cal A.D. 1010 (Dibb 1997:12). Warrick (2000:438) argues that anomalous “early” radiocarbon dates for all of the sites listed above can be attributed to the “old wood” problem: women and children collected deadfall from the forest floor, representing 200-300 year old trees (Fecteau et al.

1994:6). If so, then according to Warrick, “most Early Iroquoian site clusters were established sometime between A.D. 1100-1150” and “archaeological data support an Early Iroquoian colonization and clearance of southern Ontario’s primeval hardwood forest circa A.D. 1100-1150” (Warrick 2000:438).

It is possible that the earlier occupation showing up in the radiocarbon dating at the Richardson site could be caused by the old wood problem, accounting for the 100-200 year gap between the late cluster (F20, F11) and the more recent of the two earlier dates (Midden 1; Figure 2). However, this appears to be a relatively simplistic explanation for the complex problem of dating Early Ontario Iroquoian sites.

Based upon the archaeological data from the Richardson site, I feel that an occupation circa A.D. 1100-1150 is too early. I think it is more probable that local groups of people were in the vicinity of what was to become the Richardson site at an early date, burying their dead in the area. This activity is represented by F25, a single adult male burial under House 1, near the north wall, and “Feature 17...a small ossuary-type pit 70 cm in diameter containing the disarticulated remains of at least 5 individuals—3 males and 2 females, all adults” (Pearce 1977a:25).

Unlike F17, which appears to have been used as a storage pit before becoming a burial pit, F25

appears to have served solely as a burial pit. It is difficult to ascertain if F25 is associated with House 1 based upon the excavated post moulds. It appears that F25 is approximately a metre from the side-wall of posts within House 1 (Figure 1), suggesting, perhaps, that House 1 was built atop this grave. The grave goods in F25, notably food offerings, appear to have been deliberately placed in the burial (Pearce 1977a:25-6).

The Iroquoians practised a form of upland swidden agriculture (Fecteau et al. 1994:6). Maize was cultivated by clear-cutting the oak-hickory/maple-beech forests indigenous to southern Ontario (Warrick 2000:417). "Middle and Late Iroquois site catchment areas are estimated to have had radii of approximately 1.5-2 km. It was within this area that crops were grown and essential resources such as firewood were gathered" (Sutton 1990:51). Fecteau et al. (1994:2-3) argued that Iroquoian villages had semi-circular as opposed to circular agricultural catchments. The semi-circular arrangement of cornfields would have provided equal distance from the forest and cornfields to the village. This would have minimized travel-time, suggesting that equal importance was given to hunting-gathering and corn horticulture (Fecteau et al. 1994:5).

Sutton (1990:51) argued that abandoned agricultural fields were a resource that would attract new inhabitants to the same area after a number of years and that one of the "major factors in the choice of an area for village relocation was the availability of large areas of secondary growth for village construction and corn field clearance" (Sutton 1990:51). Warrick and Molnar have suggested that Late Iroquoian groups took advantage of the secondary growth provided by previous clearing of an area for village relocation (Sutton 1990:51). It is possible, therefore, that this land was left abandoned for some time to allow regeneration of vegetation, thus allowing saplings to be available for construction of the two longhouses and the palisade at the Richardson site. This scenario is consistent with later dates (F11 and F20) from wood that could represent these saplings.

Like F25, Midden 1 is also associated with an early radiocarbon date, possibly due to initial activity by ancestors of inhabitants of the Richardson

site. It is likely that Midden 1 was used during the occupation of House 1 but was contaminated by earlier material. In addition, the large tree stump in the center of Midden 1 could have caused mixing of cultural material from different occupations. The precise location of dated wood charcoal within Midden 1 is unknown.

Anthropogenic Native Species

The ephemeral, earlier occupations represented by dated wood from F25 and Midden 1 (Table 3 and Figure 2) might have influenced the composition of the forest during the later occupation of the Richardson village. With human disturbance, anthropogenic species such as sumac, smartweed and spikenard would be favoured. During the winter season "great deposition of both human waste and other garbage near the settlement" (Monckton 1994:212) would most likely have occurred, facilitating the cultivation of anthropogenic species near the longhouses. Raspberry seeds were plentiful and a few native species were recovered from the feature content within House 1. These plants may have been growing around the disturbed areas near the longhouses and were being utilized as a quick and easily gathered food source. This could also perhaps account for the abundance of both charred and uncharred sumac seeds found within the features of House 1.

Indeed, the presence of a large number of charred sumac seeds from relatively undisturbed feature fill leads one to suspect that they were being used in some cultural manner. In terms of ethnobotanical knowledge, it is believed that a tart drink, rich in vitamin C, was made from the ripe fruit. The bark is known to have been used to create an astringent and the leaves, in combination with the bark, was used for tanning leather, due to the large concentration of tannins (United States Department of Agriculture 2005). Sumac was also used in treating a number of illnesses, particularly stomach problems. As these sumac seeds are from a relatively secure context, I would argue that they are contemporaneous with the occupation of the site rather than representing modern contamination.

Disturbance during earlier occupations might also have led to native species such as lamb's quarters and smartweed being used in greater quantities at the summer camps, where relatively little effort would be needed to exploit them. This would account for the paucity of native species within the features from House 1. It would appear that maize was being consumed in relatively large quantities during the winter months, based upon the high frequency of preserved maize kernels in comparison to other native species, aside from raspberry seeds, within the feature fill in House 1.

Cultigens

The floral analysis of the Richardson site revealed a number of preserved maize fragments and kernels. It suggests that cultivated maize was an important component of diet. Several grinding tools were recovered: "Five ground stone tools with an elongated shape and flat or rounded which are polished and pitted are classified as pestles" (Pearce 1977b:44). The abundance of faunal remains and the large number of seasonal camps in the area suggest there was no compulsion to adopt agriculture on a larger scale. Thus, limited horticulture supplemented an established pattern of gathering and hunting.

There are new data for the consumption of plants with a C_4 isotopic signature in southern Ontario as early as A.D. 500 (Harrison and Katzenberg 2003:241). However, the combined analysis of the C_4 isotopic signature from both carbonate and collagen confirms the previous understanding that maize did not become a dietary staple until approximately A.D. 1000 (Harrison and Katzenberg 2003:241). Maize "is the predominant plant food remain in post-A.D. 900 archaeobotanical assemblages across much of the Eastern Woodlands of North America" (Smith and Cowan 2003:118). According to Schwarcz et al. (1985:187): "maize consumption rose gradually to a maximum of 50% of the diet by A.D. 1400." The substantial quantities of charred maize fragments and kernels recovered from the site are, therefore, consistent with a later temporal placement than originally proposed by Pearce.

Although there is an abundance of charred maize kernels, there is no archaeological evidence for the preservation of other cultigens at the Richardson site, from either the 1976 or 2005 investigations, despite the fact that other cultigens are known to have entered southern Ontario by A.D. 1100 and to have been utilized in conjunction with corn. It should be noted, however, that squash and beans have never been as abundant as maize in archaeological sites in southern Ontario. Indeed, cucurbits are the rarest of cultigens (Monckton 1992:81). The cultural processing and preparation techniques used on beans and squash contribute to the fact that few macro-botanical remains of these cultigens are discovered archaeologically. Despite the Richardson site's close proximity to Rice Lake, no wild rice (*Zizania*) (Fecteau 1985:135) was found. It is my impression that the absence of wild rice, beans and squash cannot be fully explained by small sample size, taphonomy and recovery techniques.

Situating the Richardson Site Results

There is a:

relative paucity of comparative data from the Early Iroquoian sequence ca. A.D. 600 to 1000. This could be a function of the archaeological research focus on later sites, recovery techniques used, the relative scarcity of such sites, or destruction of such early sites due to expansion of European settlement [Fecteau 1985:17].

Ambiguous reporting of cultivated plant remains also contributes to this problem (Fecteau 1985:17). Since the 1970s there has been a growing body of literature on the investigation of palaeobotanical remains at archaeological sites, although few detailed studies have been published from the Early Ontario Iroquoian period.

One of the characteristics of the Early Ontario Iroquoian stage is the presence of maize horticulture. At the Richardson site, the only cultigen recovered from both investigations was maize, represented by charred kernels, which were classified as Northern Flint. At the Bennett site, all

17 recovered maize kernels were identified as Northern Flint from an Eight-Rowed cob (Wright and Anderson 1969:60). No mention is made, however, of the exact provenience or the techniques employed in recovering the preserved maize kernels. At the Boys site, ten kernels were recovered; less than half of them were identified as Eastern Eight-Row complex (Reid 1975:53; Fecteau 1985:Appendix 10). Butternut and beechnut fragments were also present at Boys (Reid 1975:53-4). Maize has also been recovered from other Early Ontario Iroquoian sites dated to about A.D. 1300, including the Force site with four kernels and the Stafford site with 57 kernels (Fecteau 1985:Appendix 10). Thus, recovery of cultigens from the Richardson site is consistent with other sites and supports the known subsistence pattern of corn horticulture for the Early Ontario Iroquoian period.

Although the presence of corn horticulture suggests a more sedentary lifestyle, the large faunal assemblages found on late Pickering sites, including Richardson, Boys, Bennett and Hibou, indicate that hunting and fishing were major components of diet and represent a large part of a mixed economy (Smith 1997:57). The dental analysis done by Patterson and Kingsnorth (1984:ix) revealed that the inhabitants of the Bennett site had a fully developed horticultural economy. Gathered food was an important component in the economy of the Bennett site. A similarly important role for gathered food is inferred for the Richardson site.

Fecteau (1985:138) makes a distinction between Glen Meyer and Pickering subsistence strategies. He argues that between A.D. 1200-1300 Glen Meyer subsistence is based on corn horticulture supplemented by hunting and much fishing. The Pickering branch had a similar subsistence strategy but “[t]he expansion of the Pickering branch and the increase in the number of Pickering sites suggests a population increase at this time, perhaps due to the inclusion of bean in their diet” (Fecteau 1985:135). The only confirmed Early Ontario Iroquoian common bean is from the Glen Meyer Kelly site, which dates to A.D. 1220-1285 (Crawford and Smith 2003:217). Isotopic research on human bone

collagen does not, however, support this claim. The introduction of beans into the native diet at about A.D. 1100 should “have caused a decrease in the ^{15}N content of human bone collagen because legumes are deficient in the isotope with respect to meat and fish” (Schwarcz et al. 1985:187). There was no significant change during the period from 2300 B.C to A.D. 1640 in the $^{15}\text{N}/^{14}\text{N}$ ratio in human bone collagen. Based on this finding, it does not appear that beans were a significant source of protein in southern Ontario during this time range (Schwarcz et al. 1985:187).

Beans may occur as early as A.D. 1200 but they have not been directly dated before A.D. 1300 and are rare in the archaeological record in southern Ontario up to this point (Hart and Scarry 1999). “[B]eans and by extension maize-beans-squash intercropping are not evident in the Northeast before ca. A.D. 1300” (Hart and Scarry 1999:653). Theoretically, all five cultivated crops should be found on Early Ontario Iroquoian sites by the end of the twelfth century (Williamson 1990:306). However, it is not until the early fourteenth century at the late Pickering branch Gunby site in Halton County that all five cultigens co-appear: corn, beans, squash, sunflowers (*Helianthus annuus*) and tobacco (*Nicotiana rustica*) (Fecteau 1985:169, 135). These cultigens have been recovered, albeit in small quantities, from other contemporaneous Pickering and Glen Meyer sites. Fecteau calculated that between A.D. 1200-1400, 15 percent of sites dated to this period possessed corn, 8.7 percent had beans, 9.3 percent had squash, 10 percent had sunflower and 23.6 percent had tobacco (Fecteau 1985:Appendix 11).

Tobacco is known from ethnohistoric and ethnographic records to have important cultural and ritual properties. No evidence for tobacco is found at the Richardson site, despite there being evidence for pipes: “one complete steatite pipe, 3 bowl fragments, and 3 pieces of curved, polished steatite which were probably parts of pipe bowls were found at Richardson” (Pearce 1977a:43); and “[a] total of 48 ceramic pipe fragments were recovered, including 23 bowl fragments with a portion of the lip intact, 14 other bowl fragments, and 11 stem fragments” were unearthed during the excavation (Pearce 1977a:35).

Another significant aspect of the Richardson floral assemblage was the fact that few weedy or native species were found from the 1976 flotation of the feature contents or recovered during the current analysis of the water-screened material. Although ethnohistoric records mention the gathering and use of native plants, few species have been discovered archaeologically. Evidence from the Eastern Woodlands of North America reveals that the adoption of maize into existing agricultural systems involved largely indigenous cultigens (Hastorf and Johannessen 1994:433). In southern Ontario there is, however, no firm archaeological evidence for the cultivation of indigenous plants. A taphonomic and recovery bias could lead researchers to underestimate the importance of the gathering of native plants in favour of more readily preserved cultigens, such as carbonized maize, as seen at the Richardson site. Thus, it is possible that the lack of native species can be attributed largely to preservation rather than recovery bias.

The Hibou site, part of the Bowmanville-Port Hope site cluster, has been radiocarbon-dated to the end of the thirteenth century and is a "semi-permanent village strategically located to exploit local resources" (MacDonald and Williamson 1994:9). Maize at the Hibou site has been AMS-dated to A.D. 1220±50 (TO-3844) and A.D. 1360±50 (TO-3845) (MacDonald and Williamson 1994) and appears to be as significant as it is at later sites in Ontario (Crawford and Smith 2003:209). Hibou is a particularly interesting late Pickering site due to the substantial quantities of cultigens and wild plant remains that have been recovered from the flotation samples from every feature (MacDonald and Williamson 1994:20). Indeed, maize kernels and/or cupules have been discovered in 70 percent of the features. Tobacco, a number of fleshy fruits and greens, including bramble and chenopod, and butternut, beech, and acorn fragments have also been recovered (MacDonald and Williamson 1994:33), leading the authors to conclude: "it would appear that like other Early Iroquoians, the Hibou site inhabitants continued to seek greater economic security through a significant reliance on naturally occurring resources"

(MacDonald and Williamson 1994:36). They further argue that the ubiquity of the maize kernels and cupules recovered from the Hibou site disproves the longstanding notion that the Eastern Iroquoian people were less involved in corn horticulture than their western counterparts. Combined with data from other Late Pickering sites, such as Richardson, Bennett and Gunby, data from the Hibou site provide growing support for the theory that late Pickering peoples were "no less committed to horticulture than their contemporaries in southwestern Ontario [and] contradict Wright's (1966) notion that the practice of horticulture by eastern Early Iroquoian populations was limited in comparison to western groups" (MacDonald and Williamson 1994:36).

Significantly, the Richardson site is 15 km north of the Bowmanville-Port Hope site cluster. MacDonald and Williamson (1994:13-15) hypothesize that the inhabitants of the Bowmanville-Port Hope cluster and the Rice Lake cluster were using the same sites. If so, the inhabitants of the Richardson site would have had access to cultigens grown at the Hibou site. Thus, one could ask why such a diverse floral assemblage was recovered from the Hibou site whereas only a limited amount of corn was recovered from the Richardson site. There are no physical impediments to cultivation at Richardson. Rather, it appears that there is a conscious selection of plants and a subsistence pattern that accords with the cultural affiliation of the inhabitants of the Richardson site.

This pattern suggests that the inhabitants of the Richardson site were more closely affiliated with Algonquin as opposed to part of the Pickering Branch of the Early Ontario Iroquoian tradition. "What people eat expresses who and what they are socially" (Hastorf and Johannessen 1994:435). In adopting corn horticulture, the inhabitants of the Richardson site could have been distinguishing themselves from their surrounding hunting and gathering Algonquin neighbours to the north and by not adopting the whole suite of cultigens known to their contemporary Pickering and Glen Meyer neighbours to the west, the Richardson site inhabitants were perhaps asserting their distinctive nature through their successful subsistence strategy.

Differences in sampling and recovery techniques used by archaeologists between and within Pickering and Glen Meyer sites make it difficult to compare floral assemblages. However, it would appear that Richardson is unique in the sense that not only was maize the only cultigen recovered, but also that seeds of native species such as sumac and raspberry comprise a large percentage of the total floral material. It could be that other earlier investigations did not record sumac seeds, regarding them as contamination.

Conclusions and Future Research

The six-week excavation of the Richardson site resulted in the partial uncovering of two long-houses, two sections of the palisade, a midden and several large refuse pits along the palisade. This is a relatively small area for a later Pickering village circa A.D. 1300-1400. The limitation of the sample size of the floral assemblage must be acknowledged.

The cumulative evidence of the calibrated radiocarbon dates from F20 and F11 (Figure 2), the large quantity of charred corn and an ossuary-type burial (F17) near House 1 suggests a later occupation, circa A.D. 1300-1400. This later occupation of the site is more likely to have occurred specifically within House 1 during the winter months. It is also possible that there was an earlier occupation at about A.D. 1100.

The paradoxical occurrence of both early and late dates from a number of Early Ontario Iroquoian sites in southern Ontario needs further investigation. If Sutton (1990) is correct, the relocation of settlements to previously cleared areas is one contributing factor. Early and late dates from the Richardson site are relevant to understanding the Early Ontario Iroquoian period in eastern central Ontario. They suggest that the chronology of the Pickering branch of the Early Iroquoian tradition needs to be reconsidered along with a more complex understanding of Pickering subsistence.

The abundance of the charred remains of maize indicates that corn horticulture was an important component in the subsistence strategy.

It provides further support for placing the Richardson village site occupation within the late (as opposed to early) Pickering stage and later in the Early Iroquoian sequence. Despite its late date, maize horticulture practised at Richardson was limited, compared to other more westerly situated contemporary Pickering and Glen Meyer sites.

Fecteau (1985) concluded that cultigens spread east and northward from their entry point into Southern Ontario. However, the timing and rate of diffusion throughout Ontario has not been re-considered in almost 30 years. The adoption of maize, squash, and beans into Eastern North America "was not straight-forward, rapid, and uniform across the region but, rather, a complex, culturally variable process that is still only known in broad outline" (Smith and Cowan 2003:122). "In eastern North America the early occurrence of maize also appears to have been geographically sporadic" (Hastorf and Johannessen 1994:433). The diffusion of maize throughout southern Ontario needs to be investigated through an examination of the palaeobotanical remains of maize recovered from known Early Ontario Iroquoian sites. "[C]hronological or spatial trends for a single taxon may be far more realistic" than trying to reconstruct palaeodiets (Miksicek 1987:239) during this time period.

Beans, squash and corn were commonly grown together. "By A.D. 1150-1250 maize, bean, cucurbit, and sunflower were all present in the Northeast" (Crawford and Smith 2003:211). Hence, the absence of cultigens other than corn at the Richardson site is notable. Recovery bias, and in particular feature bias within the small site area excavated, is likely a significant factor. A possible cultural factor is the interaction between and different food preparation techniques of the Early Ontario Iroquoian populations in the area and their Algonquin neighbours.

Uncharred sumac seeds that occur within relatively secure and undisturbed features within House 1 provide evidence for a winter occupation of this structure, supporting models of Early Ontario Iroquoian settlement that suggest villages were occupied largely during the winter

months and not on a year-round basis. However, plants and animals may be processed and stored for later use and consumption and it is difficult to state confidently that the Richardson site was only occupied during the winter months. Indeed, despite the presence of a number fish bones that were known to have spawned during different times throughout the year, one cannot state with certainty that the site was occupied throughout the year.

There was only one domestic dog (*Canis familiaris*) bone positively identified in the faunal collection from Richardson, comprising less than one percent of the total assemblage, and seven bones identified to the genus level, *Canis* sp., representing 4.1 percent of the total faunal collection (Pearce 1976a:54). It is known that stable carbon isotope ratios for dogs are similar to those of their human keepers (Harrison and Katzenberg 2003:228; 1989). We also know that dogs were consumed (Pearce 1976a:54). Stable isotopic analysis of canine bones could provide an indirect avenue for dietary analysis of Early Ontario Iroquoian populations.

Acknowledgements. I thank a number of people who contributed to the completion of this research and subsequent article. My former supervisor Professor Morgan Tamplin for his guidance in issues of palaeoecology and sampling theory. My supervisor Professor Susan Jamieson for her advice and assistance with the material from the Richardson site. Professor Anne Keenlyside for acting as a committee member. Dr. Mima Kapches, senior curator of Ontario Archaeology within the Anthropology Department at the Royal Ontario Museum, for acting as the external examiner for the defense. Professor J. McAndrews and Charles Turton, from the University of Toronto, Department of Botany, for their aid in floral identification and counsel in paleobotanical matters in Ontario. A special thanks to the department of Anthropology at Trent University for its financial support from the Richard B. Johnston fund, which allowed for the radiocarbon dating to be undertaken. And finally, Steven G. Monckton, of Archaeological Services Inc., and an anonymous reviewer for their helpful comments on the manuscript.

References Cited

- Beukens, R.P.
2005 Isotrace Radiocarbon Calibration Report: Output by calibration program C14CAL98. IsoTrace Radiocarbon Laboratory, University of Toronto, Toronto.
- Crawford, G.W., and D.G. Smith
2003 Paleoethnobotany in the Northeast. In *People and Plants in Ancient Eastern North America*, edited by P. E. Minnis, pp. 172–257. Smithsonian Books, Washington.
- Crawford, G.W., D. G. Smith, and V. E. Bowyer
1997 Dating the Entry of Corn (*Zea mays*) into the Lower Great Lakes Region. *American Antiquity* 62:112–118.
- Crawford, G.W., D.G. Smith, J.R. Desloges, and A. M. Davis
1998 Floodplains and Agricultural Origins: A Case Study in South-Central Ontario, Canada. *Journal of Field Archaeology* 25:123–137.
- Dibb, G.
1997 Archaeology. In *Memories of Haldimand Township: When the Lakes Roared*, edited by Haldimand's History Committee, pp. 9-12. Boston Mills Press, Erin, Ontario.
- Fecteau, D.R.
1985 The Introduction and Diffusion of Cultivated Plants in Southern Ontario. Unpublished MA thesis, York University, Toronto.
- Fecteau, R., J. Molnar, and G. Warrick
1994 Iroquoian Village Ecology. *Kewa* 94(8): 2-16.
- Hart, J.P., and C.M. Scarry
1999 The Age of Common Beans (*Phaseolus vulgaris*) in the Northeastern United States. *American Antiquity* 64:653-8.
- Harrison, R.G., and M.A. Katzenberg
2003 Paleodiet Studies Using Stable Carbon Isotopes from Bone Apatite and Collagen Examples from Southern Ontario and San Nicolas Island, California. *Journal of Anthropological Archaeology* 22:227-244.
- Hastorf, C.A., and S. Johannessen
1994 Becoming Corn-Eaters in Prehistoric America. In *Corn and Culture in the Prehistoric New World*, edited by S. Johannessen and C.A. Hastorf, pp. 427–444. Westview Press, Boulder.
- MacDonald, R.I., and R.F. Williamson
1994 The Hibou Site (AlGo-50): Investigating Ontario Iroquoian Origins in the Central North Shore Area of Lake Ontario. In *Origins of the People of the Longhouse*, edited

- by A. Bekerman and G. Warrick, pp. 9–42. Proceedings of the 21st Annual Symposium of the Ontario Archaeological Society, Toronto.
- Miksicek, C.H.
1987 Formation Processes of the Archaeobotanical Record. *Advances in Archaeological Method and Theory* 10:211-247.
- Monckton, S.G.
1992 *Huron Paleoethnobotany*. Ontario Archaeological Report 1. Ontario Heritage Foundation, Toronto.
1994 Reconstructing Local Environments: Strengths and Weaknesses of Archaeological Plant Macrofossils. In *Great Lakes Archaeology and Paleoecology: Exploring Interdisciplinary Initiatives for the Nineties*, edited by R.I. MacDonald, pp. 209-217. Quaternary Sciences Institute, University of Waterloo, Waterloo, Ontario.
- Murphy, C.A.
2006 The Richardson Site Revisited: an Examination of the Plant Remains and Dates from a Late Pickering Site. Unpublished MA thesis, Department of Anthropology, Trent University, Peterborough, Ontario.
- Patterson J.R., and D. Kingsnorth
1984 *A Diachronic Study of Dental Palaeopathology and Attritional Status of Prehistoric Ontario Pre-Iroquoian and Iroquoian Populations*. Mercury Series Paper 122. Archaeological Survey of Canada, National Museum of Man, Ottawa.
- Pearce, R.J.
1976a A Preliminary Report on the 1976 Excavations at the Richardson Site (7ND12) BbG1-4. Ms. on file, Department of Anthropology, Trent University, Peterborough and Ontario Ministry of Culture and Recreation, Toronto.
1976b 7ND12 Richardson Site Fieldnotes. Ms. on file, Department of Anthropology, Trent University, Peterborough.
1977a An Eastern Regional Expression of the Pickering Branch. Unpublished MA thesis, Department of Anthropology, Trent University, Peterborough, Ontario.
1977b Archaeological Investigation of the Pickering Phase in the Rice Lake Area. *Ontario Archaeology* 29:17-24.
- Pearsall, D.M.
2000 *Paleoethnobotany: A Handbook of Procedures*. 2nd ed. Academic Press, San Diego.
- Reid, C.S.
1975 *The Boys Site and the Early Ontario Iroquoian Tradition*. Mercury Series Paper 42. Archaeological Survey of Canada, National Museum of Man, Ottawa.
- Schwarz, H.P., J. Melbye, M.A. Katzenberg, and M. Knyf
1985 Stable Isotopes in Human Skeletons of Southern Ontario: Reconstructing Paleodiet. *Journal of Archaeological Science* 12:187-206.
- Smith, B.D., and C.W. Cowan
2003 Domesticated Crop Plants and the Evolution of Food Production Economies in Eastern North America. In *People and Plants in Ancient Eastern North America*, edited by P.E. Minnis, pp. 105-125. Smithsonian Books, Washington, DC.
- Smith, D.G.
1990 Iroquoian Societies in Southern Ontario: Introduction and Historic Overview. In *The Archaeology of Southern Ontario to A.D. 1650*, edited by C.J. Ellis and N. Ferris, pp. 279–290. Occasional Publication 5. London Chapter, Ontario Archaeological Society, London
1997 Radiocarbon Dating the Middle to Late Woodland Transition and Earliest Maize in Southern Ontario. *Northeast Anthropology* 54:37-73.
- Stuiver, M., P.J. Reimer, and R.W. Reimer
2005 CALIB Radiocarbon Calibration. <http://calib.qub.ac.uk/calib/>
- Sutton, R.E.
1990 *Hidden Amidst the Hills: Middle and Late Iroquoian Occupations in the Middle Trent Valley*. Occasional Papers in Northeastern Archaeology 3. Copetown Press, Dundas, Ontario.
- Timmins, P.A.
1985 *The Analysis and Interpretation of Radiocarbon Dates in Iroquoian Archaeology*. Research Report 19. Museum of Indian Archaeology, London.
- United States Department of Agriculture
2005 Plants Database. <http://plants.usda.gov/>
- Warrick, G.
2000 The Precontact Iroquoian Occupation of Southern Ontario. *Journal of World Prehistory* 14:415–466.
- Williamson, R.F.
1990 The Early Iroquoian Period of Southern Ontario. In *The Archaeology of Southern Ontario to A.D. 1650*, edited by C. J. Ellis and

- N. Ferris, pp. 291-320. Occasional Publication 5. London Chapter, Ontario Archaeological Society, London.
- Wright, J.V., and J.E. Anderson 1969 *The Bennett Site*. Bulletin 229. National Museum of Canada, Ottawa.
- Wright, J.V. 1966 *The Ontario Iroquois Tradition*. Bulletin 210. National Museum of Canada, Ottawa.

Il a toujours été difficile de placer le site Richardson (BbG1-4) culturellement et temporellement dans la tradition Iroquoise inférieure en Ontario. En revisitant ce problème, un sous-échantillon de matériel non-analysé recueilli par criblage à eau lors des investigations de 1976 fut sélectionné de certains constituants à l'intérieur de Maison longue 1 et Fosse à déchets 1 pour analyse. Les matériaux floraux furent comptés et identifiés. Pareillement aux conclusions de Robert Pearce, l'archéologue original du site, mes résultats confirment que le seul cultigène présent était le maïs. Par contre, je conclus que le site était probablement occupé durant les mois d'hiver, et non à l'année longue. Afin de clarifier le placement temporel du site Richardson, deux essais par datation au radiocarbone furent exécutés. Une fois calibré et combiné avec les datations au carbone 14 précédemment obtenus du site, au moins deux occupations sont suggérées. La population Iroquoise inférieure de l'Ontario utilisait les ressources naturelles autour du site vers 1100 apr. J.-C. La datation par radiocarbone et les preuves archéologiques supportent aussi une occupation de 1300-1400 apr. J.-C. au site Richardson.

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