CHAPTER 12

SETTLEMENT AND SUBSISTENCE CHANGE AT THE TURN OF THE FIRST MILLENNIUM: THE VIEW FROM THE HOLMEDALE SITE, BRANTFORD, ONTARIO

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On going research into the development of maize agriculture among the pre-Contact populations of the Great Lakes region underscores the complex, but not necessarily direct causal relationship between maize and increasing sedentism. Whereas many researchers formerly believed that the introduction of this cultigen ultimately revolutionized the subsistence-settlement systems of the majority of the Late Woodland (ca. A.D. 900–1650) populations of the Northeast, whether or not these new systems were accompanied by new people and/or a new language, such a simplistic position is no longer tenable.

The agricultural "revolution" in southern Ontario, like many others in the archaeological record, was by no means marked by a sudden transformation, as its full effects were not manifest until the twelfth or thirteenth century, during the Middle Iroquoian period (ca. A.D. 1300–1400), although again this was not necessarily experienced by every community or in every area. The ca. A.D. 500–1000 Princess Point complex of the Grand River valley has been seen as the core area in the transition to agriculture in southern Ontario, although the point—or more likely points—at which the other aspects of Late Woodland Iroquoian life that are so intimately associated with the local agricultural economic system crystallized within the Grand River drainage, remains to be discovered. This is the case too with respect to communities elsewhere in southern Ontario and the Northeast in general.

We still have a very poor understanding of intraregional variation in the histories of maize and northern Iroquoian sedentism, although it seems safe to assume that nowhere was there a simple cause and effect relationship between the adoption of maize and the development of sedentism. This was also true for populations that were neighbors to the northern Iroquoians. The Grand River valley remains one of the most promising areas in the Great Lakes in which to investigate such questions, as seen by the recent progress made by the University of Toronto research program headed by David Smith and Gary Crawford. The complete excavation of the Holmedale site, dating to ca. A.D. 1000, some 500 to 700 years after the first appearance of maize in the area, offers another opportunity to examine these and related issues.

THE PRINCESS POINT COMPLEX

The Holmedale site is one of numerous mid-to-late first millennium A.D. sites that have been found along the lower reaches of the Grand River between Brantford and Lake Erie. These sites (Figure 12-1), together with others within the region, were collectively defined as comprising the "Princess Point complex," which was marked, in part, by the introduction of cultigens to the region. Otherwise, however, it was believed that the settlement-subsistence systems of the previous Middle Woodland period (ca. 400 B.C.–A.D. 800) had remained virtually unchanged. Indeed, David Stother's (1977:122) original characterization of the basic Princess Point subsistence-settlement system proposed that for most of the period, communities followed an annual subsistence cycle involving interior fall and winter microband hunting camps, which were situated to exploit nuts and animals attracted to mast-producing forest, and larger spring and summer macroband settlements, which were located on major rivers and lakeshores in order to take advantage of rich aquatic resources. Warm season occupations likely also entailed limited agricultural pursuits, although for the most part subsistence-settlement patterns were consistent with the strategies of populations of the preceding Middle Woodland period. Stothers further suggested (1977:162–165) that the end of the Princess Point period (ca. A.D. 850) witnessed an intensification of food production and sedentism that heralded the onset of Early Iroquoian period (ca. A.D. 900–1200), resulting in another settlement

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pattern shift toward more sedentary communities situated in well-drained sandy uplands. Subsequently other researchers questioned various aspects of this model, suggesting, for example, that the archaeological record was not sufficiently detailed to allow the macroband/microband hypothesis to be rigorously tested (e.g., Fox 1990:179).

It has always proven difficult to incorporate the Princess Point complex within the existing culture history of southern Ontario. In his original description, Stothers (1977) argued that this cultural manifestation represented the original incursion of Iroquoians into southern Ontario sometime after ca. A.D. 400. This hypothesis lost support when Fox (1982, 1984, 1990) reassigned Stothers' "Point Pelee" focus of Princess Point to the ca. A.D. 600–900 Riviere au Vase phase of the Western Basin Tradition, which encompasses a series of Late Woodland manifestations on both sides of the Canada-United States border within the drainages of western Lake Erie, Lake St. Clair, and lower Lake Huron (Fox 1990; Murphy and Ferris 1990; Stothers and Pratt 1981). Fox (1982, 1984) also eliminated Stother's "Ausable" focus on the southeast shore of Lake Huron as being too ill-defined. The remaining Ontario focus on the Grand River was generally thought to represent cultural continuity and a genetic relationship between the preceding Middle Woodland populations and the subsequent Late Woodland (Early Iroquoian) communities of the region (e.g., Fox 1990; Molto 1983; Spence et al. 1990; Warrick 1990). An even more vaguely understood Sandbanks construct is characterized as a small number of widely dispersed sites at the eastern end of Lake Ontario and the north shore of the St. Lawrence River. These apparently date to the ca. A.D. 800–1000 period and have produced "Princess Point-like" ceramics (Curtis 2002; Daechsel and Wright 1988).

The Princess Point "complex" has also sat uncomfortably in the taxonomic framework that has generally underlain lower Great Lakes archaeology. Some authors (e.g., Ferris 1999; Ferris and Spence 1995; Fox 1990; Spence and Pihl 1984; Williamson and Robertson 1994) in recognition that these other mid-to-late-first millennium A.D. sites represent cultural developments that are intermediate between the patterns of the preceding Middle Woodland and subsequent earlier periods within the Late Woodland Iroquoian and Western Basin Traditions have a new category termed the "Middle to Late Woodland Transition" or "Transitional Woodland" in an attempt to overcome the constraints of the existing taxonomy. This assignment has been shown to be taxonomically problematic as well (Smith 1997a; Smith and Crawford 1997).

In the past decade or so, the Middle to Late Woodland transition has reemerged as an important topic of debate and research for a number of reasons. In the early- to mid-1990s, for instance, Dean Snow renewed the idea of Iroquoian incursion into New York and Ontario during the Middle to Late Woodland transition (Snow 1992, 1994, 1995a, 1995b). In Snow's model, the founding population of the Iroquoian-speakers of southern Ontario and west-central New York originated with the central Pennsylvanian proto-Iroquoian Clemson's Island complex. Snow characterized these Pennsylvanian groups as already possessing many traits associated with the Iroquoian cultural repertoire (in particular, maize agriculture and technologically more sophisticated ceramic vessel manufacturing traditions) prior to their expansion northward. He further asserted that these traits were in large degree mutually dependent; other distinctive Iroquoian traits, those of matrilineal descent and matrilocal residence patterns within palisades villages composed of longhouses, were seen as an adaptive response on the part of these small groups of immigrants to hostilities that arose between them and the native Algonquian-speaking groups of southern Ontario and New York. Originally, Snow (1992, 1994, 1995a, 1995b) proposed that this migration occurred ca. AD. 900, based on the "sudden" appearance of maize on Ontario and New York sites and apparent ceramic and other material culture and settlement pattern discontinuities between Middle Woodland and Princess Point traditions in Ontario and between Middle Woodland and Owasco in New York.

Snow's chronology was upset almost immediately by some of the results of a research program into the origins of agriculture in the lower Great Lakes that was initiated in 1993 by David Smith and Gary Crawford of the University of Toronto. This work initially involved site survey and excavation at Princess Point sites along the Grand River in the Cayuga area and at Cootes Paradise on Burlington Bay at the west end of Lake Ontario (Figure 12-1). Although perhaps presaged by Lawrence Jackson with his earlier research in the Rice Lake area (Jackson 1983), Crawford and Smith's most outstanding finding was that maize was present at several of the Cayuga sites as early as ca. A.D. 550 (Crawford et al. 1997; Crawford and Smith 1996; Smith 1997a; Smith and Crawford 1995, 1997). They further suggested that the overall span of Princess Point should be expanded to ca. A.D. 500–1100 and that Princess Point co-existed for several centuries with Middle Woodland cultural expressions to the west and east and with later Early Iroquoian manifestations from around A.D. 900 to A.D. 1000 (Smith 1997a; Smith and Crawford 1997). They also speculated that in the lower Grand River valley, "Princess Point society was dependent on food production as a subsistence regime" by ca. A.D. 1000, accompanied by "more centred communities" (Smith and Crawford 1997:27).

In response to Crawford and Smith (1996), Snow (1996) revised the timing of the proto-Iroquoian migration to around A.D. 600, but failed to account for the fact that

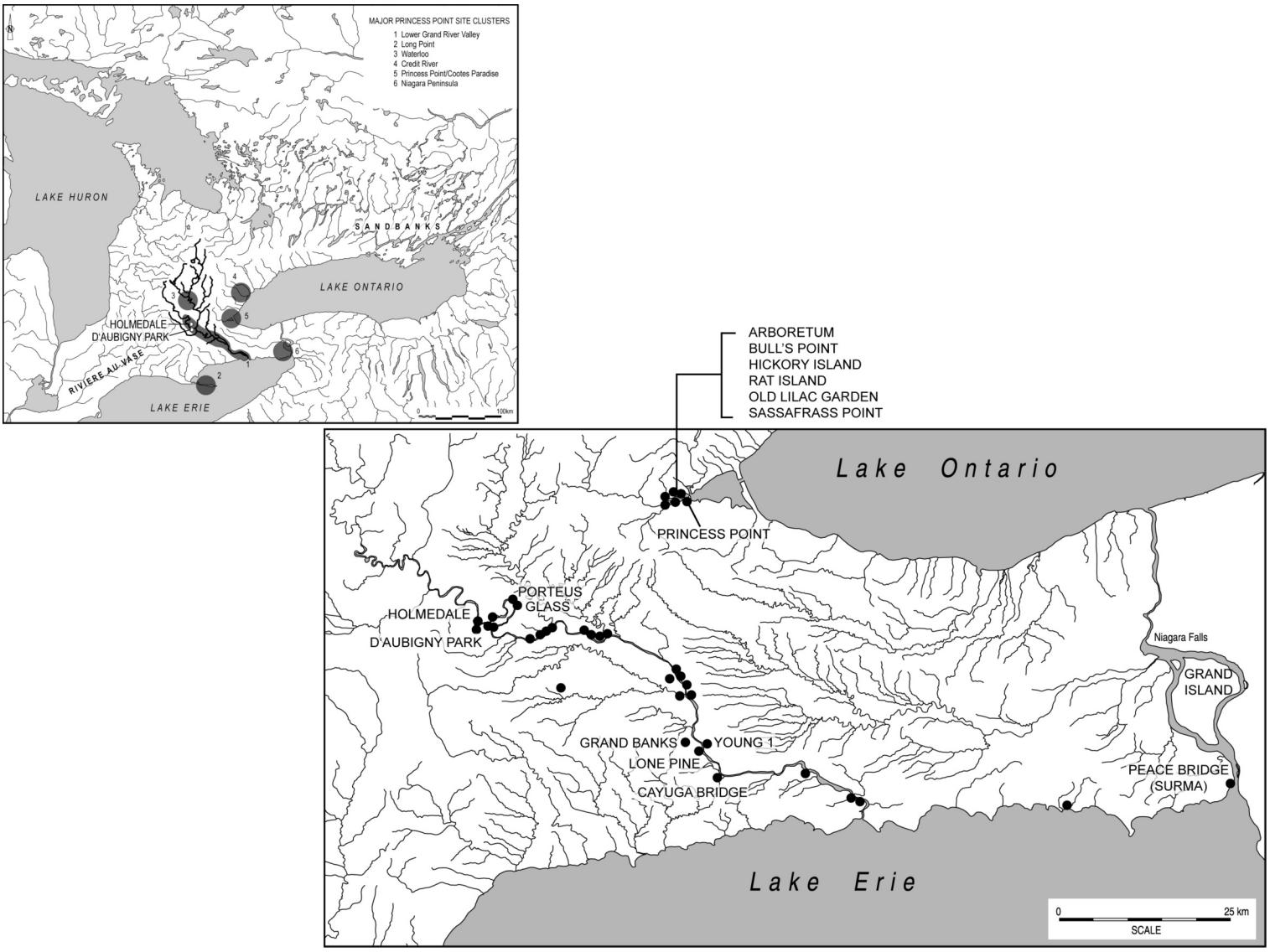

Figure 12-1. The location of the Holmedale site and other Princess Point site clusters in southern Ontario.

there is currently no evidence to suggest that maize was present on Clemson Island sites any earlier than on sites in Ontario (Hart 2001:170), nor for the fact that the status of Clemson Island vis-à-vis other contemporary regional groups requires further resolution (Hart and Brumbach 2003).

Other elements of Snow's arguments have been challenged as well. Many of the material cultural "discontinuities" cited as evidence for a population incursion in southern Ontario, for example, are oversimplifications of the archaeological record (Crawford and Smith 1996:788). The classic Middle Woodland ceramic wares of the Northeast (including Vinette 2 or Point Peninsula ware), for instance, feature vessels decorated with distinctive motifs executed by pseudo-scallop shell and dentate stamping, drag- (or push-pull) stamping and rocker-stamping often combined with incising. These vessels possess a distinctive conoidal shape. These were superseded by a more globular shaped, cord-wrapped stick decorated ware manufactured using somewhat different techniques, ca. A.D. 500–800. This change is viewed as partial evidence for this hypothesized population replacement. While changes in ceramic technology and styles certainly occurred during this period, they are not as revolutionary as the migration proponents have suggested. For instance, it is well known that classic Middle Woodland pottery was manufactured by coiling and that later pottery was constructed by modelling (or building by accretion or lamination). Snow (1994, 1995a, 1995b, 1996) and others (e.g., Bursey 1995) argue that modelling

represents an introduced technology. While coil breaks are uncommon in some ceramic samples from this period, Fox (1995:145) has argued that they occur in other samples with sufficient frequency to suggest a more gradual technological evolution. It might also be argued that the newer techniques were employed to make the pottery stronger and more resistant to coil breaks therefore representing a technological advance rather than replacement. Also linked to the new manufacturing technique is a perceived significant decrease in average wall thickness. While post-Middle Woodland vessels are undeniably thinner, empirical studies to document average vessel wall thickness over time (e.g., Braun 1983) have yet to be completed for northeastern ceramic samples. It remains a matter of speculation as to whether or not the results of such an analysis would show a one-time dramatic decrease in coil manufacture consistent with an introduced ware, or a gradual decrease consistent with increasingly refined manufacturing techniques. In the interim, a more cautious approach should be taken, given the existence of "post-migration period" vessel assemblages that exhibit attributes typical of the "pre-migration period." A complete vessel recovered from the Peace Bridge site in Fort Erie is a case in point. The reconstructed vessel, carbon encrustations on which have been AMS dated to 1330±60 B.P. (cal. 2σ A.D. 625–860, I-5243), has a classic Middle Woodland vessel shape including a conoidal body and conical base. It is undecorated, with a heavily cord marked exterior and smoothed interior, and is thus reminiscent of wares assigned to the ca. A.D. 900–1000 Hunters Home phase in New York (Ritchie 1965:253; White 1964:13). Although the context is post-Middle Woodland, the vessel's morphology is not; the more traditional vessel style was clearly persistent (Pihl 1997:404; Robertson et al. 1997:502–503). This is not an isolated example of continuity and overlap in the regional ceramic traditions of the Middle to Late Woodland transitional period (e.g., Smith 1997a; Gates St-Pierre 2001; Hart and Brumbach 2005). Rather than being indicative of population replacement, such patterns are more consistent with the idea that if Iroquoians truly were recent arrivals to southern Ontario, then it is more likely that they influenced the technologies, economies, and language of the local populations rather than replaced them.

A second case in point is the Scott-O'Brien site, a 0.4 hectare multi-component site situated on the Credit River west of Toronto. Ceramics recovered from over 100 pit features include substantial quantities of Early Woodland Vinette 1 pottery (ca. 800–400 B.C.), Saugeen and Point Peninsula Middle Woodland wares (ca. 400 B.C.–A.D. 500), as well as Princess Point ceramics (Williamson and Pihl 2002); in total an assemblage that suggests an unbroken tradition of site use. Similar continuities in site occupation have also been documented in the Rice Lake area, where many sites manifest an unbroken ceramic tradition spanning the Middle Woodland, the Middle to Late Woodland transition (Sandbanks), and Early Iroquoian periods (Curtis 2002).

Of course continuity in some areas and discontinuity in others is a possibility, and it may simply be too early to rule out migration as *one* of the processes involved in the Middle to Late Woodland transition (Smith and Crawford 1997: 28) and the spread of agricultural systems across large areas (Bellwood 2005). Nevertheless, the new migrationists have yet to provide a coherent argument outlining how a small intrusive population managed to displace or absorb the thousands of—presumably Algonquian-speaking—people distributed in geographically disparate regional groupings across southern Ontario and western and central New York, creating, in the process, an "island" of Iroquoian speakers in the middle of a "sea" of Algonquian speakers. Accordingly, Snow's hypothesis has been met largely with scepticism on the part of Great Lakes archaeologists (e.g., Clermont 1992; Crawford and Smith 1996; Engelbrecht 1992, 1999; Ferris 1999; Ferris and Spence 1995; Fox 1995; Hart 2001; Smith and Crawford 1995, 1997; Warrick, 1992, 2000; Williamson 1992; Wright 1992).

Historical linguists have also attempted to address this question through examining the origin and dispersal of Algonquian and Iroquoian languages, using glottochronology. Fiedel (1999), for instance, has suggested that a Proto-Algonquian language family emerged in the Great Lakes region during the Late Archaic period, ca. 1200 B.C. Cognate comparisons of Algonquian languages suggest a divergence of the Proto-Algonquian language family occurred sometime during the Middle or Early Late Woodland Period (ca. 500 B.C.–A.D. 900). Fiedel has suggested that the most likely archaeological complex responsible for the initial Proto-Algonquian expansion would be the Middle Woodland Point Peninsula Complex of southern Ontario. Point Peninsula spread north, giving rise to the Laurel Complex of northwestern Ontario, and east into New York, New England, and the Maritimes region ca. 200 B.C.–A.D. 200 (Fiedel 1999:198–199). Fiedel (1999, citing Fitting 1965; Ritchie 1965:207) notes that ceramic form and decoration during this time is virtually consistent through the greater Northeast area. This homogeneity was maintained through the early Late Woodland period (ca. A.D. 700–900) based on the trade in exotic material culture between Michigan, Ohio, Ontario, New York, Delaware, and Vermont (Fiedel 1999:199–201). Yet the validity of the Point Peninsula "Complex" as a real cultural entity is questionable and it may be preferable to regard Middle Woodland populations as politically autonomous with a mobile hunter-gatherer economy and flexible group boundaries (Spence et al. 1990:143, 148, 157; Williamson

and Pihl 2002; Wilson 1991).

Regarding the Iroquoian language family, Fiedel (1999:201) has stated that Iroquoian languages are "totally unlike" Algonquian languages in vocabulary, phonology, and grammar. This leads him to suggest that the two language families may be relatively recent neighbors in the upper northeast. The Iroquoian presence in this region is attributed to a recent migration, ca. A.D. 500–1000, based on glottochronological evidence provided by Lounsbury (1961, 1978). This interpretation is largely consistent with the Iroquoian migration theory proposed by Snow (1994, 1995a, 1995b, 1996; cf. Whyte 2007).

Linguistic reconstructions of this type also look to archaeological evidence for support, but in doing so assume, perforce, that there are strong links between specific forms of material culture, chiefly ceramics, and language. However, determining ethnicity in the archaeological record is a daunting endeavor, particularly due to the problematic relationship between differences in material culture and the extent to which these differences reflect disparate group identity or ethnicity. The archaeological record of this region is sparsely endowed with objects that unambiguously reflect ethnic affiliation, or serve as "ethnic boundary markers." In traditional cultural-historical schemes, the main underlying assumptions regarding style have been that ceramic attributes reflect ethnic identity, and that, more importantly, sociopolitical dominance is normally evinced by increasing frequencies of traits belonging to the predominant group. This is a notion for which there is substantial contradictory cross-cultural evidence. It has been noted elsewhere (Hodder 1978:4–9) that vessel shapes and design motifs often remain the same among a conquered population, despite significant acculturation. Furthermore, invaders might intrude upon settled populations and their arrival may not be identifiable in ceramic patterns for a number of centuries. The traditional approach assumes that potters too easily accept the legitimation of control and are quick to embrace a new and dominant ideology (Hodder 1986:26). For the Great Lakes region in particular, it has become increasingly clear that Iroquoians and Algonquians alike participated in a tradition of ceramic vessel manufacture that enjoyed comparatively widespread currency throughout much of the Northeast (e.g., Brumbach 1975, 1995; Moreau et al. 1991:58; von Gernet 1992:122–123, 1993:77). Determining the relationships between artifacts and ethnic groups is further complicated by the overlapping territories and high degree of social mobility often ascribed to the various groups in this region, the apparent openness of social groups to new members through adoption, and the drastic population movements and realignments which appear in European accounts of seventeenth- and eighteenth-century life in throughout the Great Lakes region (cf. Engelbrecht 1999).

Despite our limited knowledge of the period, the events of the Middle to Late Woodland transition are of great significance to the subsequent culture history of the region. The adoption of maize must ultimately have had an important role in initiating the transition to food production and reducing the traditional reliance on naturally occurring resources; however it would seem that this process was much more gradual than previously thought. Likewise, it is probable that it was highly variable from one area to the next. In some areas this shift may have been accomplished simply through local populations adopting agricultural practices and associated customs or ritual. In other areas, it is equally possible that the arrival of new peoples were initially responsible for the changes apparent in the archaeological record. The Iroquoian languages may have spread into the lower Great Lakes area through either means—the process being facilitated by the fact that social and ethnic boundaries were flexible and permeable to the individuals and groups who were active agents in their creation in the first place.

The incipient agriculture of these communities may have led to decreased mobility as at least some members of the community likely remained near their garden plots for longer periods of time to tend their crops. While it may be possible to overestimate the role of maize in this process, it seems clear that sites were more intensively occupied and subject to a greater degree of internal spatial organization and, increasingly, were located on terraces overlooking the floodplains of large rivers. In southern Ontario this pattern is most clearly seen in the Grand River valley at the later Princess Point sites of Porteus (Noble and Kenyon 1972; Stothers 1977) and Holmedale (Pihl 1999a), and to a lesser degree at Grand Banks, Lone Pine, Forster, and other sites tested by the University of Toronto research program (Bursey 2003; Crawford and Smith 2002). Holmedale, however, is the only site that has been excavated on a large scale to reveal the full community plan, since the Porteus investigations of the 1970s.

THE HOLMEDALE SITE

Located on the floodplain of the Grand River in the City of Brantford, the Holmedale site is situated along a low terrace that traverses an oxbow formed by the river, the current course of which flows approximately 250 meters to the south (MacDonald and MacDonald 1999). Previous development activities within the area have considerably altered the setting of the site. Although Holmedale was covered by woodlot and scrub and brush at the time of its initial discovery, it was formerly cultivated. Early twentieth-century topographic mapping also indicates that a sizeable back-water channel or creek and associated marsh formerly lay to the immediate east of the site

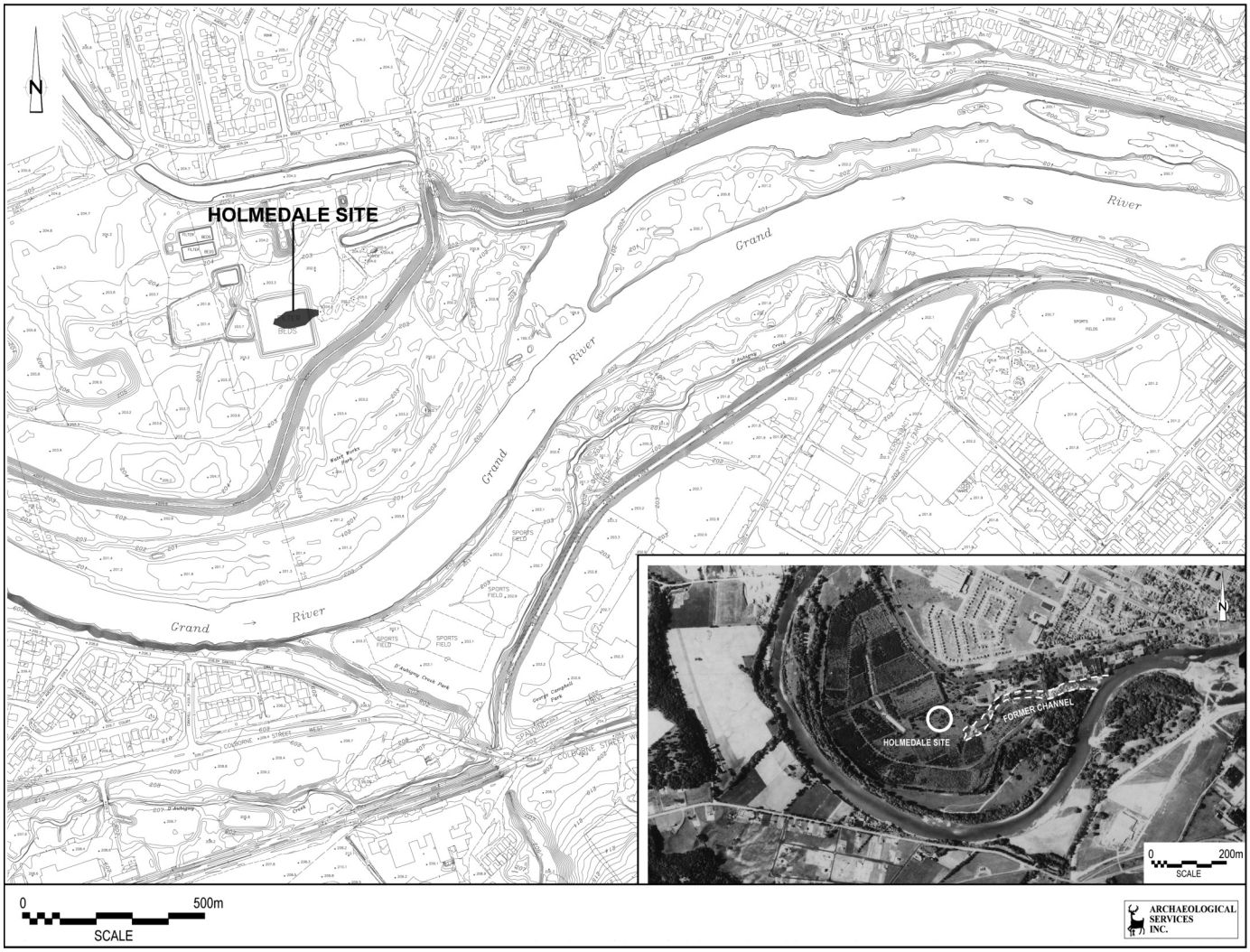

Figure 12-2. The setting of the Holmedale site on the Grand River.

(Figure 12-2).

The Holmedale site was discovered in 1996, during the course of a test pit survey undertaken in advance of proposed upgrades to an existing water treatment plant (Pihl and Robertson 1999). Artifacts were recovered from a total of 50 test pits distributed over approximately 0.5 hectare. The south side of the site rested on a ridge overlooking an elongated depression or swale. Following its discovery, the site was fully excavated through the hand excavation of one meter units and mechanical stripping of plough-disturbed soils (Figure 12-3). In total, an area of approximately 2,920 m^2 was investigated. The excavations uncovered 63 cultural features, in the form of pits and hearths, together with over 700 post molds (Robertson 1999). The artifact assemblage consisted of approximately 16,000 items.

The main focus of settlement activity at the site appears to have been concentrated in an area delineated by a major row of palisading and a series of fences (Figure 12-3). The variable orientations of the perimeter fence sections, together with the fact that they frequently bisect areas of concentrated feature activity, suggests that the compound may have been expanded or contracted on one or more occasion to meet the changing needs of the inhabitants of the site during their successive occupations. Unfortunately, the form of the area defined by the fences at any one time cannot be discerned with any degree of confidence, due both to the discontinuous patterns of the post lines and to the possibility that the construction of some of the house structures may have incorporated sections of fencing as house walls or vice versa. Whether or not such use of common architectural elements occurred as one or the other became redundant cannot be determined.

The greatest concentration of activity appears to have been confined to an oval-shaped area measuring approx-

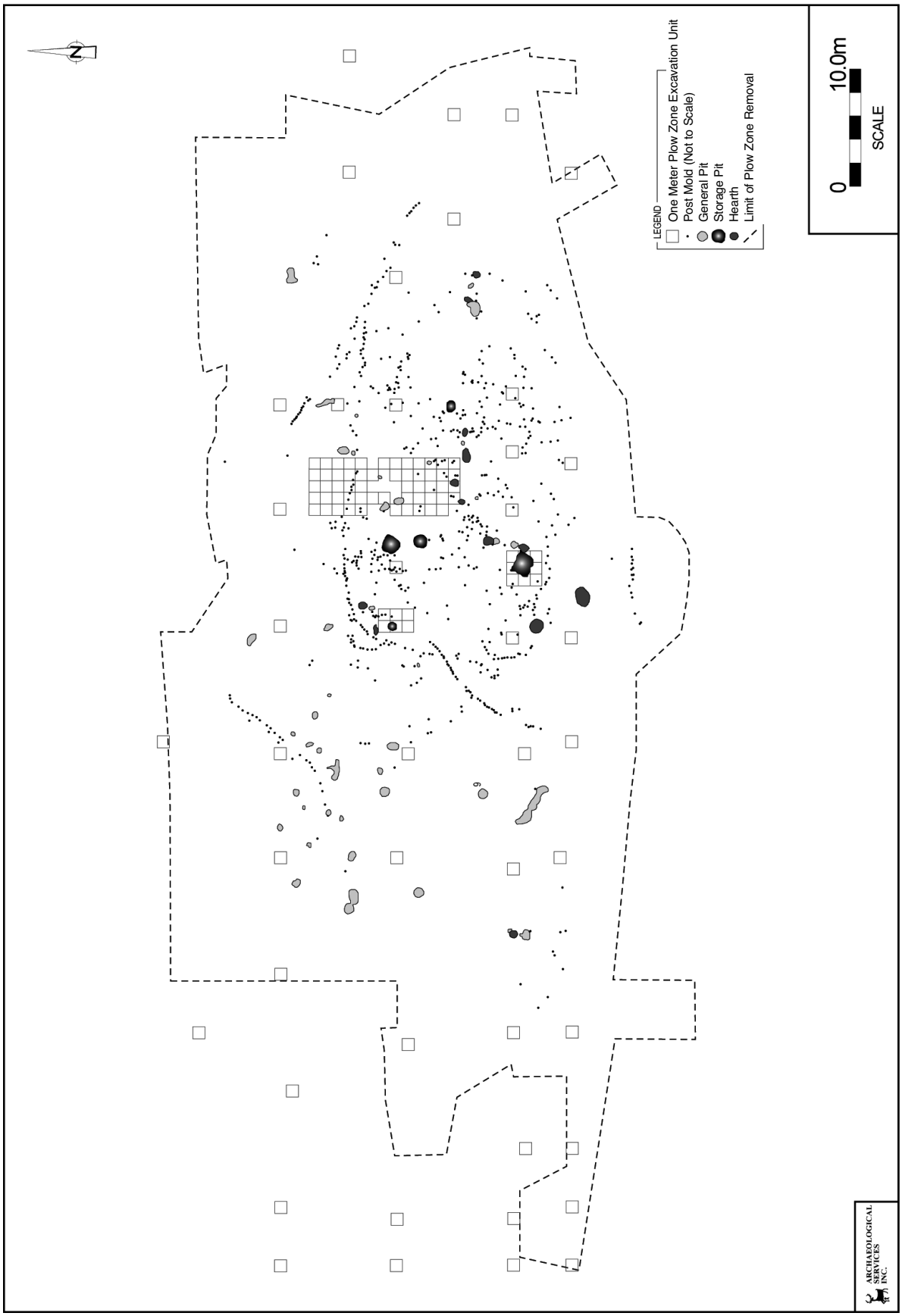

Figure 12-3. The excavation of the Holmedale site.

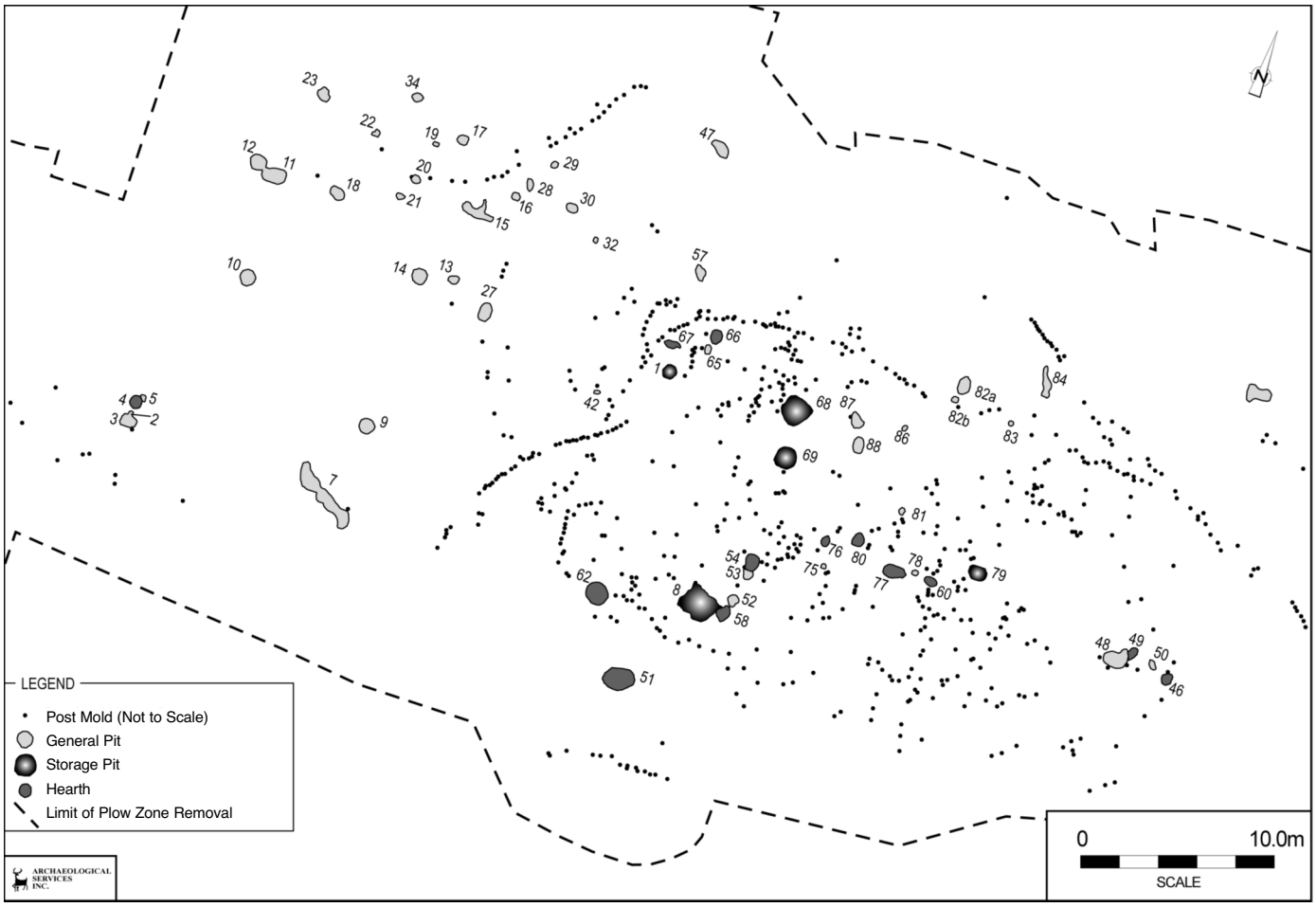

Figure 12-4. The primary occupation area within the settlement area.

imately 650 m^2. Within this compound (Figure 12-4), at least nine potential clusters of hearths and pits are readily apparent. Each feature concentration is associated with scatters of post molds of varying densities and configurations; however, few well-defined house structures are immediately evident. This pattern is reminiscent of those found on many slightly later Early Iroquoian sites. In the past, such settlement patterns, formed by overlapping lines of posts, amorphous clusters, or simply broad areas of isolated posts that exhibit little patterning of any sort have been interpreted as reflecting an absence of community planning and concomitant lack of formal village government, low population densities, and short-term but frequently repeated occupations during the cold-weather months (e.g., Noble 1968; Trigger 1981; Williamson 1990). More recently, however, highly detailed analysis of the Early Iroquoian Calvert site (Timmins 1997) has clearly demonstrated that the apparent randomness and lack of order on such sites is largely a consequence of the use of these sites over the course of many years, during which period each occupation was much more formally structured than previously assumed.

Notwithstanding the difficulties presented by settlement pattern data, the structures that are hypothesized at Holmedale are largely consistent in terms of size and form with many of those documented at other roughly contemporary or slightly later settlements such as Auda (Kapches 1987:Figure 2), Boys (Reid 1975:Figures 5 and 12), Van Beisen (Noble 1975:Figure 2); and the nearby Porteus site (Noble and Kenyon 1972:Figure 3; Stothers 1977:125). They also resemble the small circular to elliptical houses encountered on many somewhat later sites, such as Reid (Wright 1978:Figure 2), Elliot (Fox 1986b:Figure 4), Roeland, Yaworski, and Bermortel (Williamson 1985:Figures 14, 24 and 25), and Calvert (Timmins 1997:Figure 5.1), in conjunction with structures that are more recognizable as "longhouses."

In the extreme northwest corner of the compound and immediately adjacent to the palisade, a pair of hearths (Features 66 and 67), separated from one another by a dis-

tance of approximately two meters, was found in association with a small, shallow pit (Feature 65), which was devoid of artifactual remains, and a large storage pit (Feature 1). Feature 1 measured 71 cm in length, 64 cm in width, and 80 cm in depth, and was composed of four major fill layers. Considerable quantities of ceramic sherds, derived from at least four separate vessels, almost 200 pieces of lithic debitage, and over 900 pieces of faunal debris were recovered from the fill of the pit.

The presence of two short alignments of posts, one of which traversed the main palisade row to the north and west of Features 1 and 67, while the other lay intermediate between them to the east, indicates the presence of a structure measuring approximately 3.5 m in length and 2.5 m in width that was oriented roughly north-south. Only one hearth (Feature 67) and the large storage pit (Feature 1) would have constituted interior features while the second hearth (Feature 66) and the small pit (Feature 65) were exterior to the house. The structure was not contemporary with the palisade.

To the immediate east of the Feature 1/65–67 complex, an approximately 6.5 m long line of irregularly spaced posts may represent the west side wall of another structure. Three pairs of posts extending eastward from the southern terminus of this alignment, and an amorphous cluster of seven posts at its northern end may be indicative of end walls. Two large storage pits (Features 68 and 69) may constitute centrally aligned interior features associated with this potential house, suggesting that the structure may have measured approximately 2.75 to 3.0 m in width. The smaller of the storage pits (Feature 69) had a diameter of 105 cm in plan view and was 50 cm deep. Its fill was comprised of two major layers, which contained portions of at least 17 ceramic vessels, nine formal flaked lithic tools, over 500 pieces of debitage and over 460 pieces of faunal debris. Feature 68, on the other hand, measured 165 x 150 x 65 cm, and three major strata were apparent within its fill. Portions of at least six ceramic vessels, 13 formal flaked lithic tools, and around 250 pieces of chert debitage, but only 37 faunal were recovered from this pit.

To the south of the Feature 68 and 69 pairing, two hearths (Features 54 and 58), were found to be separated from one another by a distance of approximately 2.5 m. Feature 54 predated a general refuse pit (Feature 53), while Feature 58 was flanked by a pit (Feature 52), which predated a large post, and the largest of the storage pits documented at the site (Feature 8). Feature 8, which measured 179 cm in length, 142 cm in width and 92 cm in depth, contained five major depositional strata, which yielded portions of at least 22 ceramic vessels, 24 formal lithic tools, approximately 1,800 pieces of chert debitage, and 2,200 faunal specimens.

The definition of potential structural elements associated with this feature cluster is problematic. A roughly 7.0 m long line of as many as 23 single-spaced to irregular clustered posts, located approximately two meters to the southwest of Feature 8, may indicate the presence of one wall. Similarly, a dense cluster of posts to the immediate northeast of Feature 54 may indicate the presence of a wall in this location. Taken together, these potential house walls may indicate the presence of a structure of roughly 8.3 m in length and perhaps 6.4 m in width. The large post that was dug through Feature 52 may have served as a roof support.

A short distance to the west of Feature 8, a single hearth (Feature 62) occurred in apparent association with three comparatively well-defined lines of single-spaced and paired posts that extend to the northwest and which may represent the sides and north end wall of an open-ended structure measuring approximately four to five meters in length and three meters in width. The west side wall of the structure may, at some point, also have constituted a portion of the main palisade row.

Two potential—and possibly overlapping—structures also occurred to the north and east of the postulated house containing Features 8, 52–54, and 58. Within this area four hearths (Features 60, 76, 77, and 80) formed two separate, but parallel-aligned pairs. In each case, the distance between the two hearths (Features 76 and 80; 77 and 60, respectively) measured approximately 2.0 m. The intervening space between the Feature 60/77 pair was occupied by a small pit (Feature 78). Two other pits (Features 75 and 79) may also be associated with this occupation area. Feature 75 was a small, shallow, generalized pit, while Feature 79 was a storage pit in-filled by two major strata that contained very few artifacts of any sort.

Approximately seven meters to the east of Feature 79, in the southeast portion of the primary settlement area a pair of hearths (Features 46 and 49) separated from one another by a distance of approximately 2.0 m, together with two pits (Features 48 and 50) and 18 scattered posts form a discrete activity area. Although the distance between the hearths and the pairing of hearths and pits is similar to that noted for the other postulated houses, no alignments of posts that might be suggestive of walls were evident.

Approximately nine meters to the northwest of the Feature 46/48/49/50 concentration and adjacent to the easternmost palisade line, another structure may be indicated by the presence of a U-shaped line of 26 paired or staggered posts, which may represent the rounded west end wall and portions of the sides of a house measuring approximately 6.5 m in length and 3.25 m in width. It is also possible that a rounded eastern end wall may be indicated by three widely spaced posts. Other than two post moulds in the approximate centre of this potential house, there is a dearth of further evidence for "interior" activity.

A number of other features that do not appear to have

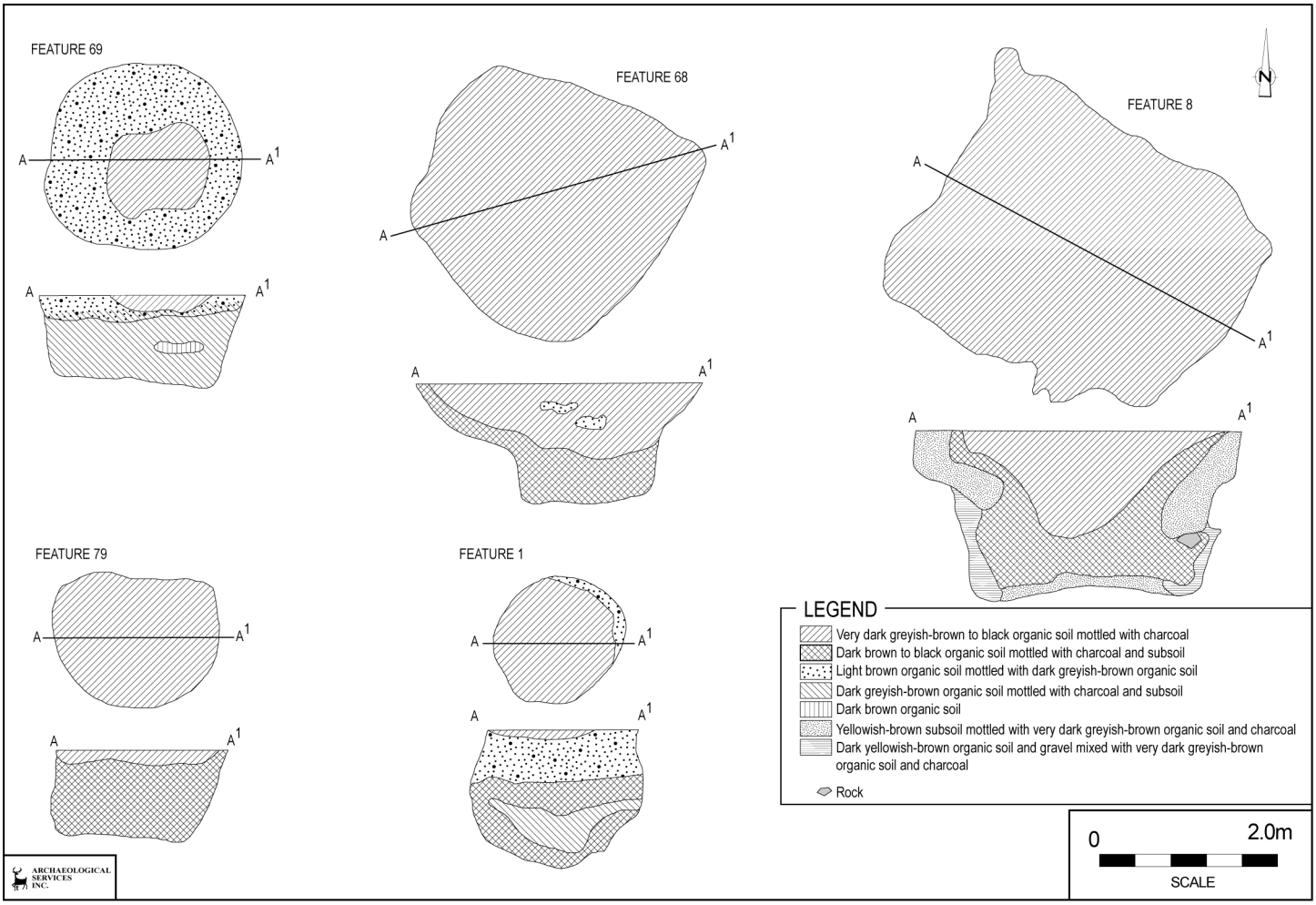

Figure 12-5. Plans and profiles of the Holmedale site storage pits.

been contained within any structures were scattered throughout the main settlement area and a significant concentration of exterior activity appears to have occurred to the northwest of the primary settlement compound. Much of this activity seems to have been focused on an approximately 10-meter long fence row of single, evenly spaced posts.

Four of the postulated house structures were associated with large deep features that likely served as large storage pits that were subsequently used for refuse disposal. Such features are frequently found on transitional Middle to Late Woodland or early Late Woodland sites (e.g., Bursey 2003; Fox 1976:182; Lennox: 1982:10; Murphy and Ferris 1990:235–236; Timmins 1997:156–160) and, in general, exhibit deep basin to cylindrical flat-bottomed, or bell-shaped profiles, as well as complex layering and lensing, indicative of gradual or periodic backfilling, weathering, and erosion of the exposed walls of the pit, and possibly re-use.

The Holmedale storage pits (Figure 12-5) compare favorably with the sample of 68 features from the Early Iroquoian Calvert site that has been analyzed in considerable detail by Peter Timmins (1997), who noted that the average dimensions of the Calvert examples were 127 cm in length, 112 cm in width, and 70 cm in depth, providing for an average capacity of approximately 1.0 m^3. The Calvert features generally possessed fill comprised of three to four strata (Timmins 1997:Table 7.24). The five Holmedale examples, on the other hand, had mean dimensions of 124 x 106 x 65 cm, and a mean volume slightly in excess of 1.0 m^3. The fills of the pits were comprised of two to five major depositional strata.

It has generally been assumed that the primary function of pits of this type was cold season storage of maize or other foodstuffs, and that in order to be effective, it would have been necessary to provide the features with a bark liner (e.g., Bursey 2003:212; Fox 1976:182; Lennox 1982:10; Murphy and Ferris 1990:236; Timmins 1997:156).

While Gabriel Sagard (Wrong 1939:95) has frequently been cited as ethnohistoric confirmation of the use of bark linings in underground storage pits (e.g., Heidenreich 1971:119; Timmins 1997:149), and he certainly described "large vats or casks of tree-bark," his discussion did not make explicit reference to bark-lined pits.

The probability that such a liner would deteriorate within a comparatively short period of time has led to the further assumption that the use-life of these storage pits was comparatively brief and that they would subsequently be used for refuse disposal (Timmins 1997:156). Although Timmins (1997:150–156) has devoted considerable effort to replicative studies concerning the post-abandonment processes responsible for the formation of the features recognized as storage pits, rather less consideration has been given to testing traditional assumptions concerning aspects of storage technology, such as the need for a bark lining, or the potential longevity of such features. Experimental data directly relevant to such questions, however, are available as a result of long-term research concerning grain storage in underground "silos" during the British Iron Age (Reynolds 1981:22–24). Such work has established, for instance, that the presence of a pit lining is not a critical factor in the preservation of grain. Rather, the key agent in the preservation process is the natural respiration cycle of the grain itself, which consumes oxygen and produces carbon dioxide as a waste by-product. Thus, grain placed in a sealed container consumes all of the available oxygen and will enter a state of unstable dormancy in the resulting carbon dioxide-charged atmosphere (Reynolds 1981:22). Until an anaerobic atmosphere is achieved, the germination of the grain at the interface of the pit walls and surface seal of the pit produces a dense layer of sprouts and rootlets that acts as a barrier to moisture penetration from the surrounding soil, while at the same time the bulk of the stored material is protected from further deterioration (Reynolds 1981:23). Upon removal of the stored grain, the pit is left with a matt of sprouted grain adhering to the walls, which may then be peeled away and discarded, either in a midden or by burning it in situ if there is no further intention of using the feature for storage. If the former option is pursued, however, there appear to be no real limits placed upon the continued viability of the storage pit (Reynolds 1981:23–24). The ultimate abandonment of these features may, therefore, be equally due to other factors that are more closely related to changes in household or community size and composition on a seasonal or more long-term basis; changes that on the basis of the other settlement pattern evidence may have been considerable.

DATING THE SITE

Two samples of carbonized plant remains recovered from the site were submitted for radiocarbon dating. Both dates were subsequently calibrated using CALIB 5.0 (Stuiver and Reimer 1993) with the calibration dataset IntCal04 (Reimer et al. 2004).

A single carbonized maize kernel (86 mg) from Feature 1 was submitted to the University of Toronto's IsoTrace Radiocarbon Laboratory, Accelerator Mass Spectometry Facility, for an AMS date, yielding a result of 1010±70 B.P. (TO-6079; cal. 2σ A.D. 890–1210). The second date was run on a 3.96 g sample of carbonized walnut fragments collected from Features 1 and 7. This material was sent to the University of Waterloo's Environmental Isotope Laboratory for a conventional date, and yielded a result of 1080±80 B.P. (WAT-3005 cal. 2σ A.D. 770–1160). Both dates are chronologically consistent with artifactual remains from the site, notably the ceramics, and are therefore considered acceptable. Using the modal dates, a site occupation spanning ca. A.D. 980–1020 is thus minimally indicated.

The Holmedale occupation therefore falls at the later end of the Princess Point time range suggested by Crawford and Smith (Figure 12-6), roughly contemporary with radiocarbon dated sites such as Bull's Point (Smith 1997a, 1997b), Grand Banks (Smith and Crawford 1997), Lone Pine (Smith and Crawford 1997), Selkirk 5 (Fox 1978; Smith 1997a), Varden (MacDonald 1986; Smith 1997a), Porteus (Smith 1997b; Stothers 1977), Moyer Flats (Fox 1986a; Smith 1997a), and Stratford Flats (Fox 1984; Smith 1997a).

The assemblage of 65 identified ceramic vessels recovered from the site (Figure 12-7) supports this general chronological placement (Pihl 1997, 1999b). The vessels are characterized by an absence of coil breaks, and the large number of exfoliated sherds suggests that the vessels were manufactured by modeling or accretion and not by coiling. Although few are sufficiently complete to evaluate with complete confidence, most vessels were probably semi-conoidal or rounded in shape with both conical and rounded bases. A significant amount of morphological variation was, nevertheless, evident. Upper rims were uncollared but frequently thickened, short to medium in height, vertical to slightly outflaring, and mostly flat-lipped. The vessels were generally well made and featured relatively thin wall construction, which generally extends to the base on several reconstructed portions. Incipient castellations were observed on 13 vessels (or 20% of the sample) and at least one shoulder was crenellated. Although the exterior upper rim, neck, and shoulder area was routinely smoothed to accept the decoration, cord-marked surfaces were sometimes incorporated into the motifs, either as a background or an

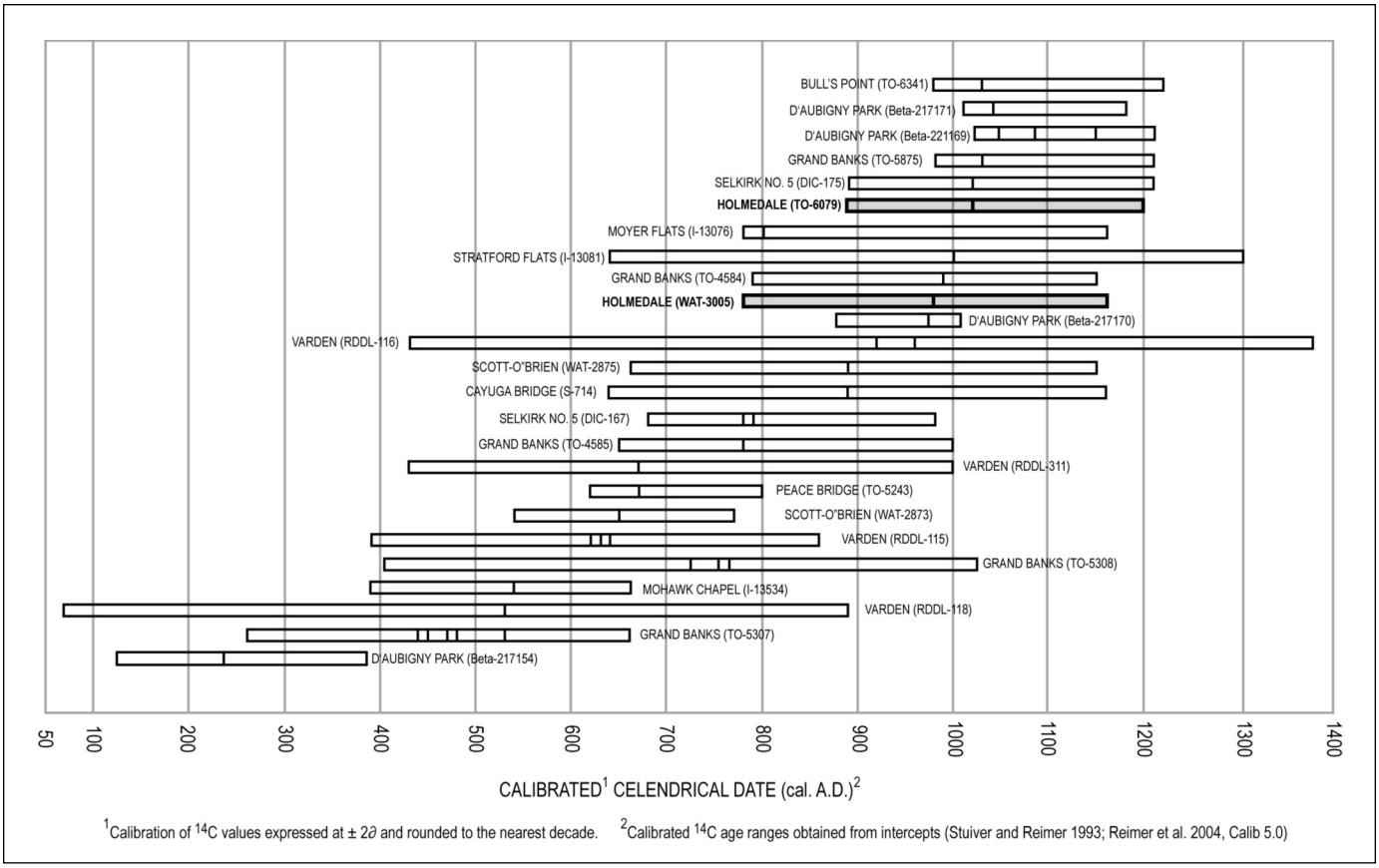

Figure 12-6. The chronological position of the Holmedale site within the radiocarbon sequence for Princess Point Complex sites. Adapted from Smith (1997).

undecorated zone. Surface treatment routinely involved cord-marked paddling, but fabrics were sometimes impressed on the bodies, often immediately below the shoulder.

There was substantial variation within exterior vessel decoration although the key characteristics of the Holmedale ceramic decoration consisted of exterior upper-rim decoration that was limited to one or sometimes two bands of obliques stamped with a cord-wrapped tool; a single row of encircling circular punctates located at the neck (usually raising interior bosses and usually positioned at or near the juncture between decorative zones located on the upper rim and neck-body); and neck-body decoration consisting of one or more horizontal bands of designs, typically stamped with a cord-wrapped implement.

THE HOLMEDALE SITE PLANT REMAINS

The plants remains analysis entailed examination of 35 soil samples derived from 21 archaeological features (Monckton 1999). These samples were processed through bucket flotation, and plant remains were extracted using a 300 micrometer screen for light fractions, and a 2.00 mm screen for the collection of heavy fractions. Both components were dried in cloth material. In the laboratory, light fractions were weighed and passed through a series of screens to facilitate the sorting of material. Objects larger than 2.00 mm were separated into sample components such as wood charcoal, nut remains, maize kernel fragments and other plant parts in addition to unidentifiable material. Altogether, the samples, which amounted to 166 litres of soil, yielded a total of 14,911 charred plant fragments (Tables 12-1 and 12-2).

Eastern 8-Row, or Eastern Complex, maize (*Zea mays*) and tobacco (*Nicotiana rustica*) were the only cultivated plant taxa identified in the sample. Noncultigens include walnut (*Juglans* spp.), oak (*Quercus* spp.), and hickory (*Carya* spp.) nuts, a wide variety of fleshy fruits and greens. Fleshy fruits are represented by black nightshade (*Solanum nigrum/americanum*), strawberry (*Fragaria* spp.), bramble (*Rubus* spp.), cherry (*Prunus* spp.), hawthorn (*Crataegus* spp.), and grape (*Vitis* spp.). Greens/grains and other taxa include chenopod (*Chenopodium* spp.), cleavers (*Galium* spp.), spikenard (*Aralia nudicaulis*), pep-

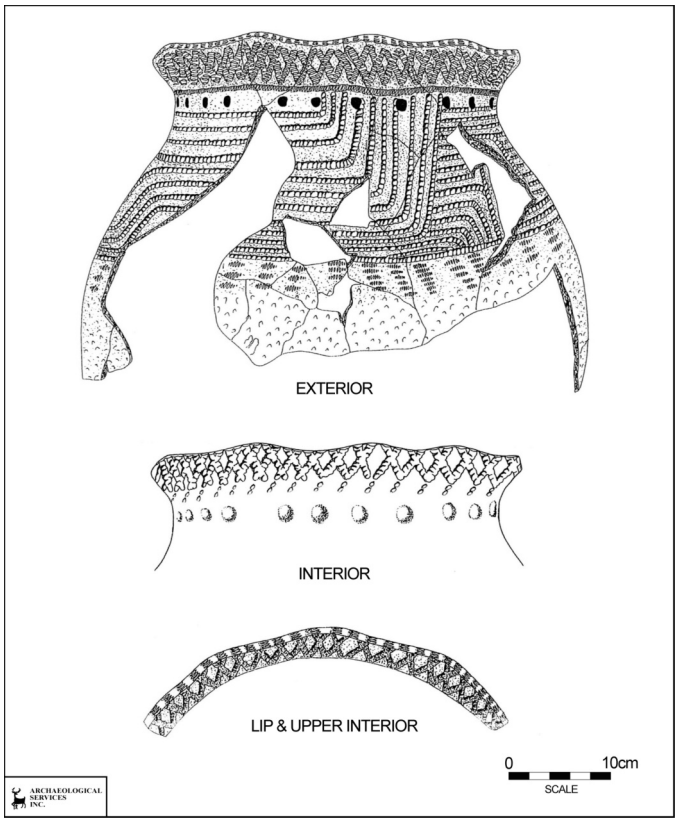

Figure 12-7. Reconstructed ceramic vessel from the Holmedale site.

per-grass (*Lepidium* cf. *L. densiflorum/virginicum*), sumac (*Rhus typhina*), cattail (*Typha latifolia*), small grass (Gramineae), and several unidentified taxa. Wood charcoal fragments represent a familiar range of tree genera for southern Ontario sites. This includes maple (*Acer* spp.), beech (*Fagus grandifolia*), birch (*Betula* spp.), ash (*Fraxinus* spp.), elm (*Ulmus americana*), red and white oak (*Quercus rubra* and *Q. alba*, respectively), and ironwood (*Ostrya virginiana*). Elm and oak are dominant in almost all samples, while ash and ironwood are common contributors.

Fifteen of the 21 proveniences yielded maize in quantities similar to those encountered on later Iroquoian settlements. Although there were several intact maize kernels, the majority of the remains were very fragmented. On the basis of a total weight contribution of 6.5 g, it is estimated that the assemblage represents approximately 70 kernels (based on a sample of 100 intact charred maize kernels from the seventeenth-century Auger site in Simcoe County [Monckton 1992], which weighs approximately 10 g and allowing for some increase in average kernel size through time [Crawford et al. 2006:556; Monckton 1992:30]).

The ubiquity and quantity of maize among the analyzed samples falls within the range of variation seen for many later Late Woodland and Contact era sites for which data are available (e.g., Monckton 1992, 1998a, 1998b; Ounjian 1998; Robertson et al. 1995), although such comparisons are fraught with potential taphonomic, sampling, and statistical sources of error. On many later Late Woodland sites, for instance, there is a tendency for maize to occur in greater quantities relative to other plant taxa in samples derived from features within houses than from exterior contexts such as middens (Monckton 1998a, 1998b). It is likely unwise, therefore, to use simple ubiquity and frequency data alone to evaluate the corresponding degree of dietary reliance on maize at this or any other point in the archaeological record.

Tobacco (*Nicotiana rustica*) is represented by only eight seeds, although the unidentifiable seed category includes numerous "*Nicotiana*-like" objects, and quantification of this taxon in archaeological assemblages is generally unreliable given the huge number of seeds produced by an individual plant and the uneven representation of seeds among features on most sites (Monckton 1992, 1998a). It is difficult, therefore, to evaluate the degree to which Holmedale inhabitants produced tobacco in comparison with later populations, although the smoking pipe sample recovered from the site is comparatively large, consisting of 17 bowl fragments, seven bowl or elbow fragments, and six stems. Smoking pipes were formerly considered to be rare finds on both Princess Point and succeeding Early Iroquoian sites (Stothers 1977:59; Wright 1966:32). Investigation of a greater number of Early Iroquoian sites has effectively challenged the assumption that pipes were not common (Williamson 1990:299), and it seems likely, based on the frequency of the Holmedale finds and those from the Lone Pine site, where 10 bowls have been recovered (Smith and Crawford 1995:67), that the same holds true for Princess Point, although in neither case do they approach the numbers seen on later Middle Iroquoian sites.

Neither common bean (*Phaseolus vulgaris*) nor cucurbit (*Cucurbita pepo*) remains were recovered from Holmedale, but poor representation of these taxa is typical of even later Iroquoian sites, due to culinary and taphonomic factors that together may not favor preservation in the archaeological record to a degree proportional with their potential dietary significance (Monckton 1992:81, 1998b:118). Bean has a homogeneous and dense cell structure, which can only be recognized if there is sufficient material to suggest its shape. Furthermore, bean was probably soaked in water prior to cooking, lowering the likelihood of accidental charring. Similarly, cucurbit is likely under represented as a result of both its seed structure, and the fact that the preparation of this food did not necessarily entail direct exposure of the seeds to fire. In the seventeenth century, cucurbit was frequently cooked whole in ashes or cut into strips (Thwaites 1896–1901:

Table 12-1. Holmedale site plant remains — sample components.

Feature	Level	Volume (l)	Wood (n)	Charcoal Wt. (g)	Maize (n)	Kernals Wt.(g)	Maize (n)	Cupules Wt. (g)	Walnut (n)	Shell Wt. (g)	Acorn (n)	Shell Wt. (g)	Hickory (n)	Shell Wt. (g)	Unidentified (n)	Nut Wt. (g)	Nut (n)	Meat Wt. (g)	Unidentified Material (n)	Unidentified Material Wt. (g)	Total Fragments	Total Weight
1	fill	5	282	2.84	120	1.38	3	0.01	6	0.18	1	0.01							1	0.01	413	4.43
	3	2	247	3.72	33	0.3			1	0.01	1	0.01							32	0.09	314	4.13
	5	3	488	11.7	64	0.85					9	0.01							56	0.2	617	12.76
		5	278	6.22	7	0.07	5	0.01	10	0.14			3	0.01					3	0.01	306	6.46
	sum	**15**	**1,295**	**24.48**	**224**	**2.6**	**8**	**0.02**	**17**	**0.33**	**11**	**0.03**	**3**	**0.01**					**92**	**0.31**	**1,650**	**27.78**
3	fill	4	1575	50.81																	1575	50.81
4	3	6																	1	0.01	1	0.01
5	3	8	0.42																4	0.01	72	0.43
7A		4	194	1.94	8	0.05			2	0.01			3	0.01							207	2.01
7B		3	138	2.55	5	0.01			2	0.01			4	0.01					5	0.01	154	2.59
7C		3	119	1.55	10	0.12			267	3.78									10	0.01	406	5.46
	sum	**10**	**451**	**6.04**	**23**	**0.18**			**271**	**3.8**			**7**	**0.02**					**15**	**0.02**	**767**	**10.06**
8	2	4	58	0.98			1	0.01	1	0.01	1	0.01							3	0.01	64	1.02
	2	4	206	2.94	4	0.01	6	0.14	1	0.01					4	0.01			8	0.04	229	3.15
	2	5	340	4.2	9	0.17	8	0.06	5	0.09									10	0.18	372	4.7
	2	5	173	2.24			3	0.11							2	0.01			1	0.05	179	2.41
	2	2	20	0.11	1	0.01													9	0.01	30	0.13
	2	4	348	6.45	5	0.07	4	0.04	7	0.18	5	0.01			10	0.1			2	0.01	381	6.86
	sum	**24**	**1,145**	**16.92**	**19**	**0.26**	**22**	**0.36**	**14**	**0.29**	**6**	**0.02**			**16**	**0.12**			**33**	**0.3**	**1,255**	**18.27**
11		3	94	0.64	3	0.01													6	0.01	103	0.66
18		4	38	0.26																	38	0.26
30		7	960	13.92	6	0.1			1	0.01									2	0.01	969	14.04
34		3	6	0.12					1	0.07					4	0.01			1	0.01	126	1.49
44		3	6	0.12															2	0.01	8	0.13
51		5	278	3.77	5	0.01	1	0.01					1	0.01					1	0.01	286	3.81
52		3	545	11.01	21	0.19	2	0.01	1	0.01					6	0.01			2	0.05	577	11.28
53		6	125	1.12	9	0.06			4	0.01	6	0.01			1	0.01			5	0.07	150	1.28
65		3	33	0.35	7	0.01					7	0.06							8	0.15	55	0.57
68		5	307	2.81	8	0.16	3	0.01	1	0.01									10	0.07	329	3.06
		4	132	1.59	12	0.08	2	0.22	6	0.44					1	0.01			5	0.01	158	2.35
	sum	**9**	**439**	**4.4**	**20**	**0.24**	**5**	**0.23**	**7**	**0.45**					**1**	**0.01**			**15**	**0.08**	**487**	**5.41**
69		6	642	45.45	123	1.22	19	0.12	58	1.38			3	0.01	12	0.01	3	0.22	5	0.01	865	48.42
		8	3,900	31.5	8	0.01	2	0.01							1	0.01			11	0.01	3,922	31.54
		9	1,297	33.41	205	2.35	30	0.09	48	1.38	2	0.01			4	0.01			4	0.01	1,590	37.26
	sum	**23**	**5,8395**	**110.36**	**336**	**3.58**	**51**	**0.22**	**106**	**2.76**	**2**	**0.01**	**3**	**0.01**	**17**	**0.03**	**3**	**0.22**	**20**	**0.03**	**6,377**	**117.22**
79		9	284	8.29	15	0.17	12	0.09											1	0.01	312	8.56
83		5	66	0.85	6	0.04	2	0.01	9	0.41	15	0.02					2	0.21	9	0.01	109	1.55
84		5	518	3.48			1	0.01			3	0.01							73	0.35	595	3.85
88	1	2	98	1.06	5	0.01			2	0.01											105	1.08
	sum	**166**	**134,463**	**215.24**	**592**	**6.5**	**90**	**0.84**	**402**	**7.45**	**52**	**0.17**	**11**	**0.04**	**37**	**0.18**	**5**	**0.43**	**288**	**1.42**	**14,911**	**232.23**
	%		**90.18**	**92.68**	**3.97**	**1.18**	**0.60**	**0.36**	**2.7**	**3.2**	**0.35**	**0.05**	**0.07**	**0.01**	**0.25**	**0.06**	**0.03**	**0.13**	**1.9**	**0.44**	**100.00**	**100.00**

Table 12-2. Holmedale site plant remains — seeds.

Feature	Level	Maize	Tobacco	*Prunus* sp.	Hawthorn	Bramble	Strawberry	Nightshade	Nightshade family	Grape	Sumac	Chenopod	Cleavers	Spikenard	Peppergrass	Small Grass	Sedge	Cattail	Unknown	Unidentified	Total Seeds
1	fill	12		2		2					1	1							2		20
	3	3									4									1	8
	5	9												1		1				4	15
		1				1						4								4	10
	sum	**25**		**2**		**3**					**5**	**5**		**1**		**1**			**2**	**9**	**53**
3	fill		1																	1	2
4	3																				0
5						1														1	2
7A		1				12						2								5	20
7B		1	3																	2	6
7C		2									1								1	7	11
	sum	**4**	**3**			**12**					**1**	**2**							**1**	**14**	**37**
8	2			1															1	3	5
	2	1				1														1	6
	2	2					1			1	1	2	1							3	11
	2		2										2							5	9
	2	1																		2	3
	2	1																			1
	sum	**5**	**2**	**1**		**1**	**1**			**1**	**1**	**2**	**3**						**1**	**14**	**35**
11		1				3														7	11
18						8														3	11
30		1				6		6	1											8	22
34						2														4	6
44						1														4	5
51																				3	3
52		2												1				1			4
53		1																		4	5
65		1																		1	2
68		2																	5		7
		1				3						3								1	8
	sum	**3**				**3**						**3**							**5**	**1**	**15**
69		3				1														6	10
		1																		24	25
		22	1		1	4		3			3	10			2			3		3	52
		12	1			2		3	1		1							8	1	12	41
	sum	**38**	**2**		**1**	**7**		**6**	**1**		**4**	**10**			**2**			**11**	**1**	**45**	**128**
79		2						1				1								3	7
83		1																		1	2
84																	1		49		50
88	1	1																		3	4
	sum	**85**	**8**	**3**	**1**	**47**	**1**	**13**	**2**	**1**	**11**	**23**	**3**	**2**	**2**	**1**	**1**	**12**	**59**	**126**	**404**
	%	**21.04**	**1.98**	**0.74**	**0.25**	**11.63**	**0.25**	**3.22**	**0.50**	**0.25**	**2.72**	**5.69**	**0.74**	**0.49**	**0.50**	**0.25**	**0.25**	**2.97**	**14.60**	**31.19**	**100.00**

15:163, 42:85). In the former case, the soft moist tissue could have provided the seeds with protection from charring while the latter situation suggests that seeds were excluded.

Based on recent research, it does seem clear that bean was not a major crop within the agricultural regime in the Northeast prior to the thirteenth century (Hart et al. 2002). The case for cucurbit is less clear at present, although it has generally been assumed that this cultigen was also a relatively late arrival to southern Ontario and that it did not achieve any major importance prior to the thirteenth century (e.g., Chapdelaine 1993:194; Smith and Crawford 1997:26). Nevertheless, cucurbit phytoliths have been identified in earlier contexts at the HH site, located near the mouth of the Red Hill Creek at the western end of Lake Ontario (Woodley 1996:124). The HH site was primarily occupied during the late Middle Woodland, although a possible Princess Point component also may have been present. No significant later components were identified at the site (Pihl and Williamson 2002; Woodley 1996). The two features from which the cucurbit phytoliths were recovered were AMS dated to 1410±60 B.P. (TO-4270, cal. 2σ A.D. 530–770) and 1550±60 B.P. (TO-4272, cal. 2σ A.D. 400–640) (Woodley 1996). The calibrated date ranges suggest that some general assumptions concerning the appearance of this cultigen in southern Ontario, based on the currently available macroscopic evidence alone, may need to be reexamined. The new central New York phytolith data point to the presence of squash in that area ca. 1300 B.C., which is not at all inconsistent with its appearance in other parts of the Great Lakes and Northeast (Hart et al. 2003, 2007; Thompson et al. 2004). Clearly, more research is required in Ontario, but the HH site evidence suggests, minimally, that squash may have arrived at roughly the same time as maize, whether by the same or alternate means.

The plant remains assemblage also indicates that the occupants of the site made extensive use of locally available wild plant foods, specifically nuts and fleshy fruits. Probably the most important collected plant food was walnut whose shell fragments constituted almost half of the food related items larger than 2.00 mm in size. Oak and hickory nuts were present only in trace quantities. There is little doubt that these walnut remains represent food remains rather than fortuitous charring in firewood because there was no walnut wood charcoal present in the analyzed samples. Such food would have been collected in the autumn. Bramble is the most commonly represented fleshy fruit taxon in most southern Ontario Late Woodland archaeological contexts spanning the ca. A.D. 1000–1600 period (Monckton 1992, 1998a; Ounjian 1998), and its strong representation at Holmedale anticipates this pattern. Dietary analysis of the late twelfth-early thirteenth-century Myers Road site in Cambridge, located approximately 25 kilometers north of Holmedale, indicates that fleshy fruits such as bramble could have contributed almost half of the daily calories needed by the average person (Monckton 1998a:128). Data presented here show that dependence on fleshy fruits was probably less important than nuts at Holmedale.

Several other taxa also represented at Holmedale could have served as greens or grains. Chenopod (*Chenopodium* spp.) seed is in this category and is represented by a single specimen. It is difficult to evaluate the contribution of chenopod to the diet of the Holmedale site inhabitants, if it was indeed consumed for food. Leaves were probably used for greens, and therefore difficult to quantify on the basis of seeds alone. Pepper-grass (*Lepidium densiflorum, L. virginicum*) has been documented for Iroquoian settlements, but its recovery at Holmedale is currently the earliest documented occurrence in Ontario. This member of the Cruciferae could have been used as a green or condiment as the common name implies (Erichsen-Brown 1979:461; Monckton 1992:48). *Lepidium virginicum* is distinguished from *L. densiflorum* by a narrow wing. However, these frequently fail to survive in archaeological specimens, rendering the species indistinguishable. The one specimen that lacks this structure therefore remains identified only to one of these two species. Several other adventive weeds common on Iroquoian sites, but not represented at Holmedale, are knotweed (*Polygonum* spp.), purslane (*Portulaca oleracea*), and several species of small grass (Gramineae).

Other taxa from Holmedale include spikenard (*Aralia nudicaulis*), sumac (*Rhus typhina*), cleavers (*Galium* spp.), and cattail (*Typha latifolia*). All these are quite common in Iroquoian sites. Spikenard, a member of the Araliaceae, was frequently used as medicine in the Great Lakes region (Wrong 1939:195). Cattail seeds occur in several locations at Holmedale and could represent the presence of rush mats similar to those referred to in ethnohistoric records of the seventeenth-century Huron (Thwaites1896-1901:42:205, 58:209, 59:129, 133, 155). It should be noted, however, that cat-tail seeds are the smallest of identified taxa and can pass through the collection screen, therefore their recovery is probably not systematic. Interpretations of the quantities of cattail should, therefore, be made with caution.

In terms of seasonality, the Holmedale plant remains assemblage strongly supports a late summer to fall occupation. A single strawberry seed was found in a soil sample from one of the large storage pits, possibly reflecting early summer (June) activity. While strawberry could have been dried and consumed in late summer, one might expect more evidence of it in the deposits.

DISCUSSION

As Fox (1990:179) had done some years earlier, Crawford and Smith's research has led them to question certain aspects of Stother's (1977:123–124) original characterization of the Princess Point settlement system, prior to the occupation of the Porteus site toward the end of the sequence, as being essentially unchanged from earlier Middle Woodland patterns; that is, one of large, warm-weather macroband camps situated on river and lakeshores and smaller interior camps, occupied by small groups of related families, during the late fall and winter. Based on their small-scale but highly detailed test excavations at sites such as Grand Banks, which Stothers (1977) had identified as a large, spring-summer riverine bar site, as well as their investigations at Lone Pine and Forster, they are more inclined to believe that these and similar later large sites were formal, more-or-less year-round settlements. They base these interpretations on a number of considerations, including apparent differences in site location choices and parameters between the Middle Woodland and Princess Point along the lower Grand River valley (Dieterman 2001), their discovery that the floodplain river bar locations of some of these sites were stable features during the first millennium A.D. (Crawford et al. 1998; Walker et al. 1997), and on the recovery of dense settlement patterns within their excavation areas (Bursey 2003; Crawford and Smith 2002; Smith and Crawford 1997). The Holmedale settlement patterns are also suggestive in this regard, although the structures are not as formal or well-defined as those reported from the Porteus site. These base settlements, several of which have also yielded evidence of later Early Iroquoian occupation, were complemented by a diverse range of seasonal and special purpose sites located in a variety of geographical settings. These latter small, specialized sites also continued to be of great importance in the subsistence-settlement systems of the Early Iroquoian period.

The introduction of maize in the sixth century, if not earlier, offered yet another, relatively reliable, resource to the late Middle Woodland subsistence repertoire, one which only gradually increased in importance. Smith and Crawford (1997:27) suggest that "Princess Point society was dependent on food production [maize] as a subsistence regime" by the turn of the millennium, based on the apparent increase in frequency of carbonized maize remains on sites of this general date. The basic chronology of this scenario of a gradual increase in maize dependence has found support from Katzenberg's (2006; Harrison and Katzenberg 2003) most recent study of stable isotope chemistry in bone apatite and collagen for pre-Contact southern Ontario populations. She concludes that maize consumption, began by at least A.D. 500 as an exotic food that was gradually adopted into the subsistence regime. However, it "did not become a dietary staple, when it comprised a sizeable portion of the diet, until approximately A.D. 1000" (Harrison and Katzenberg 2003:241; cf. Katzenberg et al. 1995:341–345). Katzenberg's skeletal sample flanking either side of the ca. A.D. 1000 watershed consists of remains from the ca. A.D. 700 Princess Point Surma component of the Peace Bridge site in Fort Erie at the mouth of the Niagara River, the ca. A.D. 900 Princess Point complex Varden site on Long Point on Lake Erie, the ca. 1150 A.D. Early Iroquoian Miller site in Pickering, and the ca. A.D. 1230–1320 Early Iroquoian Force site on the Grand River.

The disproportionate level of detail available for the Grand River Princess Point components and the diversity of the skeletal sample used in Katzenberg's studies forces one to question whether or not the Grand River developmental pattern and chronology is applicable throughout southern Ontario. Indeed, when viewed from a wider perspective, the role of maize, as either a cause or effect, of a trend toward an increasing degree of sedentism still is not entirely clear. It does seem likely that a greater commitment to maize agriculture would be accompanied by an increasingly sedentary residence pattern, at least for a segment of the community, in order to tend and manage the crops. Yet similar settlement shifts and an increasing degree of sedentism, necessitated by population concentration into regional site clusters, have been proposed for certain Middle and early Late Woodland communities prior to the addition of agriculture to their local subsistence bases (cf. Brashler et al. 2000; Ceci 1990; Ferris 1999; Hart 2001; Hart et al. 2003; Hart and Reith 2002; Wilson 1990; Wymer 1993).

By the same token, the intensification of food production, and its logical consequences, appears to have occurred only gradually throughout most of the remaining portions of southern Ontario during the Early Iroquoian period. The introduction of cultigens did not immediately result in a fully developed Iroquoian cultural pattern as suggested by Snow (1992, 1994, 1995a, 1995b). From what is known in the record, there was relatively little change in the settlement-subsistence strategies of populations from the first appearance of horticultural base settlements in the late tenth century until the late thirteenth and early fourteenth centuries, when it appears that there was sudden and radical change among Iroquoian societies (Kapches 1995; Williamson 1990; Williamson and Robertson 1994).

While maize appears to have been an increasing important dietary component during Early Iroquoian times, its role was still more that of a supplementary nature than a staple. Economic security continued to be sought through diversity (Williamson 1990:312–313). Early Iroquoian

semi-sedentary base settlements or "villages" tended to be small, palisaded compounds with longhouses occupied by either nuclear or, with increasing frequency, extended families. Around these central sites, camps and hamlets served as bases from which to collect wild plants or to hunt game. In southwestern Ontario, investigation of settlement-subsistence practices through time has demonstrated the importance of special-purpose resource extraction camps to the support of a central village. This work has also demonstrated that, initially, these central villages were not occupied by the entire population year round, thereby highlighting how Early Iroquoian settlement was transitional between Middle Woodland and Middle Iroquoian modes (Timmins 1997; Williamson 1985, 1990).

Similarly, Trigger (1976:134) has suggested that with an estimated population of 200 to 400 people, most of the early semi-sedentary villages fall comfortably within the size range of Middle Woodland spring and summer fishing groups, and that the small villages of the Early Iroquoian period may have been continuations of these early macrobands. Their small size also suggests that separate bands had not yet begun to join together to form larger communities and that leadership would have remained informal, perhaps being limited to an individual who also acted as a spokesperson in dealings with neighbouring groups (Trigger 1981:24). Early sedentary villages, therefore, may have been characterized by a flexible and evolving sociopolitical structure, whereby people were free to pursue seasonal subsistence activities in either extended or nuclear family units. Some members of these groups may have elected to remain at fall hunting sites into the winter, depending on the severity of the weather and the availability of resources.

Such overall flexibility would explain the variations in house morphology, interior house activity, and seasonally intermittent occupations at the various exploitative camps documented for Early Iroquoian populations. Until an increasing dependence on cultigens forced a realignment of work tasks which separated men from women for prolonged periods, residence and descent patterns may have remained largely unchanged from Middle Woodland times. The adoption of maize would therefore appear to have been gradual and characterized by conservatism. When horticulture was first practiced, the risk of crop failure may have been great and simple caution may explain the reluctance of Early Iroquoians to engage in full-scale farming (e.g., Bronson 1977:34; Halstead and O'Shea 1989). As long as the size of population aggregates remained relatively small, the natural productivity of some Early Iroquoian micro-environments seems to have encouraged a tendency to reduce risk factors by continuing to rely partially on naturally occurring resources. In this manner, Early Iroquoians sought greater security through a mixed economy.

There is clear evidence, on the other hand, for a change in economic strategies during the late thirteenth century, although the degree and nature of such change varied among these individual Middle Iroquoian communities. The hamlets and camps of the Early Iroquoian system were to a large degree replaced by agricultural cabin sites, which were situated within the agricultural fields that surrounded the major villages (e.g., Lennox 1995; Pearce 1983; Williamson 1983). While slight increases in house lengths and community size in the preceding centuries may have resulted from internal population growth, these changes in subsistence patterns probably related to the need to produce more maize for more people in one place. It was during this period, too, that the more elaborate sociopolitical systems and infrastructure that are recognizably "Iroquoian" become truly manifest in the archaeological record of southern Ontario. Moreover, it may have been during the late thirteenth century that maize consumption peaked, at least in some localities. Detailed isotope analysis of human remains from the ca. A.D. 1300 Moatfield ossuary, located on a tributary of the Don River approximately five kilometers north of Lake Ontario, indicates that for a brief period, maize comprised 70% of the diet. Such a reliance on a single foodstuff was likely neither sustainable in terms of production effort or desirable in terms of health or risk buffering, but intensified cultivation may have been a necessary, temporary, response to increased population concentration within a newly amalgamated settlement (Pfeiffer and Williamson 2003; van der Merwe et al. 2003). Such levels of maize consumption represent the highest levels recorded for Ontario populations, although it appears to have been related to a single generation of individuals at Moatfield. Analysis of remains from later fourteenth- and fifteenth-century A.D. sites suggest that at its peak, maize typically comprised approximately half of the diet of Iroquoians (Katzenberg et al. 1995; Schwarcz et al. 1985).

CONCLUSIONS

The long period of time involved in the transition to agricultural village life characteristic of the Iroquoian communities of southern Ontario is mirrored by sequences in adjacent areas. In central New York State, for instance, the status of Owasco as the point at which the Iroquoian pattern crystalized has been questioned on a number of grounds. On the one hand, maize was present on some sites by the first century A.D., some 900 years earlier than previously thought, and cucurbit appears to be of even greater antiquity. In several contexts, wild rice also co-occurs with these new cultigens. On the other, neither longhouses nor villages appear prior to the twelfth

century. This disjunction between the presence of cultigens and the appearance of any marked degree of sedentary community patterns, together with reconsiderations of ceramic sequences and their chronology has led many researchers to question the very concept of Owasco (e.g., Hart and Brumbach 2003, 2005; Hart et al. 2003; Thompson et al. 2004). Likewise, the direct relationship between crop husbandry and village life in New England, if indeed there was one, is complex and poorly understood (e.g., Chilton 2002; Hastenstab 1999).

To the west of the Ontario Iroquoians, recently analyzed Younge and/or early Springwells period (ca. A.D. 1100–1300) human remains from Windsor have yielded isotopic evidence of a dietary maize component comparable to fourteenth-century Iroquoians (Henderson et al. 2003) with no clear sign in their archaeological record of any long-standing tradition of village life, or even year-round occupied base settlements, prior to the Springwells phase (Krakker 1983; Murphy and Ferris 1990).

This overall variation is fully consistent with an understanding of sociopolitical organization during the Middle and Late Woodland periods as being characterized by a series of autonomous communities distributed throughout the lower Great Lakes, and with the recognition that there was unlikely to have been a simple, direct, relationship between the adoption of maize and the development of sedentism. The people of the Grand River valley during the second half of the first millennium A.D. represent one or more of these autonomous groups. Even here, in the core area of early agricultural experimentation in southern Ontario, the shift to food production did not bring about an immediate transition to formal village life given the settlement-subsistence patterns evident on this site and other Early Iroquoian sites of the subsequent three centuries. By the late tenth and early eleventh centuries, some four to five hundred years after the initial introduction of maize to the area, sites such as Holmedale, Porteus, Grand Banks and Forster appear to have been more intensively occupied and subject to a greater degree of internal spatial organization, but whether they represent year-round settlements or long-term repeated seasonal occupations remains to be demonstrated conclusively.

The point, or more likely points, at which the other aspects of Late Woodland Iroquoian life that are so intimately associated with the agricultural economic system crystallized within the Grand River drainage, or indeed elsewhere in southern Ontario, remains to be discovered, as do the means by which this shift occurred. With more detailed analyses of other Princess Point sites, it may be possible to begin to reconstruct the actual degree of social and political relatedness between these communities. Investigating these networks, which will require examination of both major base settlements and smaller sites, will no doubt also contribute to the debate regarding Iroquoian origins and cultural evolution and the role of agriculture in these developments.

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