

**INVESTIGATIONS OF IROQUOIAN SETTLEMENT AND SUBSISTENCE
PATTERNS AT CRAWFORD LAKE, ONTARIO—
A PRELIMINARY REPORT**

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Crawford Lake is located on top of the Niagara Escarpment approximately 65 km west of Toronto, Ontario. Currently, the lake serves as the nucleus of a recreation area operated by the Halton Region Conservation Authority. Recent scientific investigation of the lake by Dr. John H. McAndrews (of the Royal Ontario Museum) and his colleagues has resulted in the discovery that the sediments are varved. McAndrews has proposed that the lake was formed by the collapse of limestone bedrock overlying an underground river which served as a spillway during the last Glaciation. This collapse blocked the drainage system and created a lake some 2-1/2 hectares in extent and 24 meters deep. Since the lake's formation four meters of sediments have accumulated on the bottom. The upper 1-1/2 meters consist of layers which are alternately light and dark in colour. The light layers are the result of the precipitation and settling out of calcium carbonate during the summer months, while the dark layers result from the settling out of organic matter during the winter months. As part of an ongoing programme of the investigation of climatic and vegetation change in northeastern North America, McAndrews, Maria Boyko and Roger Byrne have subjected the varved sediments to palynological analysis (McAndrews and Boyko, 1974).

One of the results of this work has been the documentation of the shift from a Beech-Maple forest to an Oak-Pine forest at around 1500 A.D. Associated with this is an increase in grass pollen including maize (*Zea mays*) in the sediments dating between 1310 and 1535 A.D.

Since maize pollen is rarely carried more than a kilometer from the fields in which corn is grown, the presence of prehistoric agriculture and one or more Iroquoian villages was predicted in the immediate vicinity of the lake. Preliminary investigations by Byrne in 1972 resulted in the location of the Crawford Lake site, approximately half a kilometer NNW of the lake. The presence of this village site along with the accurate annual record of vegetation change throughout the period of Indian occupation presented a unique opportunity to investigate Iroquoian settlement and subsistence patterns and the effects of prehistoric agriculture on the landscape in this part of southern Ontario. Accordingly, an interdisciplinary project utilizing biogeographical, geological, palynological and archaeological studies was initiated by Byrne, Finlayson and McAndrews. The project has been supported by Canada Council grants to McAndrews in 1973 and to Finlayson in 1974. Additional support has been provided by the Royal Ontario Museum; Erindale College; University of Toronto; the University of Western Ontario; the Halton Region Conservation Authority; and the University of California.

To date, efforts have concentrated on investigating the Crawford Lake site and the environment within a two to three mile radius of the lake.

In 1973 McAndrews investigated the geology and environmental history of the Crawford Lake region (McAndrews and Boyko, 1974). At the same time, Byrne conducted a vegetational analysis in an attempt to estimate the wild plant food potential of an area of 10 square miles immediately surrounding the lake. This resulted in the definition of five habitat types, each of which is characterized by a more or less homogeneous vegetation cover. Within each habitat type both younger stands (i.e., less than 50 years old) and older stands (i.e., more than 50 years old) were studied in order to better understand the subsistence potential. Quantitative data

were collected for five kinds of nut trees—bitternut, hickory, beech, butternut, and white and red oak. Byrne has estimated that in a good year, a total of 353,000 bushels of nuts would be produced if the 10-square-mile region was covered with older woodland. If younger woodland was present approximately 156,000 bushels of nuts would have been produced. In bad years the yield would have been approximately half as much. In addition, considerable variation in the productivity of each of the habitat types has been documented (Byrne, 1974).

During the past summer, Byrne undertook a detailed pollen study of the lake sediments in an attempt to more accurately determine the nature of the vegetation and its change during the period of Indian occupation. Previously, the sediments had been examined in 10 or 25-year intervals for the period representing the last 1800 years (McAndrews and Boyko, 1974). This year, the sediments between 1300 and 1545 A.D. are being examined in five-year intervals. At present, the analyses are not complete, but some preliminary results are available. Byrne has noted that there are a series of 48 thick layers which date from 1435 to 1459 A.D. These particular sediments produce larger amounts of maize (*Zea mays*) pollen and also contain quantities of bracken fern spores (*Pteridium*), purslane (*Portulaca*), and Indian chickweed (*Mollugo*) pollen. Seeds of purslane and Indian chickweed, and sunflower (*Helianthus*) seed coats have also been found in some quantity in these layers. The historical record indicates that purslane and Indian chickweed are documented as having been used by the Iroquois as a potherb. Since both are self-pollinating plants, Byrne suggests that the presence of their pollen and seeds can be explained only by the plants having been washed in the lake prior to their use (Byrne and McAndrews, 1975). Due to the large amounts of pollen and seeds in the lake sediments during the 24-year period, it is suggested that this most likely represents the period of occupation of the Crawford Lake village site.

Archaeological investigations have been largely concentrated on the Crawford Lake village site. The aims were: (1) to determine the size of the site in order to allow estimates to be made about its population; (2) to obtain a sample of artifacts in order to place the site in the cultural-historical framework for the Ontario Iroquois (Wright, 1966); and (3) to obtain floral and faunal remains to allow an investigation of the subsistence practices of the occupants of the site.

In 1973, two test trenches 3 meters wide and 144 and 126 meters long were excavated across the probable site area (Figure 1). These revealed the presence of six longhouse structures, the walls of which were delimited by trenching. Widths ranged from 23 to 26 feet with a mean of 24 feet. Lengths for three houses were determined to be 148, 116 and 82 feet, but the lengths could not be determined for the remaining three houses due to the presence of recent disturbances. The 82-foot-long house was completely excavated (Finlayson and Matson, 1974).

Last summer two more trenches 2 meters and 1-1/2 meters wide and 100 meters long were excavated to investigate the western portion of the site. This excavation indicated that there was an extension on the 116-foot house. It also suggested the presence of a single palisade surrounding the village although no evidence for this had been recovered in 1973.

In addition, half of the 148-foot house structure was excavated to gather more data on the internal characteristics of the houses and also to test a recording procedure for the computerized plotting of settlement pattern data. (This is part of a National Museum of Man contract to facilitate the salvage excavation of Iroquoian sites.)

A study of the settlement pattern data gathered in 1973 in conjunction with the ethnohistoric data on the Huron suggested that 19.7 linear feet of longhouse was utilized by each pair of families. If this is applied to the complete or minimum lengths of the six houses, it can be hypothesized that 74 families could have occupied the available space. Using an average of six

individuals per family, a population of approximately 450 individuals might have occupied the village.

The sample of artifacts recovered in 1973 is diagnostic of the Middleport substage of the Middle Ontario Iroquois Stage (Wright, 1966). This is demonstrated by the high incidence of *Middleport Oblique*, *Lawson Incised* and *Ontario Horizontal* pottery types which account for 56% of the rim sherds recovered (Finlayson and Matson, 1974: 45).

In his definition of the Middleport substage, Wright (1966) noted four distinct clusters of sites—one in the Bruce County area, one in southern southwestern Ontario, one in the Toronto area and one in northwestern New York. Comparison of the Crawford Lake site with these clusters by means of seriation of ceramic types indicates that the site is most closely related to the Toronto area sites and falls in the latter part of the substage.

Subsistence practices were investigated by collecting macro-faunal remains by screening pit and midden fill, and by subjecting 35 bushels of fill to a flotation technique which was modification of the system used by Struever (1968).

An identification of the mammal bone by Isobel Heathcote under the supervision of Dr. Howard Savage indicates that deer (*Odocoileus virginianus*) was the most important animal being hunted. However, a variety of other mammals including elk (*Cervus sp.*), wolf or dog (*Canis sp.*), muskrat (*Ondatra zibethicus*), and squirrel (*Sciurus carolinensis*) were also being utilized (Burns and Heathcote, 1974).

The examination of the fish bones was undertaken by Jim Burns. This indicated that catfish (*Ictaluridae*), pike (*Esocidae*), sucker (*Catostomidae*), and lake sturgeon (*Acipenseridae*) are the most predominant species being utilized although others, including longnose gar (*Lepisosteidae*), and drum (*Sciaenidae*), were also used (Burns and Heathcote, 1974).

The use of the flotation process resulted in the recovery of 9,000 cu. cm. of charred floral remains which have been examined by Larry King. Carbonized wild plant food remains include: 1,052 raspberry seeds (*Rubus sp.*), 158 elderberry seeds (*Sambucus sp.*), 304 sumac seeds (*Rhus typhina*), 49 chenopod or amaranth seeds (*Chenopodium sp.*), 4 blueberry seeds (*Vaccinium sp.*), 9 hawthorn apple seeds (*Crataegus sp.*), and 3 dogwood pits (*Cornus sp.*). In addition, a large sample of nut fragments was recovered. King reports that bitternut hickory (*Carya cordiformis*), butternut (*Juglans cinerea*), and beech nut (*Fagus grandifolia*) were present (King and McAndrews, 1974).

Cultigens are represented by maize (*Zea mays*) and beans (*Phaseolus vulgaris*).

The wood charcoal recovered has been identified by McAndrews. Most of it is maple (*Acer*), beech (*Fagus*), elm (*Ulmus*) and ash (*Fraxinus*). Pine (*Pinus*) was present in insignificant amounts, and oak (*Quercus*) was entirely absent (King and McAndrews, 1974). If the charcoal is representative of the forest cover surrounding the site, it would appear the site was established in a climax forest which was subsequently cleared. Such a sequence of events is also suggested by the pollen analyses. Thus, it would appear that it may be possible to gain some insight into the nature of local forest cover by the identification of the charcoal in archaeological deposits. This presents interesting possibilities for further research.

A brief archaeological survey within a three-mile radius of the lake was undertaken in the fall of 1973 by Peter Ramsden (1974). The survey indicated the presence of a Middle Ontario Iroquois site approximately three miles southwest of Crawford Lake. Test excavations were conducted at this site during the past summer with a major part of the work being by archaeological field schools from Erindale College, University of Toronto and the University of Western Ontario. At present, only a portion of the material has been washed and catalogued. A preliminary examination of the ceramics indicates that the site is an early Middleport substage site.

It is suggested that this represents the village occupied prior to the Crawford Lake site.

The work carried out in the Crawford Lake region in 1973 and 1974 was of a preliminary nature and certainly much more work will be necessary before any detailed statements can be made about the nature of Iroquoian settlement and subsistence patterns. However, the work to date has produced some important results and some suggestions for further research.

First, it has been demonstrated that the Crawford Lake site is one of the sites whose agricultural fields were depositing maize pollen in the Crawford Lake sediments. The pollen studies by Byrne suggest an occupation of the sites between 1435 and 1459 A.D. This would suggest that the current chronology for the Middleport substage is in need of revision.

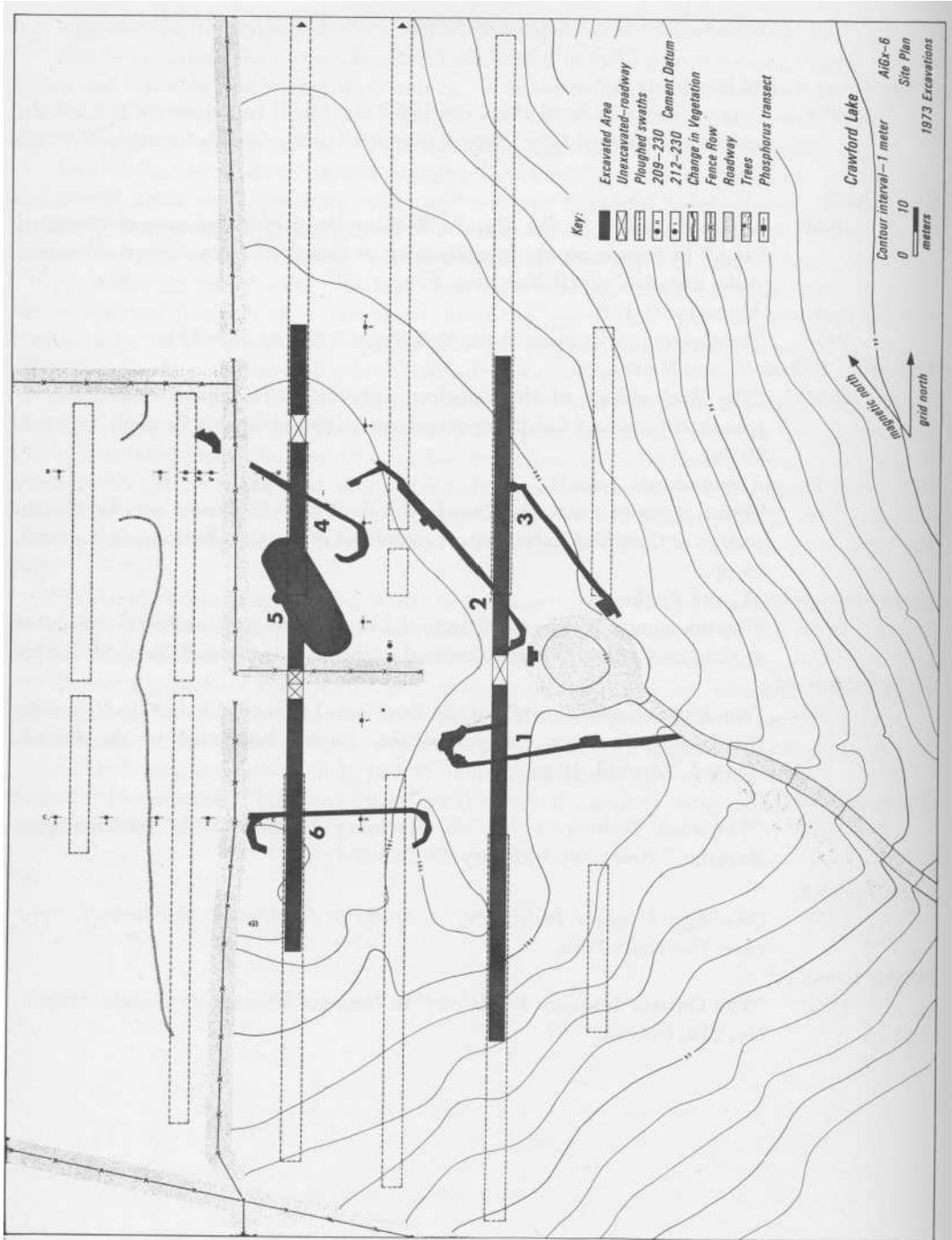
Secondly, the use of a flotation technique has resulted in a much better documentation of the subsistence practices of a prehistoric Iroquoian population. The sample of wild food remains is by far the largest to be reported from any Ontario Iroquois site and indicates a wider utilization of wild plant foods than is normally documented.

Also, the recovery of beans is the first evidence for their cultivation during the Middleport substage. Prior to this, it has been suggested that bean agriculture was not introduced into southern Ontario until the late Ontario Iroquois stage. In his definition of the Middleport substage, Wright proposed that there definitely appeared to have been a rapid population increase in this substage which was perhaps associated with a greater reliance on agriculture (1966). Perhaps this greater reliance may have included the adoption of beans as a cultivated crop.

Finally, the project suggests that it may be possible to trace a series of village movements in the Crawford Lake area in a manner somewhat similar to that proposed by James A. Tuck for the Onondaga in New York (1971). From the data which is currently available, it is possible to hypothesize a movement from the Early Ontario Iroquois Bennett site, which is located three miles south of Crawford Lake to the one or two as yet unknown sites, to the site test excavated last summer, to the Crawford Lake site. Since the pollen core suggests the presence of agricultural fields near the lake until 1534 A.D. there are probably two or three more sites which remain to be discovered. Further archaeological survey is currently being undertaken to locate additional sites.

REFERENCES

- Burns, James A., and Heathcote, I.
1974 "Faunal Remains from the Crawford Lake Site." In *Report on the Investigations at Crawford Lake*. Report submitted to the Canada Council, Xeroxed, 20 pp.
- Byrne, Roger
1974 "Areal Variation in the Woodland Plant Food Potential around Crawford Lake." In *Report on the Investigations at Crawford Lake*. Report submitted to the Canada Council, Xeroxed, 35 pp.
- Byrne, Roger, and McAndrews, J. H.
1975 "Pre-Columbian Purslane in the New World." *Nature* 253: 726.
- Finlayson, William D., and Matson, M.
1974 "The Archaeology of the Crawford Lake Site." In *Report on the Investigations at Crawford Lake*. Report submitted to the Canada Council, Xeroxed, 80 pp.
- King, Larry D., and McAndrews, John H.
1974 "Plant Remains from the Crawford Lake Site." In *Report on the Investigations at Crawford Lake*. Report submitted to the Canada Council, Xeroxed, 19 pp.
- McAndrews, John H., and Boyko, M.
1974 "Environmental History of Crawford Lake." In *Report on the Investigations at Crawford Lake*. Report submitted to the Canada Council, Xeroxed, 23 pp. Ramsden, Peter G.
1974 "An Archaeological Survey of the Environs of Crawford Lake." In *Report on the Investigations at Crawford Lake*. Report submitted to the Canada Council, Xeroxed, 10 pp.
- Struever, Stuart
1968 "Flotation Techniques for the Recovery of Small-Scale Archaeological Remains." *American Antiquity* 33: 353-362.
- Tuck, James A.
1971 *Onondaga Iroquois Prehistory: A Study in Settlement Archaeology*. Syracuse: University Press.
- Wright, James V.
1966 "The Ontario Iroquois Tradition." In *National Museum of Canada Bulletin*, No. 210, Ottawa.



Map 1
Crawford Lake Site