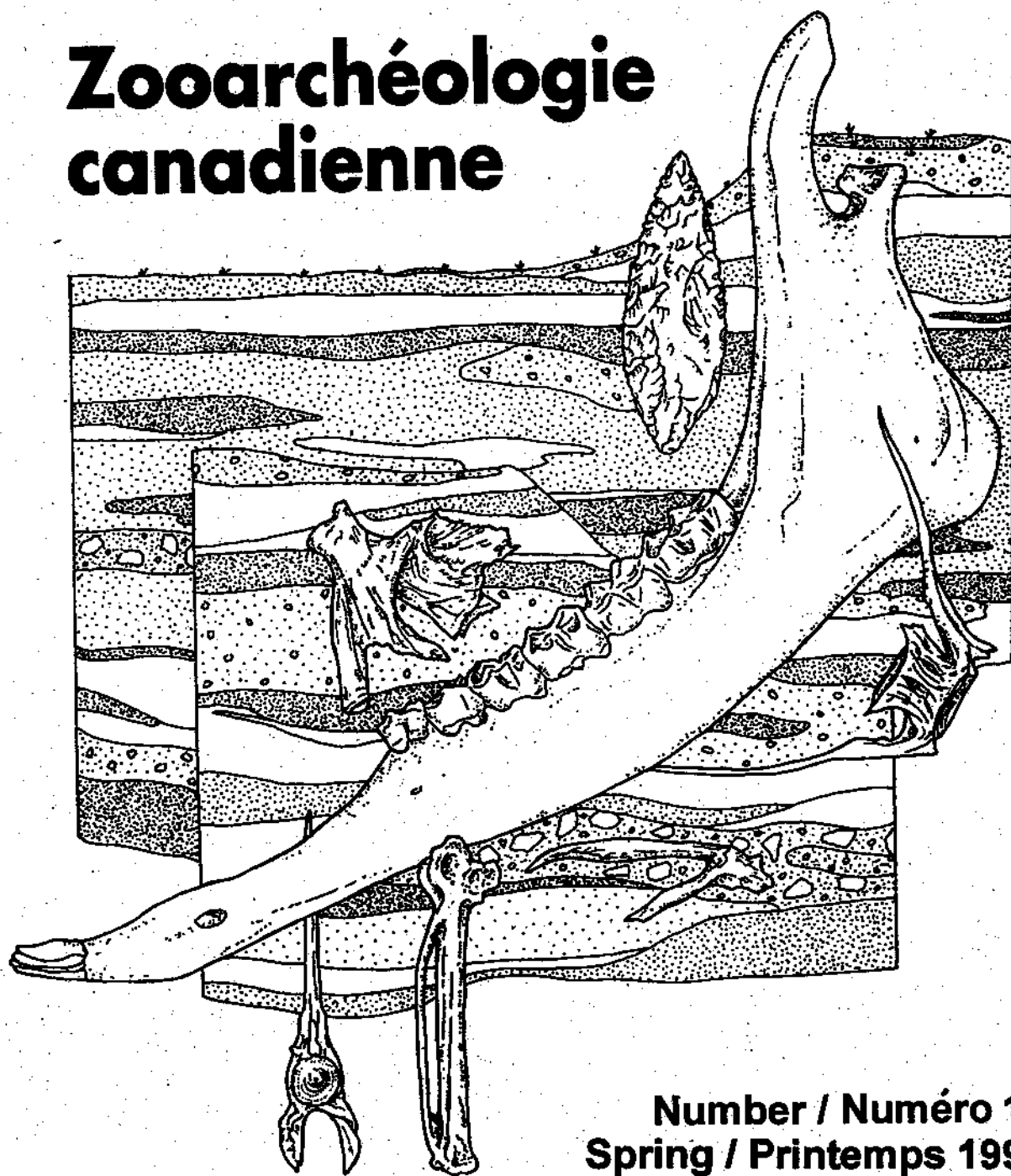


Canadian Zooarchaeology

Zooarchéologie canadienne



Number / Numéro 13
Spring / Printemps 1998

CANADIAN ZOOARCHAEOLOGY / Zooarchéologie canadienne**Table of Contents / Table des Matières**

Editor's Note / Note de l'Editeur	... 2
Feature Listings/ Articles de fond:	
Ph.D. Abstract - Evelyne Cossette	... 3
Ph.D. Abstract - Frances Stewart	... 4
Fishing at the Auger site - by Martha A. Latta	... 5
Papers delivered at spring conferences	
Canadian Archaeological Association	... 17
Society for American Archaeology	... 18
Forthcoming Conferences / Conférences à Venir	
Update for ICAZ '98	... 19
Requests, Exchanges, Notices / Démandes, Echanges, Avis	... 20

Happy summer, everyone -

We're a little late with this issue, mainly because I've been away from work on parental leave (I'm now the very proud parent of Hanna, a cheerful 21 month old baby). I've asked Dr. Max Friesen to be guest editor of this issue - Max is Assistant Professor and teaches Zooarchaeology in the Anthropology Department at the University of Toronto. You'll find this an interesting and stimulating issue, and both Max and I encourage any comments on the contents. I also want to emphasise the final point in Max's editorial, that we **REALLY ENCOURAGE** submissions for the newsletter - this is your chance to publish data and/or interpretation in an informal venue, which will reach your colleagues across and beyond Canada.

Kathlyn Stewart, Editor

EDITOR'S NOTE/NOTE DE L'ÉDITEUR

I will pry myself away from my beluga whale bones long enough to welcome readers to the lucky 13th issue of Canadian Zooarchaeology, which you will receive a scant two months, or so, before the ICAZ meeting in Victoria. I look forward to meeting many of you there at what promises to be not only an important international conference, but also a particularly large assembly of Canadian zooarchaeologists. An update on this conference appears later in this issue.

This issue also appears at a time when many of us are anticipating fieldwork. If anybody is about to engage in a field project with a research design based around zooarchaeological pursuits, you might consider submitting an overview to the next CZ, as a means of spreading the word on the nature of ongoing research, or perhaps to initiate debate or comment on appropriate field collection methodologies for zooarchaeologists.

This issue features an article by Marti Latta of the University of Toronto, in which she has synthesized the findings of 10 student analyses of fish remains from the Auger Site, a Huron Village in Ontario.

In addition, we have abstracts of two recent zooarchaeology-based dissertations, from Evelyne Cossette and Frances Stewart, both of whom are well known within our community. The ongoing production of graduate theses proves that zooarchaeology is alive and well in Canada.

As a final note, I will admit that, having taken on the temporary editorship of CZ, I had assumed that contributions would be pouring in. In reality, however, they seem as scarce as hen's teeth, and I think it's worth noting that a publication like this one cannot prosper without active participation by the readership. I will admit that I am guilty of not submitting articles or other content in the past, and I have vowed to myself to send Kathy Stewart, the regular editor of this publication, contributions in the future.

As Howard Savage used to say... Have a happy bone day!

Max Friesen, guest editor

Canadian Zooarchaeology is published twice a year at the Canadian Museum of Nature. News, letters, articles, books or papers for review should be sent to:

*Dr Kathlyn Stewart, Zooarchaeology,
Canadian Museum of Nature,
P.O. Box 3443, Station D,
Ottawa, Ontario, K1P 6P4
Telephone: (613) 364-4051
Fax: (613) 364-4027
e-mail: kstewart@mus-nature.ca*

Submissions are published in English or French.

Subscription costs (including GST) are:

*Cdn \$8.50 - Individuals
Cdn \$17.00 - Institutions
US \$8.50 - Individuals*

Please remit by cheque or money order, made out to: Canadian Museum of Nature-Zooarchaeology

Dissertation Abstract

by Evelyne Cossette

**1995. Assemblages
zooarchéologiques et stratégies
de subsistance des groupes de
chasseurs-pêcheurs du site
Hector Trudel (Québec) entre
500 et 1000 de notre ère.**

**Ph.D. Dissertation, Université de
Montréal, Département
d'Anthropologie**

Late Middle Woodland subsistence strategies are investigated through the analysis of eight archaeozoological assemblages from the Hector Trudel site located on Pointe-du-Buisson (southern Quebec), and dated from 500 to 1000 AD. The comparative analysis of these samples suggests that a broad-based economy had already been adopted at the beginning of the Late Middle Woodland period. More importantly, this strategy seems to have remained unchanged until circa 1000 AD.

The study of the richness and diversity of the assemblages indicates that, prior to the adoption of horticulture, neither a gradual broadening of the prey spectrum, a chronological diversification of the

subsistence basis, nor an intensification of the exploitation can be attested. Late Middle Woodland subsistence strategies were characterised by long-term seasonal occupations during the warm season. An economic calendar of the hunting and fishing practices carried out at close proximity to the site is presented. Accrued evidence suggests that only a small number of mammalian species (such as black bear, white-tailed deer, moose and beaver) were exploited at a distance from the camp and that hunting activities were mainly scheduled during early spring and autumn. Fishing activities were carried out through the summer months in different aquatic habitats near the camp, while peak periods of activity, aimed at capturing Lake Sturgeon, Channel Catfish and Redhorses, are suggested.



Dissertation Abstract*by Frances L. Stewart*

**1997 Proto-Huron/Petun and
Proto-St. Lawrence Iroquoian
Subsistence as Culturally
Defining**

Ph.D. Dissertation, Department of
Anthropology, McGill University

This zooarchaeological study compares the diets of two groups of Iroquoians *ca* AD 1500. One group is the proto-Huron/Petuns in York County and the other is the proto-St. Lawrence Iroquoians in Grenville County, Ontario. The zooarchaeological remains from one village in each area provide most of the comparative data. For the proto-Huron/Petuns, the zooarchaeological sample from the Keffer site (AkGv-14) is used and for the proto-St. Lawrence Iroquoians, the McKeown site (BeFv-1). Standard procedures for faunal identifications are used, but some modifications are made to accepted methods of analysis to adapt them to these Iroquoian samples. Because the Iroquoians were horticulturalists, palaeoethnobotanical evidence from the two sites and the two areas is considered as is previous work on

Ontario human and animal skeletal remains.

Contrasts were found between the Keffer and McKeown zooarchaeological samples. Comparisons with faunal remains from contemporaneous sites in the same two areas confirmed the distinctions. There are differences in the particular species exploited and in the degrees to which the same animals were exploited.

It is concluded that the proto-Huron/Petuns had a more nutritious diet than that of the proto-St. Lawrence Iroquoians. This was likely influential in the success of proto-Hurons/Petuns and the decline of the proto-St. Lawrence Iroquoians. This Iroquois material supports Malthus' position that population growth is dependent upon agriculture as opposed to Boserup's position that growth causes changes in food production.



FISHING AT THE AUGER SITE, BdGw-3

by Martha A. Latta

Introduction

This paper briefly summarises major findings from a ten-year study of fish resource utilisation exhibited by the 17th century Huron people of the Auger Site in southern Ontario.

Thanks are due to the following persons who have identified faunal remains from the Auger Site: Sidney Wilson (1983), Wendy Cameron and June Morton (1984), Jane Macaulay (1984), Nancy Elaszuk (1986), Frank Dieterman (1987), Howard Kim (1987), Lynda Wood (1987), Norbert Stanchley (1990), and William Brearley (1992). Thanks, as well, to Chris Andersen, Frances Stewart, and Max Friesen, who have given advice and suggestions about aspects of this work. Special thanks are due to Dr. Howard Savage who inspired and guided us all. The conclusions drawn in this analysis are the work of the author and do not necessarily represent the views of any of these analysts.

The Auger Site Faunal Sample

The Auger Site, BdGw-3, dates from the period of early European contact, around AD 1720, as indicated by the predominance of white and dark cobalt glass beads found in houses and middens. Its location in Medonte Township, Simcoe County, fits comfortably

within the area attributed to the Attigneenongnahac, or Fishing Cord or Net people, the second nation of the Huron confederacy.

Excavation by field schools of the University of Toronto has shown that the site covers an area of approximately 3.6 hectares. The residential portion of the site, excluding its triple-row palisade and perimeter middens, covers slightly more than 2 hectares. All or part of 14 longhouses have been excavated. Extrapolating from the known village area and the size and density of houses, the Auger site probably contained around 40 longhouses at its maximum occupation. A population of 750 to 1000 persons seems not unreasonable (Latta 1985, 1983-93).

A total of 136,847 artifacts and ecofacts have been recovered and processed to date, including 34,772 faunal specimens. Over 33,000 have been sorted to the class level, and within this number, fish bones were by far the most common category, and were over twice as numerous as mammal bones, the next most common class (Table 1).

Table 1. Faunal identifications to the Class level, Auger Site.

Class	NISP	%NISP
Fish	20,108	59.8
Mammal	10,022	29.8
Bird	865	2.6
Reptile/Amphibian	204	0.6
Pelecypoda	794	2.4
Gastropoda	783	2.3
Uncertain	848	2.5
TOTAL	33,624	100.0

As noted by Stewart (1991), the use of water screening increased the fish bone frequency to 66% of all bone elements found. Water screening was performed in 1985, when sufficient water was available; otherwise, the bone was retrieved from quarter-inch mesh screening. The resultant loss is likely to be greatest in the smallest species; however, this loss is probably small in comparison with the effects of loss due to food preparation such as off-site filleting and taphonomic processes including ingestion by dogs.

Within the total sample of almost 35,000 faunal specimens, 4,188 (12.0%) have thus far been identified to family or smaller taxonomic level. Because the analysts often found it difficult to determine which of several similar fish species was represented, a substantial proportion of the bones of catfish, suckers, and walleyes are identified only to the genus or family level.

The analysed bone samples represent all of the major middens excavated through 1990. These include four palisade midden areas on the northeast, east, southwest, and northwest of the site, and two extensive "interior" middens associated with an earlier palisade line, one in the north of the village and one in the south. This strategy was intended to provide the widest possible overview of the discard behaviour on the site, and it was also intended to minimise the possibility of individual animals occurring in more than one site area.

For the purposes of the following study, I have utilised MNI rather than NISP values, following

the general definitions of Casteel and Grayson (1977) and Lyman (1994). To be exact, I have treated each midden sample as a separate discard universe, along the lines of Jones' (1983) MNIf. The probability of error grows with the size of the species; it seems unlikely that a tiny rock bass would have been subdivided between different houses, but quite possible that a large lake trout or sturgeon would have been.

Table 2 gives the osteichthyes species identified at the Auger Site. Minimum numbers of individuals were calculated on the basis of occurrence of duplicate elements within species. On this basis, the Auger sample identified to this point represents at least 252 individual fish.

Estimating the weight of fish is difficult. Unlike mammals, fish continue to grow throughout their lives, and long-lived individuals are likely to be substantially heavier than young adults. On the other hand, over-fishing in the Great Lakes in the last century has greatly reduced the number of large individuals; references to fish taken in the early 20th century almost always suggest sizes which would be near-records today.

Using a variant of the traditional method of Casteel (1974), I chose a size which was half-way between the modern average and record sizes in 1970 (Scott and Crossman 1973). Like most averages, it is more likely to be accurate when the sample size is large, but it at least allows us to subdivide the assemblage into size classes and to separate the sturgeon from the rock bass.

Table 2. Osteichthyes identified at the Auger Site, BdGw-3, Ontario.

Acipenseridae (Sturgeons)		
Lake sturgeon <i>Acipenser fulvescens</i>	8	5
Amiidae (Bowfins)		
Bowfin <i>Amia calva</i>	17	4
Salmonidae (Salmon, Trout)		
Lake trout <i>Salvelinus namaycush</i>	3	2
Cisco <i>Coregonus artedii</i>	1	1
Esocidae (Pike)		
Northern pike <i>Esox lucius</i>	2	2
Muskellunge <i>Esox masquinongy</i>	2	2
Catostomidae (Suckers)		
Longnose sucker <i>Catostomus catostomus</i>	85	17
White sucker <i>Catostomus commersoni</i>	50	13
Silver redhorse <i>Moxostoma anisurum</i>	3	2
Ictaluridae (Catfishes)		
Yellow bullhead <i>Ictalurus natalis</i>	23	7
Brown bullhead <i>Ictalurus nebulosus</i>	63	14
Channel catfish <i>Ictalurus punctatus</i>	59	22
Anguillidae (Freshwater eels)		
American eel <i>Anguilla rostrata</i>	6	2
Gadidae (Cods)		
Burbot <i>Lota lota</i>	1	1
Percichthyidae (Temperate bass)		
White bass <i>Morone chrysops</i>	11	5
Centrarchidae (Sunfishes)		
Rock bass <i>Ambloplites rupestris</i>	9	6
Pumpkinseed <i>Lepomis gibbosus</i>	42	12
Smallmouth bass <i>Micropterus dolomieu</i>	82	24
Largemouth bass <i>Micropterus salmoides</i>	42	10
Percidae (Perches)		
Yellow perch <i>Perca flavescens</i>	220	60
Sauger <i>Stizostedion canadense</i>	98	12
Yellow walleye <i>Stizostedion vitreum</i>	93	24
Sciaenidae (Drums)		
Freshwater drum <i>Aplodinotus grunniens</i>	11	3

Fish weights are almost always recorded as caught, i.e., including the skeleton, and the ratio of skeleton to edible meat needs some work. The few examples which I could draw upon suggested that the skeleton made up no more than 50% of the total weight of the fish; the rest might be fins and scales as well as muscle, but much of it was edible. Thus, after calculating the average weight for each species, I divided that weight by 2 to obtain some measure of meat weight per individual fish.

Comparing these weights with average edible meat weights of mammalian species yields a rough outline of the relative meat weights of major food species at the site (Table 3). As Table 3 shows, although many fish were small (9 species ran between 0.5 and 1.0 kg), they are comparable in terms of edible to squirrels, rabbits, and other small mammals. Further, since a number of species fall into the medium or even heavy range, individual fish could represent very sizeable contributions to the human diet. Fortunately, such large fish were the ones most likely to be recovered by the techniques used at the Auger Site.

Table 3. Edible meat weights per individual for selected fish and mammal species.

SPECIES	WEIGHT (kg)
Black Bear	94.5
White-tailed Deer	45.0
Lake Sturgeon	38.0
Beaver	17.3

(Table 3. Continued)

SPECIES	WEIGHT (kg)
Muskellunge	15.3
Lake Trout	12.6
Channel Catfish	9.9
Small Dog	6.7
Porcupine	4.5
Freshwater Drum	3.0
Walleye	3.0
Largemouth Bass	2.8
Woodchuck	2.5
Snowshoe Hare	2.0
Longnose Sucker	1.4
Smallmouth Bass	1.3
Sauger	1.0
Bowfin	0.67
Cottontail	0.67
Grey Squirrel	0.45

Notes About Particular Species

In the following discussion, notes on behaviour and distributions of individual species are drawn from Scott and Crossman (1973), Mackay (1969), and Wooding (1972).

The commonest fish in the assemblage, by a considerable margin, was the yellow perch. The yellow perch is delicious. It feeds all year and can be taken on hook and line through the ice in the winter. Since it schools, commercial fishing with nets is profitable; the 1968 catch in Lakes Ontario and Erie, alone, was nearly 50 million lbs. Since individual perch provide slightly more than 500 grams of meat, however, the 60 perch in the Auger sample

represented only 35.1 kg of edible meat.

The three largest species are represented by very small NISP's, which renders their proportionately high MNI's somewhat suspect. Eight sturgeon bones from five locations yielded five individuals; three lake trout bones in two locations and two muskellunge bones in two locations yielded two each. It is at least clear that the Auger people were able to capture fish of this size, and if they could catch one they could presumably catch more than one.

Part of the difficulty in evaluating sturgeon is that they are highly sexually dimorphic. Males average less than half the size of females, partially because they seem to die at a considerably earlier age. Muskellunge, like the northern pike, can be caught by angling. These are sedentary and territorial fish, and populations in any area are likely to be small.

Leaving aside these doubtful categories, the species which provided the most meat at the Auger site was the channel catfish which, like most catfish, are territorial. The male builds a nest, attracts a female, protects the eggs, and guards the fry for a period. This species feeds less on the bottom than other species in the family Ictaluridae, channel catfish strike vigorously at still bait, and are fond of worms. Scott and Crossman (1973) note that they are excellent food fish, but some people consider the meat too rich or strong. This quality would probably have been advantageous to the Huron, whose cereal diet could have been varied by the addition of any other available

flavouring. Channel catfish provide an average of 9.9 kg of meat, yielding a total of 217.8 kg of edible meat in the Auger assemblage. Two other catfish species, the brown and yellow bullheads, were also present in substantial numbers. They are small, compared to the channel catfish, weighing only about 0.5 kg each, and yield only about 10.5 kg of meat in the site total.

About equal in frequency with the channel catfish, though less than half that of the yellow perch, were the walleye and the smallmouth bass. These are substantial fish, supplying approximately 3.0 and 1.3 kg of available meat, respectively. Together, they provided slightly more than 100 kg of meat.

Walleyes, and their cousins the saugers, are year-round feeders. They can be taken by still fishing in summer and winter, and because they school, netting brought large catches in the earlier years of the 20th century. They appear to return to the same spawning grounds repeatedly. During the summer, walleyes seem to suffer from excessive light; they tend to remain under dark overhangs and turbid waters during the day and only emerge to feed in twilight.

The smallmouth and largemouth bass are roughly the same size; the difference in mouth size is not immediately apparent. The record weight for largemouth bass is considerably greater than that for smallmouth; hence, they are evaluated as larger fish in this exercise. Both fish are territorial, with males building and defending nests. They are taken with lines or shallow nets, and the modern catch in

lakes and rivers is probably very great.

A family whose frequency is somewhat surprising is the suckers. These bottom-feeders grow to a respectable size, between 1 and 1.5 kg. Their meat is edible, but they are filled with bones. Scott and Crossman (1973) note that the longnose sucker is "used by native people in northern Canada as food for dogs, but even the dogs prefer the lake whitefish". Suckers will sometimes take hooks, but they are usually caught in nets, especially during the spring spawning run.

A family whose frequency is not surprising is the small sunfishes. Pumpkinseeds and rock bass are easily caught on light tackle. Many children today begin their fishing careers by angling from docks and stream banks, and Huron children doubtless did the same. In spite of their numbers, however, and because of their small size, they account for only 5 kg of edible meat.

The presence of American eel at the Auger site is doubtful. This species has been identified by two different analysts, but it still awaits confirmation by a more experienced analyst. Eel would not have been available in the neighbourhood of the Auger site. A catadromous fish, eels spend their lives in the lower Great Lakes and migrate back out to the mid-Atlantic to breed and, presumably, to die. Until the construction of the Welland Canal, Niagara Falls was an impassable barrier for these fish, and males rarely progressed farther than the St. Lawrence (Andersen 1988). If these six eel elements are correctly

identified, then it would appear that the Auger people were fishing far beyond the immediate environs of the site. Of course the Huron were trading with the French, as evidenced by the ample metal goods, and this took them into prime eeling territory; they may have acquired the eels at the same time.

One bone has been identified as burbot, or ling cod, which is a deepwater fish. Although the flesh is very coarse and minimally palatable, the liver, like that of maritime cods, is rich in vitamins A and D. The liver also produces quantities of good quality oil which may have been of more immediate relevance to Huron fishermen.

Several species are missing from the list. There are no minnows, chub, or dace species. Alewives, shad, and rainbow smelt are also absent. These are all common species in the Great Lakes area today, and there seems to be no reason to think that they were less common prehistorically. Most probably, they were cooked and eaten whole due to their small size, with their small bones being mostly digested.

More surprisingly, there are no bones from the lake whitefish, *Coregonus clupeaformis*. This is one of the commonest food fishes in Canada, occurring from coast to coast and from the Arctic to the Great Lakes. They are one of the most valuable commercial freshwater fishes, despite serious depletion in recent decades. In 1948, the Great Lakes produced 17.5 million lbs. of whitefish. A report from Lake Ontario in the 1850s suggested that catches of 40,000 in a single night

were made in long, shallow nets. Whitefishes live in large and small lakes, with well-established populations in Georgian Bay and Lake Simcoe. This fish is the mainstay of the local fishing industry, attracting large numbers of fishermen when ice conditions warrant.

Several possibilities might explain the absence of whitefish from the identified sample. First, it is possible that other salmonids might have been mistaken for whitefish – the likeliest candidate is the lake trout – but in fact, only six bones have been identified to this entire family by eight different analysts: three as lake trout, one as cisco, and two of unknown species. Even if these are all whitefish, it hardly presents a picture of a locally common, delicious, easily exploited species.

Second, it is possible that, as has been postulated for other salmonids, the bones of whitefish preserve poorly in the archaeological record (cf., Lubinski 1996). This observation has been raised to account for the rarity of Atlantic salmon bones in Lake Ontario and St. Lawrence Iroquoian sites. By this hypothesis, the long cooking of a salmon or trout would render its bones so fragile as to be edible. Certainly, some salmon bones are well preserved in sites on the west coast. In addition, whitefish bones were recognized in fair numbers by Stewart (1991) at the prehistoric Nodwell and Keffer sites. Therefore, under optimal preservation conditions, taphonomy cannot account for an absence of salmonid bones.

A third possibility is that the bones of salmonids were, for some reason, treated specially. This might involve filleting all of the fish at the catchpoint, or the careful removal of all whitefish bones for special disposal.

The fourth possibility – that the Auger people did not eat whitefish – would seem to suggest some sort of active rejection – perhaps totemic behaviour – rather than a simple dietary variance. At present, choosing between these four options is impossible, however it seems likely that some combination of two or more of them may contribute to the absence of whitefish bones in the Auger faunal sample.

Discussion

In order to evaluate the fishing methods practised by the residents of the Auger Site, additional background information is necessary. In this section, fish exploitation methods and aspects of fish behaviour in the eastern Georgian Bay region will be examined under the following headings: fishing methods presently effective for each species; proxemics; fish feeding behaviour; seasonality of spawning; and habitat preferences.

Methods of Exploitation

Many fishing methods are practised in the Georgian Bay region today and most of these were utilised by the 17th century Huron. Ethnohistoric observers (summarised in Heidenreich 1971) report the use of five main methods, presented here

with associated frequencies from the Auger faunal sample:

- 1) still angling with hook and line [229 individuals; 687.0 grams]
- 2) spearing [13 individuals; 261.2 grams]
- 3) small gill nets and weirs [47 individuals; 377.4 grams]
- 4) dip nets [61 individuals; 81.7 grams]
- 5) deep-water nets, often of great size [17 individuals; 24.1 grams].

All species except lake trout, eels, and longnose sucker can be taken on a line by still angling. More than half the individual fish obtained are not effectively taken by any other method. About one-third of the assemblage could also have been taken by gill nets or weirs, and about one-fourth could have been caught in dip nets. One species, the longnose sucker, is taken only in a deep net.

Combining all categories, we see that about 5/8 of the fish in the Auger sample are accounted for by angling, 1/4 by nets, and 1/8 by spearing and deep nets. Since the species acquired by angling tend to be small, the weight representation in this category is somewhat reduced, but it still accounts for nearly half the total weight.

All of the large species can be taken effectively by spearing. The use of gill nets and weirs, such as the one that Champlain described at the narrows between lakes Simcoe and Couchiching (Wrong 1922-1926), provided about 1/4 of the weight of fish.

Proxemics

Identified fish species exhibit three types of spacing behaviour:

- 1) fish which are isolated and territorial
- 2) fish which are grouped only at spawning
- 3) fish which school during non-spawning periods.

In terms of number of fish taken, groups 1 and 3 were equally common in the Auger faunal sample. Fish which grouped only at spawning were numerically less well represented. However, the schooling species tended to be quite small, and thus they represent a smaller fraction of the total dietary input than do the other two groups. Large species were divided between groups 1 and 2, increasing the meat weight values for these categories.

Poorly represented species might have been caught by accident in a net, but their numbers here suggest that they were pursued individually. It is notable that fish whose behaviour changes during spawning constitute a minority of the edible meat represented by the Auger assemblage. From a strategic point of view, we may conclude that the Auger residents made no effort to specialise in species which were seasonally more abundant.

Spawning Seasonality

As we have seen, most species do not group at spawning but, for those which do, breeding generally takes place in comparatively shallow

water. This is an optimal time to catch deep-water fish. Of these, as Heidenreich (1971) has shown, fish species vary greatly in the seasonality of their spawning runs.

The spawning season can be divided into six periods:

- 1) late winter – January through March, under the ice
- 2) ice break-up – April to mid-May
- 3) spring – mid-May to mid-June
- 4) summer – mid-June to August
- 5) autumn – September and October
- 6) early winter – November and December.

The large majority of species, both in frequency and in total weight, are spring spawners. More fish were obtained from spawning period 2, but the greatest weight is obtained from period 3. Summer spawning species are of less importance. Autumn and winter spawners are of little importance.

Feeding Behaviour

Many methods of fish exploitation rely upon the fish being attracted to a bait, in other words they rely upon feeding behaviour. Not only must the lure be attractive, it must be presented in the water area in which the species eats. Three general categories of feeding were recognized:

- 1) surface feeders [3 species; 77.6 grams]
- 2) mid-water feeders [10 species; 2218.2 grams]
- 3) bottom feeders [10 species; 1462.2 grams].

Surface feeding fish were rare in the Auger assemblage. Nearly two-thirds by both frequency and weight were mid-water feeders; some of these might feed in upper waters at certain seasons or times of day, but in general they might better be sought at depths of 6-10 meters.

The frequency of bottom-feeders was surprising. These species are best attracted by still angling or gill nets; they will not strike at a lure and, because they do not school, they are difficult to catch by trolling. In addition to this species frequency, a large number of bones are identified only to Ictalurid and Catostomid families. When these are included in the calculation, bottom-feeding fishes make up nearly half the edible meat in the Auger assemblage.

Fish Habitat

Fish in the region of eastern Georgian Bay usually occupy one of four basic habitats. These exclude their breeding grounds which were sometimes quite different from the areas where they otherwise lived:

- 1) small, slow-moving streams and ponds; often heavily vegetated and turbid [11 species]
- 2) streams and ponds with clear water, sandy or gravelly bottoms, and faster water movement [4 species]
- 3) large rivers and bays of large lakes; shallow water with muddy to sandy bottoms [8 species]
- 4) large rivers and lakes; deep water [4 species].

Some species varied between categories 1 and 2, or between 3 and 4, with the seasons.

I calculated the distances between the Auger village and water bodies of these characteristics. Water bodies of category 2, streams and clear ponds, were accessible less than 2 km away, perhaps one hour's walk. Categories 1 and 3, including slow-moving streams, turbid ponds, large rivers, and bays, were around 20 km distant, or one day's walk. Category 4, deep water habitats, were available from 20 to over 200 km away, and were therefore a minimum of one day's walk, but likely further.

Procurement Patterns

When all of these criteria are considered within the context of the Auger site and its hinterland, we can define three primary fishing patterns:

A. Opportunistic Procurement

Relatively few species prefer faster moving streams and deep water habitats, but the numbers and weights of fish in those species show that the Auger fishermen were exploiting clearwater streams and ponds heavily. The Coldwater River, which runs past the site, provides this sort of environment; it can be reached by an easy half-hour walk. At this distance it is cost-effective to carry out casual procurement efforts during spare time.

Virtually all of these species are best taken by angling, a method carried out by individuals, without need for any co-ordination. Because it is a low-impact activity and the appropriate water bodies are easily

accessed, it can be effectively performed by individuals who are physically restricted, such as pregnant women, children, and the elderly. Fish taken in these circumstances are likely to be consumed immediately.

B. Flexible Procurement

The majority of species in the Auger assemblage prefer weedy ponds and shallow bays and rivers. Small lakes and swampy areas, such as Bass Lake, 15 km south of the Auger village, and Lake Simcoe, about 10 km farther, were clearly being exploited. The shallow mouth of the Coldwater River and its debouchement into Georgian Bay lie some 20 km to the north.

To reach either of these areas is a good day's walk by land; Georgian Bay could be accessed by water in considerably less time, of course. A round trip by land, including fishing, would thus require three or more days. As a result, fishing activities in these environments needed to be planned and co-ordinated to some extent.

As noted above, bottom-feeding species are strongly represented. These require a different fishing strategy from the mid-water feeders which school and can be taken with nets; bottom feeders generally do not school and are most easily procured individually. Many bottom feeding species are isolated and territorial rather than schooling; as a result, they are relatively sedentary. Exploitation requires travel to where they are, not waiting to intercept large numbers at spawning runs.

On the other hand, most species in these environments can be taken throughout the year, including during periods of ice formation on lakes, making flexible procurement a year-round occupation.

At the fishing site, individuals might fish independently or they might join forces, depending upon the conditions encountered. Although netting and spearing are indicated, the great majority of species – both in frequency and in weight – are most easily taken by angling. Under these circumstances, the number and kinds of fish to be taken by each member of the group is a matter of individual preference; some individuals probably took large catches and others were satisfied with a few fish.

Co-operation is desirable but not necessary for fishing of this sort, consisting mostly of mutual protection and assistance on the journey to and from the village. Such work groups are likely to have had a social basis, perhaps consisting of families or farming parties. Fish taken by these measures could be prepared to some extent at the point of procurement and then brought back to the village for preservation by filleting, drying and/or smoking.

C. Structured Procurement

In some cases, successful fishing required advance planning and a structured fishing team. Fishing activities related to mass fish movements, such as spawning runs or large schools, require choice of location and season. Where large numbers of fish are taken in a short period of time, the most efficient procurement strategy resembles an

assembly line, in which individuals contribute to specific stages in the procurement or processing in return for a share of the catch. Spring-spawning species (April-May) were particularly common in the shallow waters of the Coldwater River mouth. Co-operative netting in shallow waters would have brought a rich harvest at this season.

The people of the Auger Site do not appear to have made extensive use of deep-water species, but some of the largest species occur only in deep-water locales where water transport is essential. For these species, a team of skilled co-workers was needed to manage boat, fishing gear and fish as well as a processing team to prepare the catch.

These structured procurement patterns are reflected in about one-third of the edible fish in the Auger Site sample. The nature of the procurement groups is a matter of speculation. They may have been corporate groups, representing individual lineages or longhouses, or they may have been informal associations of friends and colleagues; in either case, skill at the needed task would have been more important than social relationships. Leadership was determined both by age and experience and by ownership of the necessary tools – the nets and/or boats. Teams consisted primarily of able-bodied adult or adolescent men and women (Heidenreich 1971).

Fish caught by these methods, especially very large fish, were shared with the entire community in feasts and celebrations.

Conclusions

All members of the Auger community contributed to the acquisition of fish, obtained from a variety of sources – near and far – by methods of variable degrees of complexity. Most of the fish were caught and consumed without fanfare, providing the bulk of Huron dietary protein. Practices of drying, smoking and storing fish allowed food to be stockpiled for future needs. Huron men, thus freed from the necessities of the hunt, put their time and efforts into political and economic interactions consonant with growing social complexity.

References Cited

- Andersen, C. 1988. The eel fisheries of the St. Lawrence Iroquoians. *North American Archaeologist* 9(2): 97-122.
- Casteel, R. 1974. A method for estimation of live weight of fish from the size of skeletal elements. *American Antiquity* 39:94-98.
- Casteel, R. and Grayson, D. 1977. Terminological problems in quantitative faunal analysis. *World Archaeology* 9(2): 235-242.
- Heidenreich, C. 1971. *Huronian: A History and Geography of the Huron Indians, 1600-1650*. McClelland and Stewart, Toronto.
- Jones, K T. 1983. Forager technology: the Ache of eastern Paraguay, pp. 171-191. In: . G. M. LeMoine and A. S. MacEachern (eds), *Carnivores, Human Scavengers and Predators: A question of bone technology*. Dept. Archaeology, University of Calgary.
- Latta, M. A. 1985. A 17th century Attigneenongnahak village: settlement patterns at the Auger Site (BdGw-3). *Ontario Archaeology* 44:41-54.
- Latta, M. A. 1983-1994. Annual Reports of Fieldwork at the Auger Site, submitted to the Minister of Citizenship, Culture, and Recreation, Toronto.
- Lubinski, P.M. 1996. Fish heads, fish heads: an experiment on differential bone preservation in salmonid fish. *Journal of Archaeological Science* 23(2): 175-182.
- Lyman, R. L. 1994. *Vertebrate Taphonomy*. Cambridge University Press, Cambridge.
- MacKay, H.H. 1969. *Fishes of Ontario*. Second edition. Fish and Wildlife Branch, Department of Lands and Forests, Toronto.
- Scott, W.B., and Crossman, E. J. 1973. *Freshwater Fishes of Canada*. Bulletin 184, Fisheries Research Board of Canada, Ottawa.
- Stewart, F. 1991. Floating for fauna: some methodological considerations using the Keffer Site (AkGv-14) midden 57 faunal sample. *Canadian Journal of Archaeology* 15:97-116.

- Wooding, F. 1972. The Book of Canadian Fishes. McGraw-Hill Ryerson Ltd., Toronto.
- Wrong, G. (ed.) 1922-1926. The Collected Works of Samuel de Champlain. 6 volumes. The Champlain Society, University of Toronto Press, Toronto.
- Documents on file at the Faunal Archaeo-Osteology Laboratory, Department of Anthropology, University of Toronto:
- Brearley, William J. 1992. Faunal report on the Auger Site BdGw-3.
- Cameron, Wendy and June Morton. 1984. Final faunal report: material from 1983's University of Toronto field school excavation.
- Dieterman, Frank. 1987. Final faunal report: the Auger Site (BdGw-3).
- Elaschuk, Nancy. 1986. Final faunal report. Auger Site, BdGw-3, 1985 excavation.
- Kim, Howard. 1987. Faunal analysis of Operation 13, Auger Site 1986.
- Macaulay, Jane. 1984. Faunal analysis. The Auger Site BdGw-3. Material excavated from 1966 to 1976.
- Stanchley, Norbert. 1990. Final faunal report: Auger Site BdGw-3.
- Wilson, Sidney. 1983. Faunal analysis of the Auger Site, BdGw-3.
- Wood, Lynda. 1987. Final faunal report: The Auger Site BdGw-3, Simcoe County.

✱+★☆*✱*✱*

**Selected papers presented at the
31st Annual Meeting of the
Canadian Archaeological
Association, Victoria, May 6-
10, 1998**

- Ayres, C., and G. Oetelaar. Dining on the Prairies: An Examination of a Typical Winter Diet of Southern Alberta's First Peoples at the time of Contact.
- Brink, J. Another look at Bison Bones from the Wardell Site.
- LeBlanc, R. Until the Caribou Return: Alternative Communal Hunting Strategies of the Protohistoric / Historic Vuntut Gwichin of the Northern Yukon.
- Lewis, P., E. Johnson, and M. Guierrez. The significance of Muskrat in Paleonevironmental Reconstruction.
- Monks, G. Whale Bone Taphonomy.
- Orchard, P. Size Estimation of Fish Remains in Archaeology: the Case of Pacific Cod (*Gadus macrocephalus*) Remains from Shemya Island.
- Park, R. Seal: The Other Dried Meat.
- Stewart, F., and W. Finlayson. Subsistence in the Early Historic Period in the Crawford Lake Region of Southern Ontario.

***Selected papers presented at the
63rd Annual Meeting of the
Society for American Archaeology,
Seattle, March 25-29, 1998***

***Session 102: Environment and
Subsistence***

Lubinski, P. A Comparison of Methods for Evaluating Ungulate Mortality Distributions.

Gifford-Gonzalez, D. Monitoring Molar Crown Height Attrition in a Known-Age Bison Sample.

O'Brien, C. Molar Crown Heights and Dental Increments: Assessing the Differences.

Herbert, J., and L. Steponaitis. Estimating Seasonality with Oyster Shells (*C. virginica*) from the Chesapeake Bay.

Butler, V., and N. Bowers. Ancient DNA from Salmon Bone: A Preliminary Study.

Cannon, A. Core and Auger Sampling of Shell Middens on the Central Coast of British Columbia.

Nagaoka, L. Resource Depletion, Extinction, and Subsistence Change in Southern New Zealand.

Swennes, A., W. Griffiths, and J. Staech. Human / Animal Interactions in Northeastern Iowa: A View from the Highlands.

Grammar, S., R. Tykot, J. Otero, and J. Belardi. Isotopic Evidence for Reconstructing Prehistoric Subsistence Patterns in Northern-Central Patagonian Coast, Argentina.

Session 173: Zooarchaeology

Munoz, A. Ungulate Exploitation by Hunter-Gatherers from Southern Patagonia (Late Holocene).

De Nigris, M. The Impact of Cooking on Bone Modification.

Hill, M. Something to Stew Over: Ethnohistoric Evidence and Archaeological Interpretation of Bone Grease Production.

Gutierrez, M., C. Nielsen-Marsh, G. Martinez, E. Johnson, and G. Politis. Comparative Bone Diagenesis in the Rio Quequen Middle Basin (Pampas of Argentina).

Mondini, N. Taphonomic Analyses of Bone Contents in Modern Carnivore Scats from the Argentinean Puna.

Loyet, M. Small Ungulate Butchery in the Islamic Period, Tell Tuneinir, Syria.

Weisler, M., C. Lalas, and P. Rivett. New Perspectives on Fishing in Prehistoric New Zealand.

Broughton, J. Diet Breadth, Foraging Efficiency, and Prehistoric Human Impacts on a California Sturgeon Population: Evidence from the Emeryville Shellmound Ichthyofauna.

Kidder, T. The Use of Fish Otoliths to Assess Pre-Contact Settlement Organization along the Northern Gulf Coast.

Belcher, W. Fish Remains of the Baluchistan and Indus Valley Traditions of Pakistan and Northwestern India.

Sampson, G. Amphibians in the Diet of Late Holocene Hunter-Gatherers in Central South Africa.

James, S., and K. Li. Impacts of Prehistoric Agricultural Societies on the Environment: Effects on Animal Populations in Habitat Islands.

Tabldiyev, K. Burials of House Animals at Middle Age Barrows of Kyrgyzstan.



***Forthcoming Conferences /
Conférences à Venir***

1998

ICAZ update

***International Council for
Archaeozoology
8th International Congress
University of Victoria
Victoria, B.C.
23-29 August 1998***

Although the organizing committee has been keeping us up to date on the conference, its chair, Becky Wigen, has kindly submitted an update for this edition of CZ. Particularly important is the fact that, as you read this, there may still be a chance for latecomers to submit a paper to the conference. If you, or anyone you know, wishes to do so, contact the conference chair immediately at rjwigen@uvvm.uvic.ca.

Currently, about 280 abstracts have been submitted, with half of the contributors coming from outside North America, making this a truly international conference. The dog session is particularly large, with 50 papers and posters lasting two days, covering everything from genetics to burials to art work.

The conference needs volunteers, so any reader who can spare the time is requested to contact Becky at the above e-mail address.

Several sessions have been added to the conference program since the last mailing, and a current list follows:

1. Dogs: Origins, Regional Variation and Breed Development.
2. High Resolution Faunas at the Pleistocene/Holocene Boundary.
3. Patterns of Faunal Exploitation in Pacific Prehistory: From Observation to Explanation.
4. Faunal Exploitation Patterns in NW-European Stone Age Coastal Sites.
5. Archaeozoology of Africa.
6. Assessing Season of Capture, Age, and Sex of Archaeofaunas: Recent Work.
7. From Techniques to Philosophy: New Directions in Zooarchaeology.
8. Pleistocene Faunas of Europe.
9. Current Research in the Middle East.
10. Studies in Taphonomy.
11. Zooarchaeology in the Americas.
12. Faunal Remains from Ritual and Ceremonial Contexts.
13. Aquatic Mammals in Prehistoric Adaptations.
14. The Role of Zooarchaeology in Archaeological Interpretation: A Survey of World Literature (1965-1995+).
15. Panel and Open Discussion on issues in the Recovery, Identification, Quantification, and Interpretation of Vertebrate Faunal Remains.
16. Zooarchaeological Research in the Western Arctic and Subarctic North America.
17. Neolithic Faunas from the Mediterranean Area.
18. Zooarchaeological Study of the Origin and Spread of New Technologies.
19. Archaeozoology of South Asia and the Gulf Region.

For more information, check out the ICAZ website at:

<http://www.uvcs.uvic.ca/conference/archzool/>

***Requests, Exchanges, Notices /
Démandes, Echanges, Avis***

Otolith Collections

Alfonso Rojo of St. Mary's University would like to know whether there is a list of otolith collections in Eastern Canada for archaeologists' and ecologists' reference. Readers aware of such a reference should contact Dr. Rojo directly at:

Dr. Alfonso Rojo
Biology Department
Saint Mary's University
Halifax, NS
Canada B3H 3C3

e-mail: Alfonso.Rojo@stmarys.ca

✿+★☆*✿◆◇*

**Graduate Programs in
Zooarchaeology**

(submitted by Max Friesen)

Frequently, students ask me to recommend departments which are appropriate for the pursuit of zooarchaeological research at the graduate level. While there are several departments which I routinely

recommend, there may be others out there, and I am not always aware of the precise nature of the various programs. Therefore, I request that every institution with any degree of graduate specialisation in zooarchaeology contact me, and I will summarise the information for publication in an upcoming CZ. Please include as much information as possible, such as regional specialisation(s); a rough description of comparative collections available for research; course(s) offered relating to zooarchaeology, including titles, frequency (every year, every second year, etc.) and, if possible, a calendar description; and the name(s) and specialities of faculty members engaged in zooarchaeological research. I believe that such a list can help all of us advise undergraduates and Master's students who are trying to plan for their next degree. Please respond to:

Max Friesen
Department of Anthropology
University of Toronto
100 St. George St.
Toronto, ON
M5S 3G3

e-mail: mfriesen@chass.utoronto.ca

✿+★☆*✿◆◇*