The Winona Rockshelter Burial

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The incomplete skeletons of an adult male, a young adult female, a child and an infant were found in a small rockshelter in the Niagara Escarpment near Winona, Ontario. Although the site had been badly disturbed by unauthorized digging, the available archaeological and osteological evidence suggests that these represent the multiple secondary burial of members of a small, biologically homogeneous community. The only associated cultural material was a single chert flake. The accelerator radiocarbon date on bone of 1190 BP±60, calibrated to 830/859AD, can be reconciled with dental evidence for considerable maize consumption by assigning the site to the Early Ontario Iroquois (Glen Meyer/Pickering) period. The Winona Rockshelter and other Early Ontario Iroquois sites indicate a good deal of variability in the subsistence and settlement systems, and consequently in the mortuary programmes, of these early horticultural societies.

Introduction

In early January of 1983 human bones were discovered by the sons of Edward Hoffman in a rockshelter (site AhGv-3) near their home in Winona (Fig. 1). The discovery was reported later that month to the Hamilton-Wentworth Regional Police by Edward Hoffman, who gave the police all of the bones that had been recovered. However, it was not until April of 1984 that Fox was able to inspect the site with Sgt. G. Ackermann of that force. By that time, further unauthorized excavations had disturbed virtually all of the burial site. The original rock slab and thin soil fill of the rockshelter had been dug over and restructured to form the wall of a play fort and much of the soil had been thrown down the steep talus outside the shelter (Figs. 2-3). The additional bones recovered in this second episode of digging were given to the police.

In September of 1984 a Ministry of Culture and Communications team directed by Fox excavated what remained of the rockshelter. The talus below the rockshelter was also intensively examined. However, these investigations produced only a small amount of material. Four human bone fragments, one tooth, one flake of Ancaster chert, and an intrusive small mammal bone and egg shell fragment were found in the rockshelter. Four teeth and six fragmentary human bones were recovered from the talus (Fig. 2). Virtually all of the extant skeletal material (Table 1) had already been re-moved. Except for the chert flake, no cultural material was recovered from the site.

The rockshelter is one of many such features formed through differential erosion of the Lockport Formation dolomites which cap the Niagara Escarpment in this region (Fig. 1). The area sheltered by the overhang is about 7 meters long by 1.5 meters deep. The roof is only about a meter above the estimated original location of the floor (Fig. 3), which had been totally altered by the unauthorized digging. Despite the unpromising circumstances of its discovery, the unusual nature of the burial made a full analysis of the recovered material imperative.

Burial Form

The duplication of skeletal elements (for example, the three left scapulae and four occipital bones) and their varying degrees of development indicate the presence of four individuals in the burial. None are complete (Table 1). Winona Rockshelter individual number one (WR1) is a female of 17-18 years. WR2 is an adult male in his middle or late twenties. WR3 is a child of 4-6 years, while WR4 is an infant of 0-4 months.

Because the burial context was destroyed we cannot say for certain whether the burials had been primary or secondary, complete or incomplete, in separate graves or a single locus, or some combination of these. Archaeological excavations produced only a few additional scraps of human bone, despite a complete examination of the rock-shelter interior. To complicate matters, organic staining and rodent gnawing on several bones indicate that at least some of the skeletal elements

Figure 1 - Area of Winona Rockshelter

● - Glen Meyer/Pickering sites
◆ - Chedoke Falls site (AhGx-265)
◆ - Winona Rockshelter (AhGv-3)

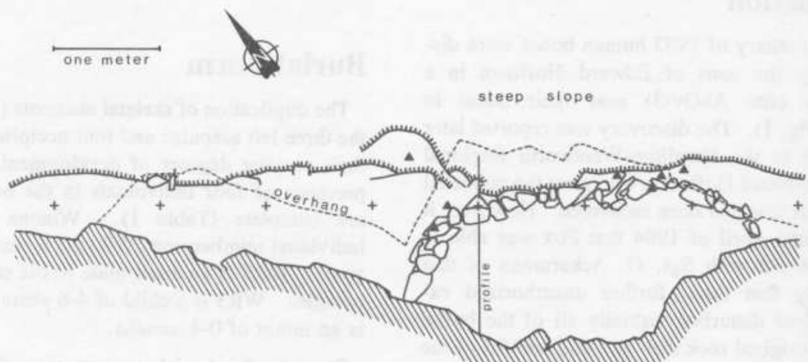


Figure 2 - Winona Rockshelter Plan

▲ - locations of items recovered in rockshelter excavation

Table 1 - Recovered Elements

WR1	calvarium, R. maxilla
	maxillary teeth: RI1-I2, RC, RPM1, RM1-M2; LI1, LPM1-PM2, LM3 mandibular teeth: LC, LPM1, LM1-M2 ribs: 5R, 1 L vertebrae: 6th and 7th cervical, three thoracic, 1st-3rd lumbar arms: both scapulae, R clavicle, both humeri (including the unfused proximal epiphyses), both ulnae, L radius; R 2nd metacarpal legs: both innominates, R femur, an unfused femoral proximal epiphysis, R tibia
WR2	most of cranium and mandible
	maxillary teeth: RPM2, RM1-M2; LM2-M3 mandibular teeth: RM1-M3; LM1-M3 ribs: 5R, 7L vertebrae: 4 thoracic, 1 lumbar arms: L scapula, R clavicle, R humerus, both radii; R 2nd and 3rd metacarpals legs: both fibulae, L tibia; R 3rd-5th metatarsals
WR3	most of cranium
	maxillary teeth: decid. RM1-M2; perm. RM1 mandibular teeth: perm. LI2 ribs: 3R, 6L vertebrae: 3 thoracic, 2 lumbar arms: L scapula, both humeri, both radii, both ulnae; L hamate; R 1st and L 1st., 3rd and 5th metacarpals and one unidentified metacarpal shaft; 2 middle row phalanges legs: L ilium, both femora; R 2nd cuneiform; L 3rd metatarsal, a metatarsal epiphysis, and a metatarsal shaft; epiphysis of a proximal row phalanx
WR4	sphenoid, small fragment of calvarium, R petrous element, R malar, planum occipitale
Unassigned	adult rib (2 fragments), vertebra (1 fragment), and sphenoid (1 fragment)

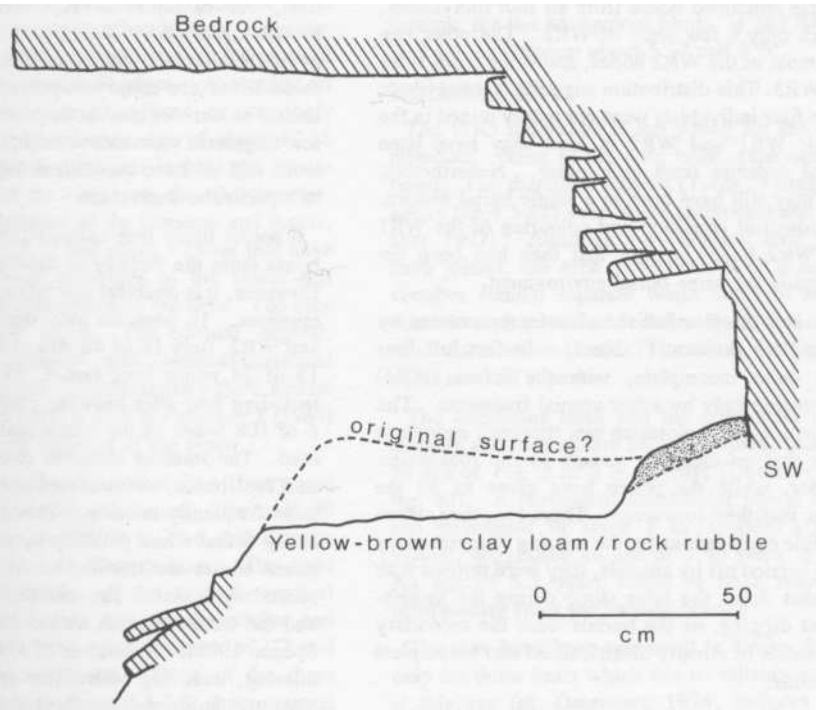


Figure 3 - Winona Rockshelter Profile

had been disturbed and exposed prior to the unauthorized digging. Although there is no evidence to suggest earlier human excavation, some animal disturbance may have occurred. Only five elements were found in the rockshelter interior during the archaeological excavation: two rib fragments, one from WR2 and the other from WR3, in the east part of the rockshelter, and a WR1 lumbar vertebral fragment, a WR1 tooth and an unassigned rib fragment from the west part (Fig. 2). Rodent gnawing on the vertebral fragment suggests that it may not have been in its original position when found. The same may be true of the other elements. Their locations beneath or beyond the walls of the play fort (Fig. 2) indicate that they had not been disturbed by the unauthorized digging, but the possibility of earlier displacement remains strong.

Despite this, there are some clues to the nature of the burial. The first unauthorized digging episode produced many of the bones of individual WR1 and one element of WR3. According to the police report, the remains of WR1 were described as "lying in their proper position, leg bone at one end and skull at the other". The recovery of a WR1 maxillary tooth near the west edge of the rockshelter suggests that the WR1 cranium may have been at the west end of the burial. The later unauthorized digging resulted in two bags of bone. One of these contained bones from all four individuals, though only a few were of WR2. The other bag held most of the WR2 bones, and some from WR1 and WR3. This distribution suggests that the bones of the four individuals were not totally mixed in the burial; WR1 and WR2 at least may have been placed separate from each other. Nevertheless, they may still have been in a single burial feature. The identical condition and colouring of the WR1 and WR2 bones suggest that they had been de-posited in the same burial environment.

None of the four individuals was represented by a complete skeleton (Table 1). In fact, all four were quite incomplete, with the infant (WR4) represented only by a few cranial fragments. The archaeological exploration was thorough enough to show that no elements remain in the rockshelter interior, while the police have given us all the bones that they recovered. There are, then, three possible explanations for the missing elements: they were carried off by animals, they were thrown with backdirt down the talus slope during the unauthorized digging, or the burials were the secondary interments of already disarticulated and incomplete skeletons.

The evidence of earlier exposure and rodent damage apparent on some bones suggests that animal activity was indeed a factor, but does not answer the question of whether such activity could have been responsible for the absence of so many elements. On the other hand, although much of the backdirt had been thrown down the talus, a thorough archaeological examination of that area produced only ten elements: a rodent-gnawed metatarsal, the right ulna, the organic-stained right scapula, and the lower left canine and upper left first premolar from WR1; the upper left second molar from WR2; a hand phalanx, thoracic arch, and lower left lateral incisor from WR3; and a rib fragment that could be from either WR1 or WR2. Also, most of these were buried beneath the backdirt, and thus appear to have been deposited there before the unauthorized digging episodes. It is doubtful that any significant elements remain undetected in the talus.

There is some evidence that elements had been originally present in the burial but were not recovered in any of the digging. The mandibles from WR1 and WR3, though not found, are nevertheless represented by some of the recovered teeth (Table 1). It is possible, though perhaps unlikely, that these elements would have been left behind in a primary burial elsewhere while some of the teeth from them were recovered and transferred to the rockshelter. Also, some bones found in the rockshelter are broken and incomplete. The WR2 left tibia, for example, is represented only by its broken distal end. Since bone preservation was good it cannot be assumed that the missing parts of these bones are simply dispersed about the rockshelter as unrecognizable fragments or dust. Very few fragments were recovered in the archaeological work and all have been identified, if not assigned to a particular individual.

It seems likely that animals have removed some bones from the vicinity or totally destroyed them. However, it is doubtful that this accounts for all the absences. To consider only the two adults, WR1 and WR2, only 18 of 48 ribs, 13 of 48 vertebrae, 13 of 24 major long bones, 25 of 60 teeth (not including four sites showing premortem loss), and 6 of 108 bones of the hands and feet were recovered. The smallest elements (teeth, patellae, hand and foot bones, and unfused epiphyses) are those most frequently missing. This is the pattern generally found when partially or completely decomposed bodies are transferred from a primary to a secondary burial. The smaller skeletal elements and the teeth are often overlooked or ignored (cf. Spence 1988). A number of WR3 bones are also missing, including both tibiae and fibulae, fifteen ribs, and numerous vertebral elements. The only unfused WR3 epiphyses recovered are the distal right femoral epiphysis, a distal metatarsal epiphysis, and the epiphysis of a proximal row foot phalanx. WR4, the infant, is represented only by a few cranial elements (Table 1). It is very unlikely that all of the postcranial bones would have disappeared by mischance. In sum, even with the evidence of previous animal and human disturbance there is good reason to believe that most, if not all four, of the individuals buried here were deposited as incomplete secondary burials.

The Human Skeletons

The human bones recovered are in a reasonably good state of preservation, though a number of bones show damage caused by human and rodent activity. Table 1 provides a roster of the recovered material. Four individuals, all incomplete, have been identified, and are described briefly below. Tables 2-8 present the basic metric and nonmetric data. The presentation of metric data follows Montagu (1960) and Melbye (1971), and that of the nonmetric traits follows Berry and Berry (1967), Ossenberg (1974), Saunders (1978) and Molto (1983a). The dental traits presented in Tables 7-8 follow Butler (1979), Berry (1976) and Scott and Dahlberg (1982).

Individual WR1

The wide sciatic notch and the presence of a preauricular sulcus suggest that WR1 is a female. This is supported by the small size of the mastoid processes and supraorbital ridges. A number of skeletal elements remain unfused or are only partially fused, suggesting an age of about 17-18 years. The unfused epiphyses include the secondary epiphyses of the vertebrae, the rib tubercles, the proximal epiphyses of the humerus and femur, and both epiphyses of the ulnae. Those that have fused are the distal epiphyses of the femur and humerus and both epiphyses of the tibia. The iliac crest has partially fused. The coronal, sagittal, lambdoidal, squamosal and occipito-mastoidal sutures are still open. The maxillary third molars have erupted, but wear is only at Patterson's (1984) stage 1, with some blunting of the cusps.

WR1 shows no highest nuchal line (Berry and Berry 1967) and no occipital mound. The nasal sill is sharp. The cranial index is 78.6, but damage prevents calculation of other indices. The right foramen transversarium of the seventh cervical vertebra is divided into two equal anterior and posterior parts, but the other foramen of C7 and those of C6 are undivided. None of the three recovered lumbar vertebrae (Ll-L3) show unusual features. The only pathological features are in the dentition (see below).

Individual WR2

Although the innominates were not recovered, several cranial traits and the size and robusticity of the humerus, compared with the WR1 humerus (Table 5), indicate that WR2 is a male. The mastoid processes are large and the posterior root of the zygomatic process is well marked. The chin is of the bilateral form, most common among males.

The long bone epiphyses have all fully fused, as have the secondary centres of the vertebrae and ribs. However, the medial epiphysis of the right clavicle has only partially fused, suggesting an age in the 18-28 year range (Webb and Suchey 1985: Table 1). All sutures are open, except for some initial closure in the middle of the right masto-occipital suture (the left masto-occipital suture shows no closure). The third molars have erupted; those on the mandible show wear of Patterson's stage 3. All things considered, an age in the middle to late twenties seems likely.

Rodent damage introduces some uncertainty in the measurement of cranial length, and consequently cranial index, but the index certainly falls between 75 and 79. There is no sagittal keel or highest nuchal line, but a slight occipital mound is present. None of the bones show evidence of arthritis. Stature, calculated by the Trotter and Gleser (1958) formula for the Mongoloid fibula, is 163.84 cms. ± 3.24, or between about 5'3" and 5'6".

Individual WR3

The WR3 individual is too young for sex determination. None of the long bone epiphyses have fused. The diaphysis lengths (Table 6) suggest an age in the 4.5-6.5 year range (Merchant and Ubelaker 1977). Although the vertebral arch halves have joined, the arch and centrum of a thoracic vertebra remain separate while those of another thoracic and a lumbar vertebra had fused only a short time before death. The ilium, ischium and pubis are still separate.

The deciduous teeth and the permanent medial incisors and first molars had all erupted, indicating an age of 7 ± 2 or 8 ± 2 years (Ubelaker 1978: fig. 62). A permanent mandibular lateral incisor had developed to stage 7 in Trodden's (1982) system, suggesting an age of 5.40 years ± 0.52. An age of 5.5 years seems to be a reasonable compromise from the various criteria.

The data have been presented in Tables 2 and 4 only for those traits which can be reliably assessed at this age (cf. Ossenberg 1974; Buikstra 1976; Molto 1979; Saunders 1989). Even then, caution is required in assessing their significance. We

Table 2 - Cranial and Mandibular Discrete Traits

L = left R = right A = absent P = present

Trait	WR1	WR2	WR3
supraorbital notch	AR		AL, AR
supraorbital foramen	PR		PL, PR
multiple supraorbital openings	AR		AL, AR
frontal foramen	AR	AL, AR	AL, AR
metopic suture	A	A	A
frontal grooves	AL, AR	PL, AR	AL, AR
accessory optic canal		AR	
*posterior ethmoid foramen		PR	
Os Japonicum			AL, AR
*maxillary torus	AR	AL, AR	
accessory lesser palatine foramen		PL	PL
ovale-spinosum confluence		AL	AR
pterygo-spinous bridge		AL, AR	AR
*pterygo-basal bridge		AL, AR	
*spino-basal bridge		AL, AR	
carotico-clinoid bridge		AR	
tympanic dehiscence	AL. AR	AL, AR	AR
*auditory exostosis	AL, AR	AL, AR	
*marginal foramen	AR	AL, AR	
pharyngeal fossa		A	
precondylar tubercle		AL, AR	
*intermediate condylar canal	AR	AL, AR	
divided hypoglossal canal	AR	AL, AR	AR
posterior condylar canal	PR	PL, PR	PR
H pterion	PL, PR	PL, PR	PL, PR
epipteric bone		AL, AR	AR
bregmatic bone	A	A	A
coronal ossicles	AL, AR	AL, AR	AL, AR
sagittal ossicles	A	A	
parietal foramen	AL, AR	PL, AR	AL, AR
parietal process of temporal	AL, AR	AL, AR	AR
parietal notch bone	AL	AL, AR	AR
asterionic bone	AL	AL, AR	AR
lambda bone	A	A	A
lambdoidal ossicles	AL	AL, AR	AL, AR
mendosal suture trace	AL	AL, AR	AL, AR
occipito-mastoid ossicles	AL, AR	AL, AR	AR
sagittal sinus direction	R	R	R
*pseudo-mastoid suture	PL, AR	AR	
jugular foramen bridge	AL, AR	PL, AR	AR
mastoid foramen lateral	PL, PR	AL, PR	AR
mastoid foramen on suture	AL, PR	PL, AR	PR
mastoid foramen multiple	AL, PR	AL, AR	AR
*accessory mandibular foramen		AL, AR	
accessory mental foramen		AL, AR	
*mylohyoid arch		PL, AR	
*mandibular torus		AL, AR	

* observations not reliable for WR3 because of age

Table 3 - Cranial and Mandibular Measurements and Indices

	WR1	WR2
cranial length	159	* 180
cranial breadth	125	139
cranial index	78.6	* 77.2
minimum frontal breadth		92
asterionic breadth		100
transverse biporial arc		303
frontal arc	111	
frontal chord	99	
parietal arc	112	118
parietal cord	99	104
occipital arc	100	
foramina) breadth		31
upper nasal breadth	16	
bicondylar breadth		118
bigonial breadth		105
foramen mentalia breadth		48
maximum mandibular length		100
coronoid height (vertical)		49L, 50R
ramus breadth (oblique)		36L, 35R
mandibular angle		128°

- estimated

Table 4 - Postcranial Discrete Traits

	WR1	WR2
<u>Scapula</u>		
unfused acromion epiphysis		AL
suprascapular notch		PL
humeral facet		AL
glenoid fossa extension	AL	PL
<u>Clavicle</u>		
rhomboid fossa	PR	AR
supra-clavicular foramen	AR	AR
sub-clavian facet		AR
<u>Humerus</u>		
septal aperture	AL, AR	AR
supratrochlear spur	AL, AR	AR
distal spur	AL, AR	AR
pectoralis/teres major impressions	AL, PR	AR
Ulna		
divided trochlear notch	AL	
femur		
trochanteric fossa spicules	**AR**	
hypotrochanteric fossa	AR	
Tibia		
distal anterior squatting facet		**PL**
distal lateral squatting facet		AL

Table 5 - Postcranial Measurements and Indices

	WR1	WR2
Clavicle		
maximum length		157 R
shaft diameter		11 R
Humerus		
maximum length		308 R
maximum shaft diameter		23 R
minimum shaft diameter		15R
vertical diameter of head	37 R	43 R
transverse diameter of head	35 R	43 R
epicondylar breadth		60 R
lower articular surface breadth		42 R
Radius		
maximum length		251 L, 252 R
physiological length		237 L, 238 R
maximum diameter of head		21 R
breadth of distal epiphysis		29 L, 29 R
Fibula		
maximum length		347 L
Tibia		
maximum length	336 R	
antero-posterior nutrient foramen diameter	31 R	
medio-lateral nutrient foramen diameter	17 R	
platycnemic index	54.8 R	
antero-posterior mid-shaft diameter	38 R	
medio-lateral mid-shaft diameter	15 R	

Table 6 - Immature Bone Measurements (mm), WR3

	WR3	Merchant and Ubelaker (1977) age range (yrs.)
L scapula height	88	
L scapula breadth	62	
L humerus	174 ± 1	4.5-6.5
R ulna	154	**5.5-6.5**
R radius	138	**5.5-6.5**
L ilium breadth	84	**4.5-5.5**
R femur	237	**4.5-5.5**

Table 7 - Maxillary Dental Traits

	WR1		WR2		WR3	
	L	R	L	R	L	R
deciduous first molar:						
hypocone						A
parastyle						P
deciduous second molar:						
Carabelli groove						P
hypocone						P
metastyle						P
permanent first molar:						
Carabelli groove		A				P
hypocone		P				P
parastyle						A
metastyle						A
mesial margin cuspule						P
paraconule		P				
enamel extension		A		A		A
permanent second molar:						
Carabelli groove		A	A			
hypocone		P				
parastyle		P				
paraconule		A				
enamel extension		P	A	P		
enamel pearl			A			
permanent third molar:						
Carabelli groove	A					
hypocone	P					
parastyle	P					
metastyle	P					
foveal cuspule	A					
mesial margin cuspule	A					
metaconule	P					
enamel extension	P		A			
enamel pearl	P		P			

simply do not know enough yet about the developmental course of many of these features. One unusual trait shown by WR3 is the doubling of the right posterior condylar canal, which is formed by two small canals that are separate, but parallel, throughout their lengths.

The most striking feature of WR3 is the premature synostosis of the sagittal suture. It has been completely obliterated from bregma to lambda, though the coronal suture is still open and the lambdoidal suture, although the edges have joined, remains fully visible (Figs. 4-5). A bulge extends across both parietal bones some distance posterior to bregma, giving the cranium a slightly swollen appearance in the centre. Probably the full fusion of the sagittal suture and initial closure of the lambdoidal suture severely restricted growth, and may have been a factor in the death of WR3. Premature sagittal synostosis has also been observed in a late Middle Woodland skeleton (a young adult male) from the Serpent Mounds site Mound I (Anderson 1968: 46-47), in an adult female in the Princess Point series from the Surma site (Cybulski 1968:17), in a Middle Woodland subadult of the Le Vesconte Mound (personal communication, J.E. Molto), and in a Late Wood-land subadult from the Uxbridge Ossuary (Pfeiffer et al. 1985:86).

Table 8 - Mandibular Dental Traits

	WR1		WR2	
	L	R	L	R
permanent first molar:				
protostylid	A			
hypoconulid	A			
deflecting wrinkle	A			
metastylid (cusp 7)	A			
paraconid	A			
postmetaconulid	A			
tuberculum accessorium	A			
enamel extension	P		A	A
permanent second molar:				
protostylid	A		A	A
hypoconulid	P			
deflecting wrinkle	A			
entoconulid (cusp 6)	A			
metastylid	A			
paraconid	A			
postmetaconulid	A			
tuberculum accessorium	A			
enamel extension			A	A
permanent third molar:				
protostylid			A	A
enamel extension			P	A

Individual WR4

Only a few cranial elements of this individual were recovered (Table 1). The size of these elements, and the lack of fusion of the greater wings to the body of the sphenoid, indicate an age between birth and four months.

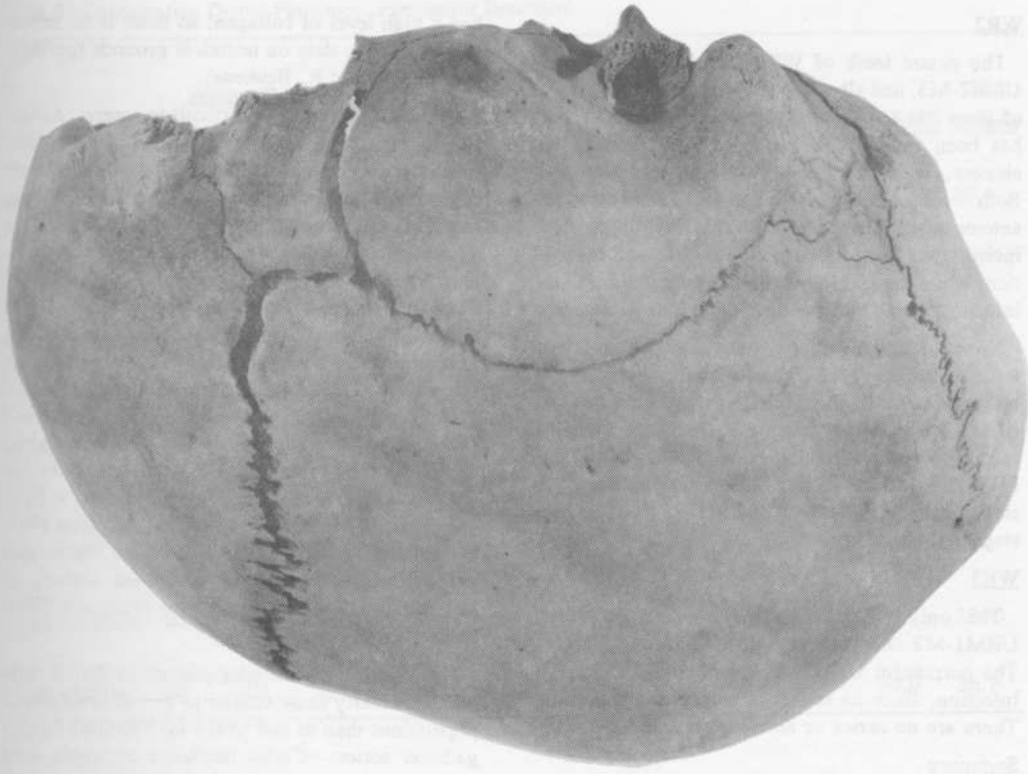
The Dentition

In the absence of any diagnostic cultural material, the assignment of the Winona Rockshelter to a particular period must depend on other criteria. The dental health of the adults can at least reduce the possibilities. There are clear differences in dental pathology between hunter-gatherers and horticultural populations in Ontario (Anderson 1968; Patterson 1984). With this in mind, the rockshelter dentitions were analyzed in some detail.

WR1

The teeth recovered include the URII (upper right medial incisor) - PM1, URM1-M2, ULPM1-PM2, ULM3, LLC (lower left canine) - PM1, and LLM1-M2. All maxillary alveolar sites were observable except for those in the left C-M3 area. Although the presence of some mandibular teeth suggests that the mandible had originally been buried in the rockshelter, it was not recovered.

Maxillary alveolar resorption is slight, but alveolar thinning has exposed the roots of the right medial incisor, canine, and first premolar, in what Patterson (1984:383) refers to as "dehiscenses". None of the ten observable sites show abscesses, and there is no evidence of antemortem loss. Evidence of antemortem trauma, in the form of either fractures or chips, is absent on all the recovered teeth. There are caries on the URI1, URM1 and LLM1. The incisor has a medium-size carious lesion on the distal side of the crown, while both molars have small caries on the occlusal surfaces (two on LLM1). None can be ascribed to attrition, which is relatively light, reaching Patterson's stage 1 in the upper second and third molars, and stage 2 in URM1. The LLPM1 lacks the occlusal tubercle known as Leong's premolar, which is considered to be a northern or Ojibwa feature (Gibbs 1987:16-17).



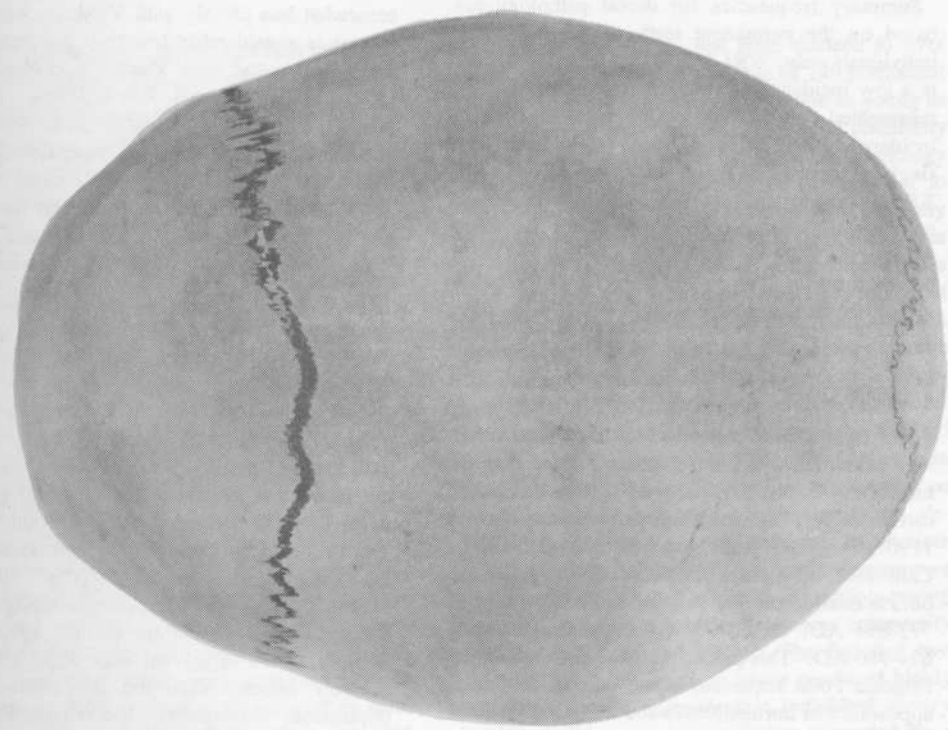


Figure 4 - Cranium of WR3 (Top)

Figure 5 - Cranium of WR3 (Right Side)

WR2

The extant teeth of WR2 include URPM2-M2, ULM2-M3, and all of the mandibular molars. Two of these are too damaged for observation. There has been antemortem loss of ULM1 through an abscess, its pocket still visible in the alveolus. Both lower medial incisors and LLI2 were also lost antemortem. The cause of the loss of the left incisors has been obscured by closure and resorption, while the LRII socket is porous, indicating an infection which had not developed into an abscess.

None of the maxillary teeth show antemortem trauma, but the ULM2 has a small caries on the occlusal surface. The LRM 1 is chipped, while the LLM1 crown has a fracture. There are small to medium sized occlusal caries on LLM2, LRM2 and LRM3. Attrition levels, in Patterson's terms, are stage 5 (LRM1), stage 4 (LLM1, both M2s) and stage 3 (both M3s).

WR3

The only observable teeth are the deciduous URM 1-M2 and the permanent LLI2 and URM 1. The permanent URI1 was apparently lost through infection, since its socket is enlarged and porous. There are no caries or antemortem trauma.

Summary

Summary frequencies for dental pathology are based on the permanent teeth of the two older individuals only, WR1 and WR2 (Table 9). There is a low incidence of antemortem trauma (8.7%), represented only in WR2. The rather high caries incidence of 29.2% involves both individuals. The single abscess of WR2 gives a low frequency of 2.9%. Antemortem loss (9.8%) is also represented only in WR2 for the purposes of this summary (though the WR3 child also lost a permanent tooth before death). The youth of WR1 is probably responsible for her lower level of dental pathology.

Discussion

The right fourth metatarsal of individual WR2 was submitted, with Native consent, to the Isotrace Laboratory of the University of Toronto for radiocarbon dating. The resulting date, uncorrected, is 1190 BP ± 60 years, or 760 AD (TO-1925). Calibrated, it becomes 830 AD or 859 AD. At the 68.3% confidence interval, the calibrated range is 772-894 AD; at the 95.5% confidence interval, 674-980 AD. This places the site either late in the Princess Point sequence, at the time of the initial appearance of horticulture in southern Ontario (Fox 1990a), or early in the subsequent Early Ontario Iroquois (Glen Meyer/Pickering) period. The bone had a high level of collagen, so there is no reason to question the date on technical grounds (personal communication; R. Beukens).

The dental evidence is difficult to assess. Anderson (1968), Patterson (1984) and others have demonstrated a marked trend, with the development of farming, toward higher rates of caries and lower rates of antemortem trauma. Accordingly, the Winona Rockshelter dental pathology was compared to that of several other sites (Table 9): Surma, a Princess Point series from the Niagara Peninsula (Cybulski 1968); Varden, a series from Long Point that is probably Princess Point, to judge by the available archaeological and biological evidence (Molto 1983b; Fox 1985; MacDonald 1986); Le Vesconte, a Point Peninsula burial mound on the Trent River of south-central Ontario (Patterson 1984; Kenyon 1986); Bennett, a Pickering complex site near Hamilton (Patterson 1984; Wright and Anderson 1969); and Glen Williams, a probable Late Prehistoric Iroquoian ossuary in Halton County, near Georgetown (Patterson 1984; Molto 1983a).

The Winona Rockshelter pattern of dental pathology is clearly more similar to that of horticultural populations than to that of the Le Vesconte hunter-gatherer series. Caries incidence compares most closely with Bennett and Glen Williams, and somewhat less closely with Varden. Antemortem trauma is considerably less than that recorded for Le Vesconte and even Varden, and closest to the figures for Bennett and Glen Williams. However, dental fractures are virtually absent in the Late Woodland populations of southern Ontario (Patterson 1984: Table 9.22), though present at Varden and Winona Rockshelter. The figures for antemortem loss and abscesses are most comparable with the Le Vesconte and Princess Point incidences.

The sedation of these populations on the basis of dental pathology is complicated by additional factors. One, of course, is the small size of the Winona Rockshelter sample. Another is the youth (17-18 years) of WR1, which may reduce the comparability of the Winona Rockshelter dentitions with those of larger collections since it diminishes the incidences of all forms of dental pathology. Also, dental sedation offers no absolute answers. The incidence of caries in the permanent teeth of the Donaldson II series (ca 1 AD) is 7.7%, higher than that of the later Donaldson I series (0%) and similar to that of Surma (Molto 1979: 39-41). Bennett, with a caries incidence of 30.2%, is more severely affected than the later Glen Williams population. Nevertheless, the Winona Rockshelter pattern of dental pathology reflects a horticultural

Table 9 - Comparative Dental Pathology, Permanent Dentition

	Winona Rockshelter							Glen	
	WR1	WR2	WR1 + WR2		Le Vesconte	Surma	Varden	Bennett	Williams
chips	0/14	1 /9	1/23	4.3	42.9		29.3	7.4	10.4
fractures	0/14	1 /9	1/23	4.3	21.6		7.9	0	0
total antemortem trauma	0/14	2/9	2/23	8.7	45.6		37.1	7.4	10.4
antemortem loss	0/16	4/25	4/41	9.8	8.0	2.9	13.9	18.7	24.0
abscesses	0/10	1/25	1/35	2.9	10.0		4.5	14.1	8.4
caries (all teeth)	3/14	3/9	7/24	29.2	6.5	7.4	10.8	30.2	22.4
caries (molars)	2/5	3/9	6/15	40.0	13.3		25.0	60.0	35.7

adaptation and suggests that the site falls within the Princess Point-Middleport span (ca. 700-1400 AD).

A reasonable compromise among the conflicting dental indicators and the early radiocarbon date might be to assign the site to the Early Ontario Iroquois period. Glen Meyer and Pickering series display a good deal of variability in dental pathology. Glen Meyer burials from the Bruce Boyd site have a caries incidence of 8.1%, with caries pre-sent on 5 of 61 permanent teeth. The Reid and Elliott sites, in the same region, have incidences of 18% and 20% respectively, while the Bennett site incidence is 30% (Spence 1988; Saunders and MacKenzie-Ward 1988: Table 3; Patterson 1984). Dental trauma (chips and fractures) is also variable, standing at 20.0% for Elliott, 0.9% for Reid, and 7.4% for Bennett.

This variability is due in part to the small sizes of many of the samples (Elliott in particular is poorly represented), and perhaps in part to differing age profiles in the series (Saunders and MacKenzie-Ward 1988:23). The Elliott sample consists of only ten permanent teeth from one adult, while the Bruce Boyd sample of 61 permanent teeth is from four adults, of whom three had caries. At Reid 111 permanent teeth were observed from six individuals, ranging in age from thirteen to over forty years. The Bennett sample of 149 permanent teeth is from twelve individuals, some as young as seven years. However, there is a good possibility that the inter-site variability in dental pathology also reflects varying degrees of commitment to cultivation through time or even between generally contemporaneous communities. In the initial stages of adaption to farming it would not be surprising to find communities practising different mixes of hunting, gathering, fishing and cultivation, as each experimented to establish the balance appropriate for its local environmental conditions (cf. William-son 1990a:319). There may even have been some intra-community variation in this respect. At Gard Island 2, a 9th century AD Riviere au Vase site in the southwest corner of Lake Erie, stable isotope analysis reveals varying, though significant, degrees of maize consumption, though it is not clear whether the variation is due to rapid change over time or to differential maize consumption among contemporaneous members of the same community (Schurr and Redmond 1991). The fact that two adult males from the same grave produced highly divergent results suggests that individual dietary variation did occur, a conclusion supported by a similar study on Ontario materials (Schwarz et al 1985:201).

A combination of selected measurements and nonmetric traits has occasionally been used to senate groups in southern Ontario (cf. Anderson 1968, Ossenberg 1969, Cybulski 1968, 1982; Molto 1983a). The Winona Rockshelter skeletons were thus compared with several southwestern Ontario series, to see if consistent trends could be established for the area (Table 10). Unfortunately, the data from the rockshelter are too sparse to define reliable trait incidences. It is worth noting that there is a high frequency of supraorbital foramina, a low frequency of parietal foramina, and no tympanic dehiscences or sutural bones. How-ever, these characteristics do not situate the rock-shelter skeletons clearly in any particular temporal or cultural category, and summary data from such a small sample could change radically with only a few additional skeletons. Furthermore, this approach is less effective with relatively small groups like the one that the Winona Rockshelter series probably represents. The social dynamics of such groups can create erratic concentrations of traits that make biological seriation difficult (Spence 1986).

Examined from this perspective, the homogeneity of the Winona Rockshelter skeletons takes on a different significance. As noted, parietal foramina are unusually low in incidence while supraorbital notches, tympanic dehiscences, asterionic bones and lambdoidal ossicles are absent. Of particular interest is the presence of small enamel pearls between the lingual and buccodistal roots of the upper left third molars of both WR1 and WR2. This suggests that the Winona Rockshelter skeletons derive from a single, biologically homogeneous group, probably a small horticultural community.

Conclusions

In the absence of dateable cultural material or an associated habitation site it is impossible to assign the Winona Rockshelter burial securely to a particular archaeological phase or complex. However, the dental evidence and the radiocarbon date can be most comfortably accommodated by the site's assignment to the Early Ontario Iroquois period. Although prior disturbance of the site prevents a definitive reconstruction of the burial form, the available evidence suggests the joint secondary burial of individuals from a relatively small, biologically homogeneous unit.

Burial patterns of the Early Ontario Iroquois period are rather variable (Williamson 1990a:-306,308). The data from the Elliott and Bruce Boyd sites, Glen Meyer occupations on the Norfolk Sand Plain, suggest the annual spring burial in a single grave of those in the community who had died over the preceding year (Spence 1988). People who died during the occupation of the inland winter village were given individual primary burials there, then exhumed in the spring to be transported to the warm season lakeshore site for final joint burial. The mortuary programme was thus closely articulated with the settlement system of the community. However, Saunders and MacK-enzie-Ward (1988) suggest that the multiple burials of the Reid site, a late Glen Meyer or early Uren site on the Norfolk Sand Plain, had not been transported from elsewhere. At Bennett, a Pickering site near Hamilton, most burials were primary or partially disarticulated interments of one or two individuals in longhouses (Wright and Anderson 1969). At Miller, a Pickering village near Toronto, several graves contained from one to thirteen individuals each, all but one of them a secondary interment (Kenyon 1968; Ossenberg 1969). The Pickering burials of the Serpent Mounds site, on the other hand, were in ossuaries that held up to 29 individuals each (Anderson 1968).

This mortuary variability in the Early Ontario Iroquois period probably reflects variability in both the social and subsistence systems of these early horticultural communities, influenced by such factors as intra-village social structure, inter-village alliances, and the annual round of the community. Similar variation also appears to have characterized the preceding Princess Point phase, with individual primary burial the rule at Surma but larger multiple burials at Varden (Emerson and Noble 1966; Molto 1983b; Fox 1990a:182). The Winona Rockshelter site is probably an example of the pattern of annual joint secondary burial of the dead from a single community, as seen at the Varden, Bruce Boyd and Reid sites.

However, there are still some unexplained features of the Winona Rockshelter burial that set it apart from the others of its time. One is its location at some distance from any habitation site (Fig. 1). Other Early Ontario Iroquois burials are either in or very near their associated settlements. At Winona there is no village in the immediate vicinity, either on top of or beneath the escarpment.

The other unusual aspect of the burial is its location in a small rockshelter. Although similar rockshelters abound along the escarpment, they were rarely used for burial. One rockshelter said

Table 10 - Comparative Nonmetric Traits

	Winona Rockshelter	Surma	Varden	Donaldson I	Bennett	Middleport	Glen Williams
supraorbital foramen	3/3	8/12	12/14	6/12		32/46	79/151
metopic suture	0/3		0/7	0/3			
frontal grooves	1/6	3/12	6/12	2/10		19/46	50/151
accessory optic canal	0/1		0/10	0/7		1/33	8/83
Os Japonicum	0/2	1 /6	1 /9	0/5		1/24	10/69
maxillary torus	0/3		0/12				
ovale-spinosum confluence	0/2		0/14	0/6			
pterygo-spinous bridge	0/3	4/8	0/13	0/7			
pterygo-basal bridge	0/2	2/9	2/14	0/7		0/43	0/123
spino-basal bridge	0/2	1/7	3/14	0/7		4/43	16/119
carotico-clinoid bridge	0/1		2/12	2/7		5/33	23/92
tympanic dehiscence	0/5	7/20	13/14	2/7	15/17	13/43	65/135
marginal foramen	0/3	3/11	6/13	0/7		4/40	32/109
pharyngeal fossa	0/1		0/8				
precondylar tubercle	0/2		0/8	0/3			
intermediate condylar canal	0/3	2/4	0/13	0/7		14/39	40/95
divided hypoglossal canal	0/4	4/8	7/15	0/7		2/42	21 /130
posterior condylar canal	4/4	6/9	12/14	4/6		41/42	104/120
epipteric bone	0/3	0/8	1/11	0/6		3/36	9/71
bregmatic bone	0/3	0/9	0/7	0/4			
coronal ossicles	0/6	1/8	1/7	0/4			
sagittal ossicles	0/2	0/9	0/6	0/3			
parietal foramen	1/6	5/14	6/14	6/10		18/45	59/147
parietal process of temporal	0/5		1/14	0/9		5/41	8/144
parietal notch bone	0/4	2/11	1/13	1 /7		5/40	26/1 18
asterionic bone	0/4	3/13	3/13	0/7		3/37	26/109
lambda bone	0/3	1 /9	1 /7	1 /4		5/21	18/65
lambdoidal ossicles	0/5	6/9	3/7	2/5		19/38	50/96
mendosal trace	0/5		1 /7			0/21	5/74
occipito-mastoid ossicles	0/5		1/11	0/5		5/36	1 1 /87
sagittal sinus right	3/3	8/10	5/7	3/4	5/9		
pseudo-mastoid suture	1/3		0/13				
mastoid foramen absent	0/5		1/14	2/7			
mastoid foramen multiple	1 /5			2/7			
accessory mandibular foramen	0/2	2/12	3/11	3/8			
accessory mental foramen	0/2	0/17	0/14	0/10	2/16		
mylohyoid arch	1 /2	4/13	1/13	3/7	4/14		
mandibular torus	0/2		0/14	0/6			
Carabelli trait (pUM1s)	1/2	2/19		0/6			
enamel extension - pUM1	0/3	1/17		1 /6			
- pUM2	2/3	7/16		4/6			
- pUM3	1/2	2/14		2/2			
- pLM 1	1 /3	2/18		0/8			
- pLM2	0/2	7/20		2/6			
- pLM3	1/2	4/18		1/5			

to have produced burials is associated with the Chedoke Falls site (AhGx-265), a probable early 14th century occupation in Hamilton (Fig. 1; Williamson 19906:116). Unfortunately, virtually nothing is known about the burial component of the site. Rockshelter burials are much more common among the Odawa and related groups to the north (Fox 1990b:470-471). That the 18th and 19th century Ojibwa inhabitants of the Winona area may also have considered rockshelters to be appropriate locations for ritual and burial is suggested by the observation of Ojibwa Reverend Peter Jones (1861:255) that "The caverns, or hollow rocks, in the mountains which surround Burlington Bay, were once noted as being abodes of gods...". It may also be no coincidence that a high quality cream and grey Ancaster chert variant outcrops in the vicinity of the site.

It is possible that the few rockshelter burials in southwestern Ontario represent intruders from the north, but this seems unlikely. No archaeological evidence exists for such intrusions, and the Chedoke Falls burial is linked to a local Early-Middle Ontario Iroquois occupation site. Unfortunately, there are no osteological data relevant to this question. No Odawa skeletons of this period have been reported, and in any event the Winona skeletons are too poorly represented to permit meaningful comparison.

In sum, the Winona Rockshelter site probably represents the burial of those members of a small Early Ontario Iroquois community who had died during the preceding year. Its unusual location, in a rockshelter well removed from the community's principal occupation site, cannot be satisfactorily explained with the available evidence. It may be an idiosyncrasy peculiar to that particular community, or it may even represent a unique aberration, due to spiritual factors, from the community's standard burial practices. Hopefully future discoveries in the area will shed further light on this rather mysterious site.

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