Burials From a Historic Hudson Bay Company Cemetery at Fort Frances Ontario : a case study in applied forensic osteology

By

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BURIALS FROM A HISTORIC HUDSON BAY COMPANY CEMETERY AT FORT FRANCES ONTARIO:

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ABSTRACT

The excavation of DdKi-2, Fort Frances, Ontario, was an emergency situation arising from the construction of a new parking lot for Boise Cascade Canada Ltd. (now Stone Consolidate Ltd.) who unexpectedly encountered 13 burials of human origin. The osteological and isotopic data are used to estimate racial affinity, age at death, sex, stature, and pathological conditions of these individuals for the eventual repatriation of the remains.

ACKNOWLEDGMENTS

I would like to thank my advisor, Dr. William Wade, for his incredible support, encouragement, and mostly for his friendship throughout the past three years. His dedication to both this project and the field of physical anthropology has truly been an inspiration. Friday afternoons will never be the same. I would also like to thank my committee members Dr. John Conroy and Dr. Chris Meiklejohn for their patience and endless help, as each week this project seemed to be once again delayed due to reasons of divine intervention.

I wish to express my gratitude towards the Manitou Rapids Reserve, Rainy River Band, for their cooperation in allowing me to carry out this research. I would also like to thank C.S. "Paddy" Reid of the Ontario Ministry of Citizenship, Culture and Recreation, for giving me permission to transport this material to the University of Manitoba, and along with Dr. William Wade, Dr. Raymond Wiest, and Dr. Greg Monks for their support in helping me to secure funding for this research.

This thesis would not have been possible without the generous financial support from Stone Consolidated Ltd. I would like to thank Mr. Greg Rogozinski for always sounding interested in my "thesis updates", although I am sure he has learned more about historic osteology than he ever expected to in one lifetime.

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My appreciation is also be extended to Dave Cote of the Manitoba X-Ray Clinic for allowing me to use his facilities. To my long time friend, David Hunter, thank you very much for taking time out of your busy schedule to process my radiographs. You have always been a true friend.

There are many other people in my life, for without their support this thesis would not have been completed. The most important of whom are my parents. You have always been there for me, both financially and emotionally, never questioning my goals, but sometimes, I am sure, wondering why I would want to sit in a lab with a bunch of skeletons. Thank you for always having faith in all of my dreams.

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DEDICATION

This thesis is dedicated to the memory of Brett Wadell, college and friend. Without his support and help in acquiring these remains, this thesis would not have been possible. His passion and dedication for learning and teaching physical anthropology, and particularly to the study of paleopathology, has been an inspiration to me and everyone whom he met. He will be sadly missed.

1.0 INTRODUCTION

On October 24, 1984, during the construction of a parking lot, the Boise Cascade Paper Company of Fort Frances, Ontario (Fig. 1) unearthed the remains of at least three human burials. The Ministry of Citizenship and Culture was immediately contacted and excavation efforts began the following day. Once all skeletal material was disinterred, at least thirteen individuals were discovered in twelve burial locations. Three burial styles were found: extended burial in a coffin, flexed burial with no coffin, and bundle burial (Rajnovich, 1985).

The Boise Cascade site is attributed to the post-contact period in North America. The remains, dating from 1817 to 1880, possibly contain representation from three cultural identities: Euro-Canadian, Aboriginal, and Metis.

The remains have been housed at the Ministry of Culture, Tourism and Recreation in Kenora, Ontario. In August 1995, I contacted C.S. "Paddy" Reid to ask permission to obtain the skeletal material to carry out this project. After meeting with him and discussing the project's goals, the osteological remains were transported to the University of Manitoba for laboratory study.

This unique opportunity to analyze burials from a significant period in Canadian history, with the ultimate goal of repatriating the remains, is highly important to the field of archaeology in northwestern Ontario. I am extremely fortunate to be able to conduct this study with the full cooperation of the Manitou Rapids Reserve, Rainy River Band for a thorough anthropological analysis. Their support in this research project has been invaluable, and every measure has been taken to ensure that the human remains were treated with dignity and respect while they were in my care.

1.1 RESEARCH OBJECTIVES

On historical grounds, it is known that the cemetery at old Fort Frances is eclectic, and that the European, Aboriginal, and Metis inhabitants of the fort used the cemetery to bury their dead. This thesis investigates whether and to what extent individual burials contain evidence of the cultural and biological identity of the living individuals.

The initial goal of the study is to assess basic forensic parameters, i.e., the sex, age, and race of each individual. The first question addressed, then, is whether or not this objective can be achieved with confidence.

Secondarily, the burials are subjected to metric and observational scrutiny, using standard forensic and paleontological methods. Data include a) size and shape measures, emphasizing those that best lend themselves to statistical differentiation; b) non-metric morphological characteristics, emphasizing those that best differentiate racial identity; and c) gross and radiographic observations of skeletal pathologies and anomalies.

In addition, the skeletons are subjected to stable isotope analysis to determine whether and to what extent, nutritional status can be determined.

The extent to which the initial hypothesis is answered affirmatively influences the ultimate goal of the study, i.e., to assess whether and to what extent the racial affiliation of the individual influences, or is a reflection of, the nutritional and health status of the individuals buried in the cemetery.

Development in this area between the years 1940 and 1962 (i.e., house indicated on Fig. 2) and the construction during 1984 resulted in major disturbances to the

site material prior to the archaeological excavation. This disturbance resulted in skeletal breakage, missing elements, and intermixing of site material rendering individual identification difficult and, in one instance, impossible.

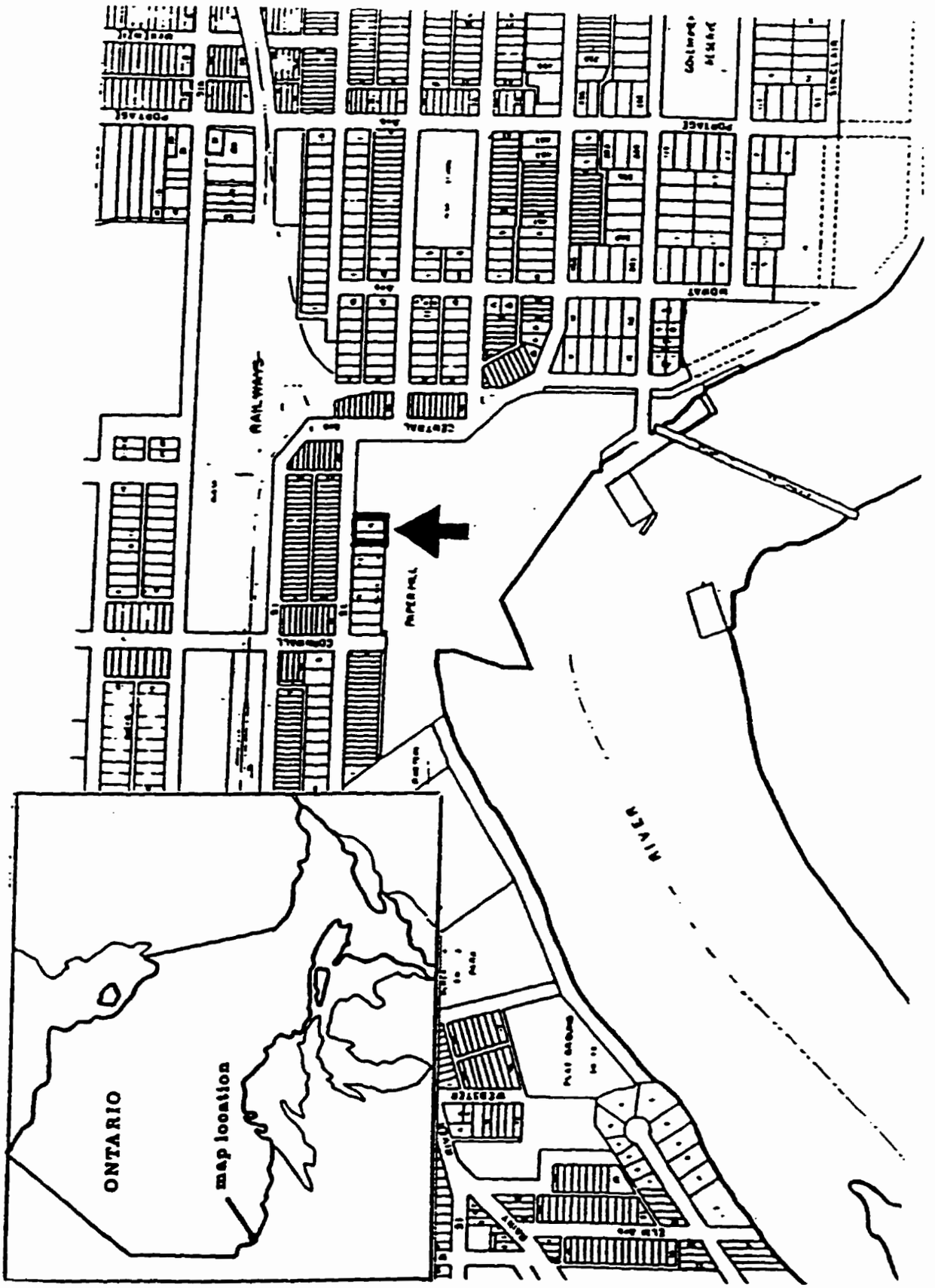

Figure 1: Fort Frances Town Site (Rajnovich, 1985).

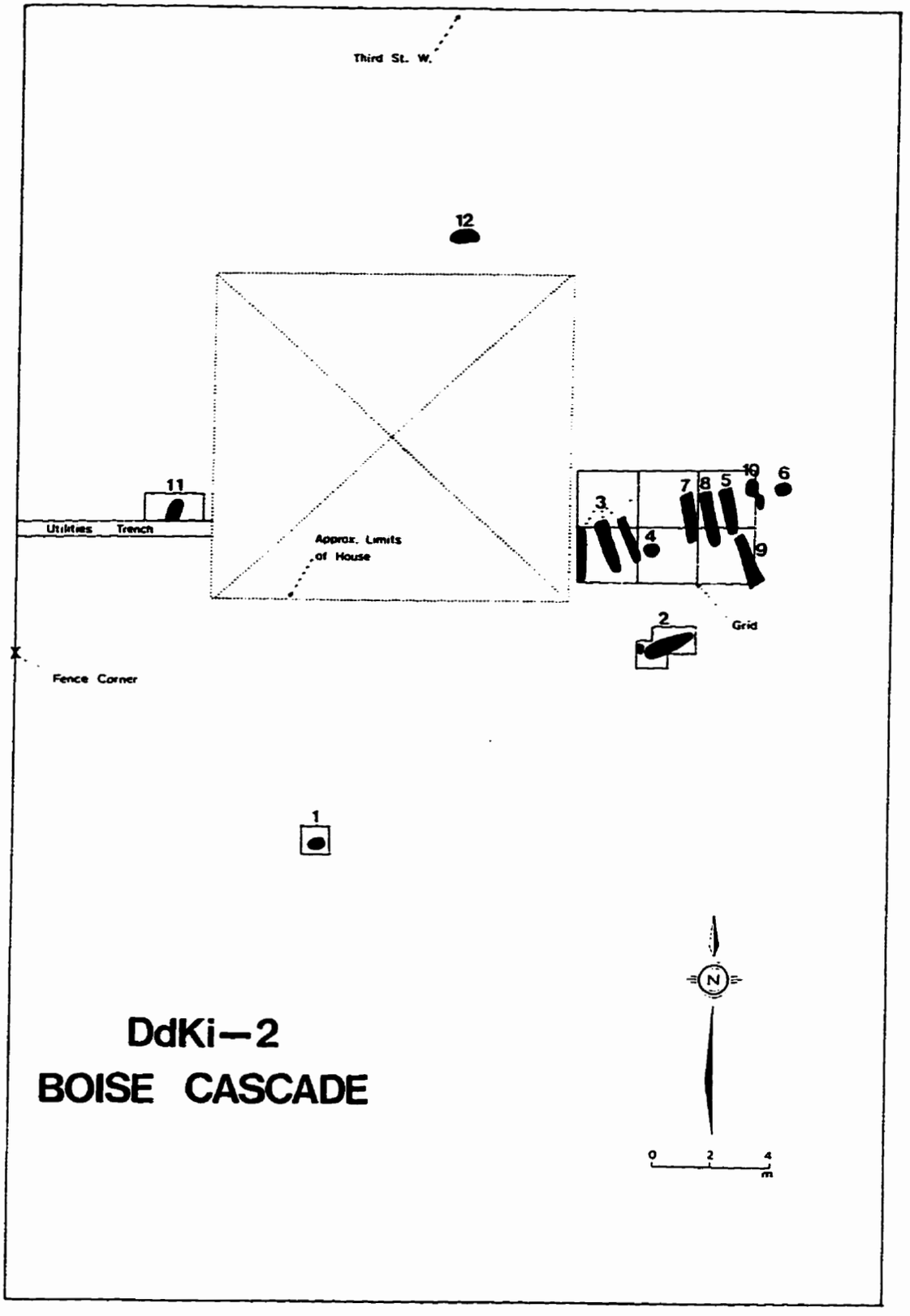

Figure 2: Burial Locations and Limits of House (Rajnovich, 1985).

1.2 HISTORICAL BACKGROUND

In 1688, Jacques de Noyons built a post on the Rainy River, a vast forest covered most of its basin; it was a lush wilderness, rich in trees, flowers, birds, mammals, fish, and insects (Nute 1950:4). The Rainy River became the important link between the drainage systems of the Hudson's Bay and the Mississippian basin allowing for an American, as well as a Canadian, presence in the region.

European contact with the Aboriginals created a wary but workable symbiotic relationship which resulted in the majority of Aboriginals becoming "'Company' Indians, free in day-to-day activities but constrained in the long run to secure pelts for the Hudson's Bay Company (Harris and Warkentin 1974:252)." From the beginning, the Aboriginals became engaged in a debt system which acted to tie themselves and their families to a single post.

During the 18th century there was a growing interest in the area surrounding Rainy Lake. The streams and lakes provided a means of transportation, and the woods and rivers were home to the marten, the lynx, the otter, the beaver, and the Monsonis and Crees, "*par excellence* the trappers of those days" (Morton 1939:174). In 1718 La Noue built a post on Rainy Lake only to be followed by another Frenchman, La Vérendrye, in 1731. Fort St. Pierre was built on the Rainy River near its outflow from Rainy Lake. This site has been identified at a spot two miles east of the present day Fort Frances. The area contained a very abundant supply of fish which served as a source of the Aboriginal diet during a large part of the year. During the autumn months, the marshes were plentiful with wild rice (Morton 1939:174).

By the 1730's there was a significant Canadian penetration of the region around Rainy Lake. Marcel Giraud (1986:321) argued that Metis or mixed bloods must have been among the Aboriginal peoples around the lake.

The Aboriginals of Rainy Lake were described as unmanageable in the early years after the fall of New France in 1760. Canadians and Scots were unable to re-establish a post here and could not get through to the west until 1770. In the 1770's the Frobishers sent two servants, François Boyer and Michael Boyer (possibly Metis), to establish a post at Rainy Lake and care for the brigades by provisioning them with rice, and to keep the Aboriginals friendly and willing to allow the goods to pass through without plunder (Morton 1939:283).

By 1790 a North West Company post, called Rainy Lake Post or Lac la Pluie, stood below the falls (Chaudière or Kettle Falls), at the present day Fort Frances. This became a very important post for the North West Company as it served as the rendezvous point for the Athabasca brigade. To ensure that the Athabasca brigade was able to get back to its wintering grounds before the river froze, it passed over its furs to Montreal Voyageurs, took their trade goods at Rainy Lake, and then turned around to come back. The post, while it did gather some of its own furs, was mainly a depot for merchandise and especially for provisions. Apart from a small quantity of meat, the supply of food laid up for the brigades was wild rice gathered by the Aboriginals (Morton 1939:427).

In 1793 the Hudson's Bay Company moved into the area with John MacKay setting up a post at Rainy River. MacKay settled immediately below Manitou Rapids where there is still a Aboriginal reserve. The attraction of the spot lay in its fishery which still exists today (Morton 1939:430). MacKay stayed here until 1796 when the North West

Company made dispositions to drive him out; he deserted Lac la Pluie by the end of the year.

The XY Company entered Lac la Pluie in 1804 and established a limited operation in the region. By 1808 the American Fur Company arrived and also began setting up trade (Nute 1950:1).

In 1820 the Hudson's Bay Company took over the post at Lac la Pluie as the two companies merged. By this time the Hudson's Bay Company was getting competition from traders being outfitted by Americans (American Fur Company) on the Missouri River system (Morton 1939:432).

According to the winter records for the period 1818 to 1830, post staffing ranged from 32 to 44 men. The reports also indicated a high percentage of Aboriginal families in the area suffering from starvation (HBCA B.105 d/1). The 1822-23 Lac La Pluie district report provided a listing of all Aboriginals in the area. The unofficial Company census indicated a total of 455 Aboriginals in the region divided into the following categories: 107 Aboriginal males, 118 Aboriginal woman, 230 Aboriginal children (HBCA B.105/e/9).

The visit of Governor George Simpson and his wife, Frances Ramsey Simpson, on September 25, 1830 resulted in renaming of the post to Fort Frances (HBCA B.105/e/9).

In 1833, the Hudson's Bay Company found it worth its while to eliminate the competition, the American Fur Company, by offering a cash settlement of £300 per annum. These payments continued until 1844 when the American Fur Company went out of business. During this time the Fort was located on Rainy River a mile below the falls at the outlet of the lake. It remained the headquarters for the district though it was no

longer as important as it had been under the North West Company, since it was no longer the rendezvous point of the Athabasca brigade or the calling station for all the brigades of the North West Company (Morton 1939:703).

An Indian treaty of 1873, Number 3 in local parlance, granted the land between Lake Superior and Lake of the Woods to the Dominion which resulted in Fort Frances being made the central Indian agency for reserves on the Canadian side of the border (Nute 1950:61). Fort Frances and the surrounding area began to receive more notice as an important economic and administrative center. In 1875 a lock project was initiated to bypass the falls but was abandoned in 1878 in favor of an intercontinental railroad (Nute 1950:52). This construction activity resulted in a large workforce residing in the area during this period.

2.0 OSTEOLOGICAL ANALYSES

2.1 BURIAL SUMMARIES

There are many discrepancies between the skeletal material illustrated in Chartrand's (1988) report and the material received for this study. This redistribution possibly resulted from the frequent transport of material through many years. Some remains are reassigned to other burial numbers, while other osteological material is simply not present. The skeletal material, as I received it, is labeled as, individuals 1-5 and 7-12. There was no material labeled as individual 6 and Chartrand's (1988) reference to this burial is vague. There are two individuals, whom I have labeled Unknown A and Unknown B, who are not represented in Chartrand's (1988) report nor in the 1985 archaeological report. There is a complete list of the analyzed osteological material for each burial in Appendices A, C, D and F. Cultural material has also been examined to aid in estimation of race (Appendix E). Whenever possible, this study is cross referenced with Chartrand (1988).

Burial 1

Burial 1 had been exposed by the construction backhoe but is recognized as being a bundle burial (Rajnovich 1985). I have identified this individual as an Aboriginal female 22 to 24 years of age.

All cranial material is absent and all post-cranial material is extremely fragmented with much of the cortical bone missing. There is no dentition present for this individual. The cultural material includes a scatter of glass trade beads, a carved

bone-handled table knife, a porcelain underglaze blue transfer-printed cup fragment, a small button, a piece of woven material, and a small sample of bark. The composition of this burial is identical to that described in Chartrand (1988).

Burial 2

Burial 2 is described as a coffin burial, although no coffin outline is present; coffin nails were recovered *in situ* (Rajnovich 1985). I have identified this individual as an Aboriginal female age 40-44 years old. Cultural material includes, coffin nails, two copper coins, and green staining on both eye orbits. Both the archaeological report and Chartrand (1988) state that there was an infant bundle burial recovered at the head of this adult; there are no such remains present among the skeletal material I received for this study. The only additional osteological material is not of human origin, but rather cervid.

All cranial and post-cranial material contains varying degrees of fragmentation. The cranium of individual 2 is missing a large portion of the right temporal and parietal regions. Both maxillary and mandibular dentition are present but show signs of extreme wear. Individual 2 was assigned a manubrium fragment from burial 3B; it appears to have signs of osteophytic development consistent with the tuberculosis infection diagnosed in individual 2. Much of the post-cranial remains are badly fragmented, making some measurements impossible to obtain.

Burial 3

Burial 3 is described (Rajnovich 1985) as an extended burial in a coffin; the remains were completely exposed by the backhoe and bagged by the Fort Frances Police before the arrival of the archaeological team. I have identified this individual as a European female aged 22-25 years old. The cultural material includes, many white seeds and a sample of wood. The cranial material is warped and very fragmented, represented only by the calotte. The only post-cranial material present consist of a shaft fragment from each of the radii.

In Chartrand's report (1988), there are four individuals with this burial number: 3A, 3B, 3C, and 3U. The skeletal material I received for this study is labeled 3A, 3B, and 3BAG. Therefore, it is necessary to cross reference both sets of data.

Chartrand's burials 3A and 3B (designated as $3A_{[JC]}$ and $3B_{[JC]}$ from here forward) consist of skeletal material similar to the burials labeled 3A and 3B that arrived for this study.

Burial 3A is composed of $3A_{[JC]}$, as well as, the frontal fragment and loose dentition from Chartrand's 3U. Burial 3B contained material from $3C_{[JC]}$, the mandible from 3U, as well as, material from $3B_{[JC]}$, with the exception of the unhealed, fractured right ulna (found among the remains of burials 10 and 12 as discussed later).

The foramen magnum, left mastoid process, and the left os coxae of burial 3A are reassigned to burial Unknown A. This material is too robust for individual 3A and the condition of the bone appears to be more suited to burial Unknown A. An unattached, extra frontal bone from 3A is reassigned to the skull of burial 4 due to a perfect match of coronal sutures.

Much of burial 3B is transferred to burial Unknown A. There are a few exceptions: the gracile left and right mastoid processes, and a mandible with dentition, from burial 3B, are reassigned to burial 3A. This material is far too gracile to be related to the extremely robust skeletal remains of individual 3B. As well, a small fragment of the manubrium from burial 3B is transferred to burial 2 as indicated in the description of burial 2 above.

Burial 3BAG includes a fragmentary frontal bone, damaged maxilla, two pairs of fragmentary clavicles, and a fragmentary piece of the right os coxae. The maxilla from 3BAG is possibly the same as that present in burial $3C_{[JC]}$, but this is not certain. The frontal bone is reassigned to burial 9 based on its robusticity and precise matching of coronal suture lines. The maxilla is transferred to burial Unknown A; examination of the maxillary teeth confirms dental wear patterns exactly as those present on the mandible of burial Unknown A. The first pair of clavicles is reassigned to burial Unknown A based on similar robust muscle attachments, as well as, similarities in the condition of the bone. The second set of clavicles is reassigned to burial Unknown B based on their gracile nature and the condition of the bone. The fragmentary right os coxae is transferred to burial Unknown A due to similarities in its robusticity and bone density; the acetabulum requires an extremely robust femoral head, which is found with burial Unknown A.

After careful examination, I reassigned much of the osteological material from 3A, 3B, and 3BAG to other burials leaving only one individual with the designation of burial 3.

Burial 4

The archaeological report states that burial 4 was found as a thin scatter of broken bone and therefore no burial type can be determined (Rajnovich 1985). I have identified this individual as a European male age 23-28 years old. Both the cranial and post-cranial material is extremely fragmented.

Burial 4 is similar to that described in Chartrand's (1988) report but it also includes material from burial 3A as described above. A fragmentary right mandible is present with partially intact dentition. There are two right humeri present, the larger is reassigned to burial Unknown A based on its robusticity, size, and similar bone condition.

Burial 5

Burial 5 is described as an extended burial in a coffin (Rajnovich 1985). I have identified this individual as an Aboriginal female 16-18 years old. Coffin nails are the only cultural material present with this individual. The cranial remains are extremely thin, fragmented and warped. A fragmentary left mandible is present. The post-cranial remains are small and fragmentary. There is an extra right humeral shaft fragment that cannot be identified as belonging to any of the individuals in this sample. The composition of this burial is identical to that represented in Chartrand's (1988) report.

Burial 7

Burial 7 is described as an extended burial in a coffin (Rajnovich 1985). I have identified this individual as an Aboriginal female aged 17-19 years old. The cranial

remains are fragmented and warped. Both maxillary and mandibular teeth are present for this individual. The post-cranial remains are also very fragmented. One bone from each pair of the radii and ulnae is extremely robust while the other is very gracile. The larger bone of each pair is reassigned to burial Unknown A based on its robusticity and similarities in bone condition. Since Chartrand (1988) does not provide detailed data on which bones are present or missing for each burial, it is impossible to determine whether or not he includes both the gracile and robust arm bones with burial 7.

Burial 8

Burial 8 is described as an extended burial in a coffin (Rajnovich 1985). I have identified this individual as an Aboriginal female age 18-21 years. Cultural materials present include one straight pin and four silver earrings. The mandible, right humerus, and right radius have green copper stains. Both the cranial and post-cranial remains are quite fragmented. The mandibular dentition is complete but the maxillary dentition is fragmentary. The composition of this burial is similar to that in Chartrand (1988).

Burial 9

Burial 9 is described as an extended burial in a coffin (Rajnovich 1985). I have identified this individual as an Aboriginal male age 18-24 years. Cultural material includes one straight pin, identical to the one found with burial 8. The cranial material is partially damaged but morphoscopic characteristics are still obtainable. The post-cranial remains are almost complete and exhibit only a slight amount of damage. All of the maxillary and mandibular dentition is present in excellent condition. Burial 9 is similar to that described in Chartrand (1988).

Burial 10

Burial 10 is described as a flexed burial with no coffin (Rajnovich 1985). I have identified this individual as a female age 40-60 years old. Cultural materials present include, trade beads, a brass crucifix, a piece of brown fabric, and hundreds of white seed beads. Both the cranial and post-cranial remains, as well as the dentition, are extremely fragmented and very brittle. An extra right ulna, exhibiting an unhealed distal perifracture, is reassigned to burial Unknown A based on its extremely robust characteristics and similarities to the left ulna of this latter burial. These remains are more fragmented than those described in Chartrand (1988).

Burial 11

Burial 11 is described as an extended burial in a coffin (Rajnovich 1985). I have identified this individual as a European male age 18-25 years. Cultural materials present with this individual include, a sample of heavy woven cloth, bottle fragments, and nails and iron hardware, possibly from the coffin. Burial 11 was previously disturbed during the 1940's in the construction of a utilities trench; this led to the disappearance of the entire cranium and majority of the thorax section of this individual (Rajnovich 1985). The eight vertebrae present, 5 lumbar and 3 thoracic, are all severely fragmented. The pelvic and leg bones are only slightly damaged. It is not possible to cross reference this material due to the absence of osteological data in Chartrand (1988).

Burial 12

Burial 12 was recovered from the scoop of a backhoe, therefore the burial type and orientation cannot positively be ascertained; burial 12 is possibly an extended burial in a coffin (Rajnovich 1985). The only cultural material present is a carved stone pipe. I have identified this individual as a European female age 50-59 years old. The skull and post-cranial remains are all extremely fragmented. The mandible is in fairly good condition and contains much of the adult dentition; this is in contrast to data represented in Chartrand (1988). The maxilla is absent. A fragment of a right distal ulna displays signs of an unhealed perifracture and has been reassigned to burial Unknown A.

Burial Unknown A

Burial Unknown A is not represented in either Chartrand (1988) or in Rajnovich (1985). The burial type and orientation is therefore not known. I have identified this individual as a European male age 30-35 years old. The only cultural indicator present is green staining on the left ulna and right radius.

The cranial and post-cranial material are acquired from burials 3A, 3B, 3BAG, 4, 7, 10, and 12 as indicated in the descriptions of these burials (above). Both mandibular and maxillary teeth are present in fair condition. The right humeral head of burial Unknown B is reassigned to burial Unknown A based on its robusticity and similarity in bone condition. The smaller left and right radii and ulnae, and scapulae fragments are reassigned to burial Unknown B based on their gracile appearance and similar bone condition. There are also fragments of each of the innominates, and a right fibula reassigned to burial Unknown B for the same reasons.

Burial Unknown B

Burial Unknown B is not represented in either Chartrand (1988) or in the 1985 archaeological report. The burial type and orientation is therefore not known. I have identified this individual as a European female age 40+ years old. The cranial material and all dentition are absent. The post-cranial material is acquired from burials 3BAG and Unknown A as described in these burials above. All post-cranial remains are extremely gracile and only slightly damaged.

3.0 METHODS OF IDENTIFICATION

3.1 ESTIMATION OF RACE

For purposes of this research, the term "race" is used to describe the structure of human variation from a biological perspective, primarily to facilitate repatriation of the skeletal remains.

3.11 FROM THE CRANIAL SKELETON

The cranium is the most consistent skeletal structure for the estimation of race (Bass 1987; Giles and Elliot 1962; Novotny *et al.* 1993). For this study, the cranium is employed in burials 2, 4, 7, 8, 9, 12, and Unknown A. Cranial analyses are divided into two basic groups; those employing morphological indicators and those employing discriminant functions.

3.12 FROM CRANIAL MORPHOLOGY

Many authors suggest that, for the estimation of race, qualitative analyses of the skull are superior to quantitative analyses, noting that racial differences are most evident in the face (Bass 1987; Cameron 1930a; Gill 1986; Novotny *et al.* 1993).

Gill (1986) suggests the shape of the palate to be a useful estimator of race; Caucasians typically exhibit a parabolic or triangular shaped palate while Amerindians commonly exhibit an elliptic or horseshoe-shaped palate where the posterior dentition

curves in medially. Gill also notes the utility of the posterior palatal suture in the estimation of race; the suture is most commonly straight in Amerindians but in Caucasians is most often jagged near the midline of the palate.

Rhine (1990) has also developed a method that employs non-metric attributes of the skull for the purpose of estimation of race. This method distinguishes between individuals of Anglo, Hispanic, Indian, and Black ancestry. There are 45 traits assessed: 18 are on the braincase, 13 are on the face, 7 are dental, and 7 are mandibular. With this method, the greater the number of characteristics expressed per category, the greater the likelihood of inclusion in that particular ancestry or group. I found this method difficult to use as the measurement loci are sometimes hard to interpret.

3.13 BY CRANIAL DISCRIMINANT FUNCTION ANALYSIS

There are a variety of different techniques that employ discriminant function analyses to estimate the racial affiliation of a skull (Moore-Jansen *et al.* 1994; Gill 1984; Gill *et al.* 1988; Gill and Gilbert 1990; Giles and Elliot 1962, 1963). This research project utilizes the computer program, FORDISC 2.0, developed by Moore-Jansen, Ousley, and Jantz at the University of Tennessee, Knoxville.

The FORDISC 2.0 computer program classifies single crania against reference samples drawn from eleven groups: 1) white males, 2) white females, 3) black males, 4) black females, 5) Amerindian males, 6) Amerindian females, 7) Hispanic (Mexican-American) males, 8) Vietnamese males, 9) Chinese males, 10) Japanese males, 11) Japanese females, and uses 24 standard measurements. In cases of fragmentary remains, the program also classifies post-cranial material against reference samples. A

major problem of FORDISC 2.0 is in the absence of reference samples for race estimation for Amerindian mandibles.

3.14 FROM DENTITION

In the past, a number of authors suggested the dentition be used as a means of assessing racial affiliation (Hanihara 1967; Hellman 1928). However, the dentition is now mainly a supporting estimator of race, based largely on the analysis of non-metric dental traits (Harvey 1976).

Probably the most commonly cited dental non-metric trait suggested to indicate racial affiliation is the expression of shoveling of the medial and lateral incisors. Amerindian populations typically exhibit very high frequencies of marked and semi-marked shoveling of the medial and lateral incisors; in some Amerindian populations the frequency of marked shoveled teeth approaches 100% for medial incisors and 80% for lateral incisors in both sexes (Dahlberg 1951). Amerindian frequencies of marked and semi-marked shoveling in medial and lateral incisors typically ranges between 80 to 90% (Dahlberg 1951; Hrdlicka 1920) while Caucasian values range around 2 to 15% in males and females (Hrdlicka 1920; Mayhall *et al.* 1982).

A few other dental characteristics can be used to increase the accuracy of race estimation. Amerindians commonly exhibit enamel extensions which project beyond the enamel-cementum junction in between the roots; Amerindians also commonly display "enamel pearls" and buccal pits on the lingual surfaces of the molars. Caucasians typically display anterior dental crowding more often than other races (Hellman 1928;

Hrdlicka 1920). Concave tooth wear is also common among Aboriginal groups due to a large amount of grit present in their diets (White 1991).

3.15 FROM THE POST-CRANIAL SKELETON

The postcranial skeleton appears to exhibit some racially based differences which are reflected in Trotter and Gleser's (1952, 1958) and Trotter's (1970) stature estimation formulae as Negroid lower limbs appear to contribute proportionally more to stature than Caucasoid and Mongoloid lower limbs. Differences in postcranial indices demonstrate that Negroids possess longer distal limb segments than Caucasians.

The most commonly studied elements of the postcranial skeleton are the clavicle, scapula, humerus, innominates, femur and tibia. All but a few demonstrate considerable overlap and prove to be poor discriminators of race.

DiBennardo and Taylor (1983) compiled 3 stepwise discriminant functions of the femorae and innominates based on 15 of 32 measurements they collected from the Terry Collection (n=260; 65 each of Negroid and Caucasian females and males) which allowed for differentiation between Negroids and Caucasians. This function highlights a pattern of greater innominate dimensions, particularly the acetabular joint in Caucasians. Although the technique correctly identifies individuals 95% of the time in their sample, the authors caution that the discriminant functions should not be applied liberally and would only achieve this level of accuracy for their base sample.

3.2 ESTIMATION OF SEX

The estimation of sex in the study sample is determined, for the most part, by FORDISC 2.0. When fragmentary or missing elements render this impossible, alternative methods are employed.

3.21 FROM THE PELVIS

The pelvis is the most reliable skeletal element for determining sex because of its differential structure in females to facilitate birth. T.W. Phenice (1969) published a new visual method for sexing the os pubis. This is now the most commonly used method because it is the "most accurate method yet known" (White 1991:323). Ubelaker (1978) claims that it has a 96% accuracy rate.

The Phenice method involves three readily observable characteristics of the pelvis; the ventral arc, the sub-pubic cavity, and the medial aspect of the ischio-pubic ramus. These features are located on the pubis and ischio-pubic ramus. Therefore, a relatively small piece of the pelvis needs to be present in order to determine the sex of an individual. The ventral arc is a

> slightly elevated ridge of bone which extends from the pubic crest and arcs inferiorly across the ventral surface to the lateral most extension of the subpubic concavity where it blends with the medial border of the ischio-pubic ramus (Phenice 1969:298).

The ridge only occurs in females.

Females display a lateral recurve (subpubic concavity) which occurs in the ischio-pubic ramus, a short distance below the lower margin of the pubic symphysis (Phenice 1969:300) as well as, a ridge on the medial aspect of the ischio-pubic ramus. In males, the ischio-pubic ramus border has a broad flat surface (Phenice 1969:300).

There is some variability within each of these features; for the estimation of sex the ventral arc is considered to be the most reliable feature and the medial aspect the least (Phenice 1969).

Ferembach *et al.* (1980) have shown that a sub-pubic angle of 90° or over usually indicates the female sex.

Another readily observable feature of the pelvis that indicates sex is the pre-auricular sulcus. It is commonly recognized as a discrete trait - that is, it is either present or absent. The sulcus is located at the inferior portion of the ventral iliac where the ilia attaches to the sacrum by ligaments. Houghton (1974) differentiates between two types of sulci, the GL and the GP.

The GL (groove of ligament) is an imprint found on both male and female pelves.

> Commonly it is a narrow, short, straight-edged and shallow groove at the antero-inferior margin of the [sacro-iliac] joint. Sometimes it is wider, extending laterally to the small tubercle situated almost a centimeter from the inferior margin of the joint, and in such cases has a rather rough lateral edge. The essential feature of both these variations of GL is the even, flat floor to the groove (Houghton 1974:381).

The GP (groove of pregnancy) is associated with the hormonal changes and weight gain due to pregnancy; females who have "borne at least one child" will demonstrate a GP, females who have never been pregnant will likely demonstrate a GL.

Houghton (1974:381) describes the GP as

> [giving] the impression of being formed by the coalescence of a series of pits, or small craters, in the bone. Sometimes the individual pits making up the groove are much more elongated, as though the bone had been scooped out. The floor of GP is uneven, being ridged where adjacent pits or scoops, meet, but between these ridges is smooth-surfaced. Similarly the margin of GP tends to be undulating rather than straight. Frequently there is an extension of the groove superiorly on the anterior surface of the ilium, adjacent to the joint.

The pitting, described in reference to the GP, is similar to that found on the pubic symphysis of women who have experienced labor. This pitting is generally created by the tension and possible tearing of ligaments during labor (Houghton 1974).

Krogman and Iscan (1986) cite many morphometric techniques for determining the sex from skeletal remains. These include Giles' [1970] discriminant function analysis which assumes that the parent population is known, Keil's [1930] which measures acetabular size, Sauter and Privat's [1952] Cotyl-sciatic index, and Thoms and Greulich's [1940] which indicates pelvic types as strongly male or female. These methodologies are very problematic because they require a substantial portion of the pelvis. This is impractical for this study since the majority of individuals contain only a few small fragments (if any) of the pelvic bone.

3.22 FROM THE SKULL

The skull is generally considered to be the second best indicator of sex by visual characteristics (El-Najjar and McWilliams 1978; Giles 1964; Novotny *et al.* 1993).

The morphoscopic method developed by Acsádi and Nemeskéri (1970) achieves 94.3% accuracy for sexing females, 86.1% for males and 98.2% in combination with discriminant analysis. The methodology rates six traits — the glabellar prominence, external occipital protuberance, mastoid process, orbital shape, gonial angle, and the shape of the mandibular mental region, into one of five categories — hypermasculine, masculine, indifferent, feminine, and hyperfeminine. Each category has a numerical value and is weighted; the values are added up and divided by the weights to give a final result. If the results are positive the skulls are labeled as male, and if they are negative they are female. If the results fall between +0.4 and -0.4 they are labeled as uncertain. Even though the accuracy of this methodology is very high, the feasibility for this study is very low due to the large amount of the skull required in order to employ this technique.

There are numerous cranial characteristics that can be used for determining the sex of an individual. A list of the sexual characteristics of the skull are presented in Appendix B (Brothwell 1981; El-Najjar and McWilliams 1978; Krogman and Iscan 1986; White 1991, cited in Ens 1995).

The skull is not as accurate morphometrically as it is morphoscopically for the determination of sex. Giles (1970) discriminant function analysis illustrates that the accuracy of the skull in the estimation of sex ranges from 83.1% to 89.7% compared with 93.1% to 98.5% for the pelvis, and accuracies over 92.9% for the remaining individual post-cranial elements (cited in, Krogman and Iscan 1986).

3.23 FROM LONG BONES

Morphoscopic estimation of sex from the long bones is primarily achieved through seriation and therefore is very unreliable. It is possible, and not uncommon, to observe a female skeleton with extremely robust, male-like characteristics or a male skeleton with extremely gracile, female-like characteristics. A more reliable and accurate method for estimating sex based on post-cranial elements is by employing the computer program FORDISC 2.0.

3.3 ESTIMATION OF AGE

3.31 FROM THE STERNAL RIB END

Recent tests indicate that the most consistently accurate age marker for modern humans may be the sternal end of the rib (Loth *et al.* 1994; Loth and Iscan 1989; Saunders *et al.* 1992). The rib-phase method features sex-specific standards and narrow 95% confidence intervals. The rib phases are found to be at least twice as accurate as those from the pubic symphysis (Iscan *et al.* 1985, 1987; Loth and Iscan 1989; Loth *et al.* 1994).

Due to the fragmentary and damaged condition of the ribs this method cannot be employed for the purpose of this study

3.32 FROM THE PUBIC SYMPHYSIS

Todd (1920) is the first to categorize the pubic symphysial development into phases. Many researchers have improved upon his methodology to include both males and females as well as Blacks and Whites (Brooks 1955; Gilbert and McKern 1973; Katz and Suchey 1989; McKern and Stewart 1957).

Due to the fragmentary nature of the remaining burials this methodology can only be employed for individual 4.

3.33 FROM THE DENTITION

One of the more accurate indicators of chronological age is dental calcification and eruption. Ubelaker (1978) developed a technique for establishing the age at death in American Indian populations of individuals between five months in utero to 35 years. His methodology includes patterning dental calcification, crown completion, tooth eruption, and root completion; the third upper molars begin to calcify at eight to eleven years, crown completion is between 12 to 15 years, tooth eruption occurs at 17 to 30 years, and root completion is at 18 to 25 years with similar patterning in the lower third molars (Ubelaker 1978:73). Since there are no subadults in this study, earlier stages of dental development do not have to be reviewed in detail. Although the exact ages of these events vary by population, personal experience has shown Ubelaker's chart to be extremely useful cross culturally.

Tooth wear analysis is another consideration when estimating an individual's age at death. Dental wear begins immediately after a tooth has erupted; the rate and patterns are determined by tooth development sequences, tooth shape and size, internal crown structure, tooth angulation, non-dietary tooth use, biomechanics of mastication, and diet (McKee and Molnar 1988). The rate of tooth wear within a single population is fairly homogenous with the amount of wear primarily a function of age.

3.34 FROM THE AURICULAR SURFACE OF THE OS COXAE

Lovejoy *et al.* (1985) have developed a technique which utilizes the auricular surface of the os coxae to estimate an individual's age at death. A fine granular

appearance is associated with youth and is usually accompanied by billowing and striae. As the individual increases in age, their bone density becomes greater and its granular appearance disappears being replaced by a macroporous structure.

Due to the fragmentary nature of the burials this technique is employed in very few individuals in the present study.

3.35 BY RADIOGRAPHIC TECHNIQUES

Changes in cancellous and cortical bone structure at the macroscopic and microscopic level occur throughout an individual's life. The use of radiography can help evaluate many types of skeletal changes: involution of epiphyses and other cancellous bone, mineralization, measurement of cortical thickness, and determination of bone density (White 1991). When possible (*i.e.* when complete or undamaged skeletal remains are present) this technique is employed to determine an individual's age at death.

3.36 FROM THE POST-CRANIAL ELEMENTS (EXCLUDING THE PELVIS)

Diaphyseal-epiphyseal union is useful in estimating the ages of children, adolescents, and young adults (Bass 1987; Krogman and Iscan 1986; McKern and Stewart 1957). Since epiphyses are present in many of the burials this methodology has proven to be very helpful.

3.37 FROM THE CRANIAL SKELETON

Cranial suture closure has always been associated with extreme, inherent variability (Brooks 1955; Krogman and Iscan 1986; Meindl and Lovejoy 1985; Todd and Lyon 1954a, 1954b; Zivanovic 1983). It is not uncommon to find complete sutural obliteration in the twenties, and conversely, unfused sutures are often found in elderly individuals (Novotny *et al.* 1993). Meindl and Lovejoy (1985) attempt to improve upon the Todd and Lyon (1924) technique but conclude that the correlation of suture closure with age is still inferior to most other methods for estimating age. This method will only be used when no other possible estimator is available.

3.4 ESTIMATION OF STATURE

3.41 FROM COMPLETE LONG BONES

Research carried out by Trotter and Gleser (1951a, 1951b, 1952, 1958) are breakthroughs in the investigation of stature reconstruction. In 1958, Trotter and Gleser re-evaluated the problem of skeletal reconstruction from long bones. Their new sample, obtained from casualties of the Korean War, incorporates a greater diversity of races than previous studies; there are a larger series of Whites and Blacks as well as a small series of Mongoloids, Mexicans, and Puerto Ricans (Trotter and Gleser 1958). This study utilizes only the maximum length of each long bone rather than creating obscure measurements difficult to replicate.

The Mongoloid group in Trotter and Gleser's (1958) work is a heterogenous mixture of Japanese, Hawaiians, Filipinos, and Amerindians. There are no values for females due to the source of data, soldiers of the Korean war. This study therefore employs formulae, for both males and females, developed by Genovés (1967) for stature estimation of Amerindian populations. These remains, obtained from hospitals in the Federal District of Mexico, provide a more homogenous population sample than previously presented by Trotter and Gleser (1958). The maximum length of all long bones are used in these measurements as well.

3.42 FROM FRAGMENTARY LONG BONES

The two most widely recognized sources of data on the estimation of stature from fragmentary long bones are those developed by Steele and McKern (1969) and Steele (1970).

Steele (1970) created tables for correlations of individual long bone segments (femur, tibia, humerus) with maximum bone length. When the researcher begins to combine segments, the correlation increases dramatically; for example, in the femur of White males, a stronger correlation exists when segments 1, 2 and 3 are employed than when segments 2 and 3 are used in combination.

3.5 ANALYSES OF DIET AND PATHOLOGIES

3.51 PATHOLOGIES FROM BONE MATERIAL

A decrease in nutritional foods can lead to not only stunted growth in the bones, but also to more severe skeletal manifestations. These include such diseases as rickets, scurvy, and porotic hyperostosis. Individuals with decreased nutrition are also more susceptible to infectious disease which can then precipitate the onset of Harris lines, anemia, and periosteal reactions (Angel 1966, 1967, 1975, 1982,1984; Blakey and Armelagos 1985; Frisancho 1978; Himes 1978; Jantz and Owsley 1984; Ortner and Putschar 1984; Stuart-Macadam 1985, 1992).

Pathological conditions can also occur in response to daily activities; physically demanding tasks can create specific wear patterns on bones and joints of the skeletal body (Dutour 1986; Lai and Lovell 1992; Lillie 1994).

3.52 PATHOLOGIES FROM RADIOGRAPHS

Analyses of pathological conditions can be obtained by the use of radiographs. For example, the reason for callus formation in a specific area of bone can be ascertained by employing this technique; it can be determined if the callus is due to a fracture in the bone or the invasion of an infectious disease.

3.6 ISOTOPIC ANALYSIS

The analysis of stable isotopes of carbon and nitrogen in preserved bone has provided a new method for studying both modern and past environments and diets. This technique has been used by many researchers to examine the relationship between a consumer and its diet (Bender *et al.* 1981; DeNiro and Epstein 1978, 1981; Macko *et al.* 1982a, b; Schoeninger and DeNiro 1984; Tieszen *et al.* 1979a, b, 1983; Vogel 1978), to determine herbivore foraging behavior (Bombin and Muehlenbachs 1985; Tieszen *et al.* 1979a,b; Vogel 1978) and to determine the presence of maize or other C_4 species of plants (Bender *et al.* 1981; DeNiro and Epstein 1981; Katzenberg 1984; Lynott *et al.* 1986; Norr 1981; Schwarcz *et al.* 1985). Marine versus terrestrial comparisons have been reported for archaeological and recent samples (Chisholm *et al.* 1982; Hobson and Collier 1984; Schoeninger and DeNiro 1984).

The theory underlying the method of stable isotope analysis is explained by DeNiro and Epstein (1978), van der Merwe and Vogel (1978), and others for dietary maize determinations, and by Chisholm *et al.* (1982) for marine versus terrestrial comparisons.

Isotope fractionation is the selection for or against one or more isotopes of an element during the course of a chemical or physical reaction. As a result there is a change in the relative concentration of the isotopes involved in the reaction. These results are then compared to a standard and expressed in parts per mil (‰). A negative value indicates a sample that is depleted in ^{13}C relative to the standard, Pee Dee Belemnite (PDB), or isotopically "lighter" (van der Merwe 1982).

Bone collagen sample preparation for stable carbon and nitrogen isotope analysis at the University of Florida under the direction of Dr. L. Norr as cited in Ens (1997) is as follows: bone samples were scraped clean of discoloration, visible dirt and rootlets. The samples were then repeatedly cleaned in distilled water using a sonicator until the water was clear, and freeze dried. Dried bone was ground and screened through two screens (i.e., 500 μm and 250 μm). All bone was passed through the 500 μm screen. The sample remaining in the 250 μm screen (i.e., particle size 250 to 500 μm) was used for collagen analysis.

Approximately 0.75 g of crushed bone was used for collagen preparation per sample. Biochemical bone minerals, carbonates and fulvic acids were removed by soaking the sample in 0.2 M HCl until demineralization was complete (i.e., until reaction ceased and the particles were translucent). The samples were rinsed to neutral pH, drained, and then soaked in 0.125 M NaOH for approximately 10 hours to eliminate remaining lipid and humic acid contaminates. Microscopic contaminates were removed by dissolving the collagen 10^{-3} M HCl at 90°C for 5 hours, adding 100 μL of 1 M HCl and heating for another 5 hours, and finally filtering through glass filter funnels. The filtered collagen solute was reduced to approximately 2 ml, frozen and freeze dried.

Approximately, 0.5 mg of dried homogenized collagen was used for combustion for carbon isotopes, and 1 mg for nitrogen isotopes and carbon to nitrogen ratios. Carbon and nitrogen isotopes samples were loaded separately into an auto-loading light element isotope-ratio mass spectrometer with reference standards of Pee Dee Belemnite (PDB) for carbon and atmospheric nitrogen (AIR) for nitrogen resulting in delta-values

(δ) measured in parts per mil (‰). The University of Florida carbon to nitrogen ratios (C:N) are typically lower than those calculated using atomic C:N ratios and require a correction factor of 1.167 for comparative purposes.[1]

Carbon, found in the atmosphere as CO_2 with a virtually constant $^{13}C/^{12}C$ ratio of about 1:99, is incorporated into plant tissues via photosynthesis. Isotopic fractionation takes place during this process which therefore alters the $^{13}C/^{12}C$ ratio. Most plants use the Calvin-Benson, or C_3, photosynthetic pathway, which produces a three-carbon molecule, phosphoglyceric acid, as its first intermediate product (i.e., most flowering plants, trees, and shrubs, and most of the temperate zone grasses).

C_4 plants follow a pathway that incorporates the CO_2 carbon into a four-carbon molecule, oxaloacetate, as its first intermediate product. The majority of species represented in this group are xeric environment grasses (i.e., maize, some millets, some sorghums, cane sugar, some amaranths, and some chenopods).

The third group, the Crassulacean Acid Metabolism (CAM) plants, is represented by tropical succulents, including pineapple and cacti, few of which are found in any quantity in the diet of herbivores or humans. Marine plants approximate the C_3 cycle, but obtain their carbon from dissolved oceanic bicarbonates which have isotope ratio values differing from atmospheric CO_2.

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[1] "Atomic C:N ratios are higher than C:N ratios calculated from weights of C and N because the former are calculated directly from the numbers of atoms of each element in a sample. Nitrogen and carbon atoms have atomic masses of 14 and 12, respectively, to convert from weight % C:N ratios to atomic C:N ratios one multiplies the former by 14/12, or 1.16667" (Ambrose and Norr 1992:403).

The photosynthetic pathways of C_3, C_4, and CAM plants differ chemically and therefore produce different degrees of isotopic fractionation. Values averaging about $\delta^{13}C$= -26.5‰ characterize modern C_3 plants, while modern C_4 species values average about -12.5‰ (van der Merwe 1982; Vogel 1978). The separation of about 14‰ between the group averages allows for discrimination between them. Modern marine plankton have values averaging about $\delta^{13}C$= -19.0‰ (Brown *et al.* 1972; Sackett *et al.* 1965).

When either terrestrial or marine herbivores eat plants, their metabolism selects and recombines plant chemicals, resulting in further fractionation of the carbon isotopes. While the whole body average value of a consumer is displaced from its diet by only 0.8±1.1‰ (DeNiro and Epstein 1978), the increment between the diet and bone collagen of the consumers, called the "collagen enrichment factor", or "ΔDC", appears to be about 5‰ (Chisholm *et al.* 1982). This means that the bone collagen from a modern herbivore subsisting solely on C_3 grasses will give a value for $\delta^{13}C$ of (-26.5 +5)‰ or -21.5‰. If the diet is based solely on C_4 grasses then the value would be -7.5‰.

In archaeological situations, bone collagen extract is analyzed because it is the only organic tissue that is reliably preserved in sufficient quantity for analysis. Since bone collagen turnover is slow, taking at least ten years for complete replacement, seasonal and other short-term variations average out (Libby *et al.* 1964). The measurement obtained may therefore represent a lifetime average for the individual sampled.

4.0 BURIAL ANALYSES

This section will describe the morphoscopics and morphometrics employed in the estimation of age, sex, race and stature of each individual, as well as, any anomalies and pathologies that may be present within this sample population. All osteological and dental anomalies and pathologies for each burial are presented in Appendices D, E, and F.

4.1 BURIAL 1

4.11 STATUS

All cranial material is absent and all post-cranial material is extremely fragmented with much of the cortical bone missing.

4.12 AGE

I have determined individual 1 to be 22 to 24 years of age. The estimation of age is based on the complete fusion of the distal end and the head of the right radius, the fusion of the right humeral head and the medial epicondyle, as well as the complete fusion of the right proximal ulna. The vertebral bodies are partially unfused.

4.13 SEX

I have identified this individual as representing typical female skeletal traits. The estimation of sex is largely established through analysis of the pelvis; it has a wide angle of the sciatic notch and a faint presence of a pre-auricular sulcus. All of the skeletal material is very gracile and this supported the conclusion for female remains.

4.14 RACE

The estimation of race is based on morphometric analyses. The FORDISC 2.0 program indicates these remains are of Aboriginal ancestry.

4.15 ADDITIONAL OBSERVATIONS OF POTENTIAL FORENSIC SIGNIFICANCE

4.151 BIOLOGICAL

Individual 1 exhibits no biological anomalies or pathologies.

4.152 CULTURAL

Individual 1 exhibits green staining, due to the presence of copper, on 4 phalanges, 1 vertebral body, the anterior-lateral side of the right radius, and the anterior-medial side of the right ulna. The cultural material includes, a scatter of glass, trade beads, a carved bone-handled table knife, a porcelain underglaze blue transfer-printed cup fragment, a small button, a piece of woven material, and a small sample of bark.

4.2 BURIAL 2

4.21 STATUS

All cranial and post-cranial material contains varying degrees of fragmentation.

4.22 AGE

I have determined individual 2 to be 40-44 years old. The estimation of age is supported by the complete fusion of all post-cranial epiphyses and the eruption of both mandibular and maxillary third molars. There is heavy attrition, past the dentine, consistent with stage "H" (Lovejoy 1985). The auricular surface of the os coxae shows "islands of coarse granularity and dense surfaces" indicating an individual within this age range (Steele and Bramblett 1988:213). In addition, the endocranial lambdoid suture has recently fused, and the sagittal and coronal sutures are almost absent. All of this data concurs with the above estimation of age.

4.23 SEX

I have identified individual 2 as a female. The estimation of sex is established by analyses of the pelvis, skull and mandible. The pelvis displays a slight presence of a pre-auricular sulcus and a wide angle of the sciatic notch. The skull exhibits small supra-orbital ridges and mastoid processes, less prominent glabella region and frontal sinuses, and a single frontal boss along the midline. This individual also shows quite a

robust nuchal crest, but not so great to be classified as characteristically male. The mandible has a short and broad ramus, and a gonial angle that is slightly obtuse in nature, characteristics normally associated with osteological material belonging to a male.

4.24 RACE

The estimation of race is based on morphoscopics of the maxilla, examination of tooth wear patterning, and analyses employed by FORDISC 2.0 which classifies this individual as having Aboriginal ancestry.

4.25 ADDITIONAL OBSERVATIONS OF POTENTIAL FORENSIC SIGNIFICANCE

4.251 BIOLOGICAL

Individual 2 displays characteristics representative of *Mycobacterium tuberculosis*. There is severe lipping present on all vertebral bodies, as well as, the superior and inferior articulating facets. Lipping is present on the occipital condyles of the skull creating remodeling of the articular surfaces. The odontoid process of the atlas and its articulating surface on the axis are modified due to the presence of osteophytes (Ortner and Putschar 1984:414).

The ninth, tenth, eleventh, and twelfth thoracic vertebrae, and the first lumbar vertebra, display collapsed vertebral bodies. The vertebral bodies of L2 through L4 have also begun to collapse (plate 1).

The right humerus exhibits lipping on the edges of both the capitulum and trochlea, as well, the right ulna displays lipping on both the olecranon and coronoid processes.

The acetabulum of both pelves are extremely deep with lipping present along their outer margins. Both acetabular fossae (attachment site for the ligamentum teres) are extremely thin and almost worn through.

The sacro-iliac joint displays signs of tuberculosis due to the presence of osteophytic development in this region. The first rib is also extremely remodeled because of the tuberculosis infection; the head exhibits severe pits and grooves as well as the presence of osteophytes.

Severe lipping of both femoral heads and intercondylar fossae is also present. Severe osteophytic development is present on both patellae.

The right distal tibia and fibula are fused and extreme remodeling has occurred as a result of the tuberculosis; the x-rays and morphoscopic analyses show no sign of callus formation, eliminating the possible diagnosis of a healed fracture (plate 2). The talocrural joint is severely deformed allowing little or no movement in the ankle region; this joint is responsible for inversion and eversion of the foot to enable walking. The subtalar joint is also severely remodeled, restricting pronation and supination of the right foot. These two pathological conditions severely limit this individual's ability to walk.

All ten metatarsals are present and exhibit smooth proximal, and distal, articulating surfaces; this is also a direct result of the tuberculosis infection.

This individual also exhibits large deltoid tuberosities, the attachment site for the deltoid muscle; this muscle aides in shoulder abduction (beyond 15°), shoulder flexion, and shoulder extension. As well, both femurs exhibit robust linea aspera.

This individual has extremely bad teeth. The majority of the mandibular and maxillary teeth are severely worn into the dentine area. The mandibular molars of this individual show extreme concave wear. This is typical of Aboriginal peoples as they consume large amounts of grit in their traditional diet (White 1991:353). There is one small carie present. Periodontal disease has affected the entire mandible except the incisors.

4.252 CULTURAL

Two pennies, dating from 1842 and 1852 (Rajnovich, 1985), are found covering the eye orbits of individual 2 which results in green staining of the surrounding bone. There are also coffin nails associated with this individual.

4.3 BURIAL 3

4.31 STATUS

The cranial material is warped and very fragmented, only being represented by the calotte. The only post-cranial material present consist of shaft fragments from both the left and right radii.

4.32 AGE

I have determined individual 3 to be 22-25 years of age. The estimation of age is partially based on attrition present on the second mandibular molars; slight tooth wear patterns indicate the age of this individual to be between 21 and 25 years old. This individual shows evidence of slight wear on both maxillary and mandibular teeth consistent with stage "D" (Lovejoy 1985).

Other evidence to suggest this age range includes the beginnings of the endocranial sagittal suture closure. There is no evidence of mandibular third molar eruption suggesting this individual to be developmentally immature. The only post-cranial material present are the left and right radii, which contain no distal or proximal elements to aid with the estimation of age.

4.33 SEX

I have identified this individual as representing female skeletal remains. The estimation of sex for individual 3 is principally based on the gracile nature of the remains. The skull contains a small and gracile, nuchal crest and mastoid process. The gonial angle of the mandible is more obtuse and the ramus quite short and gracile. All of these characteristics are suggestive of a female skeleton.

4.34 RACE

The estimation of race is based on the presence of an unfused metopic suture, more commonly found among European populations (Brues 1977). The FORDISC 2.0 program is not employed due to the fragmentary nature of this burial.

4.35 ADDITIONAL OBSERVATIONS OF POTENTIAL FORENSIC SIGNIFICANCE

4.351 BIOLOGICAL

Individual 3 displays an unfused metopic suture, found rarely within this age range, 22-25 years old (plate 3).

The teeth of this individual are only fair. Both maxillary and mandibular caries are present. Periodontal disease is present on all canines, premolars and molars of the mandible. Both morphoscopic and radiographic analyses confirm the absence of the left

third mandibular molar. No resorption is present and therefore, it is possible that this tooth had never developed.

4.352 CULTURAL

Hundreds of white plant seeds are present with the remains of individual 3.

4.4 BURIAL 4

4.41 STATUS

The archaeological report states burial 4 was found as a thin scatter of broken bone (Rajnovich 1985). Both the cranial and post-cranial material is extremely fragmented.

4.42 AGE

I have determined individual 4 to be 23-28 years of age. The estimation of age is based on observation of the post-cranial skeletal remains. The pubic symphysis clearly illustrates phase 2 of the Suchey-Brooks aging technique; the age range is 19-35 years with a mean age of 24.7 years (Suchey, and Katz 1986). Other age estimators include, an unfused right medial clavicle, a partially unfused thoracic vertebral body, the presence of an epiphysis of the head of a mid-rib, as well as, the complete fusion of the right humeral medial epicondyle. The mandibular teeth show dental wear patterns consistent with that of a 24-30 year old individual.

4.43 SEX

I have identified this individual as displaying typically male characteristics. The estimation of sex is based on morphoscopics of the skull and mandible. The skull exhibits large supraorbital ridges, small frontal bosses and a large nuchal crest. The mandible is very robust with a long broad ramus and a gonial angle near that of a right angle. All of these characteristics are consistent with male osteological material.

4.44 RACE

The estimation of race is based on characteristics employed by FORDISC 2.0 which categorizes this individual as having European ancestry.

4.45 ADDITIONAL OBSERVATIONS OF POTENTIAL FORENSIC IMPLICATIONS

4.451 BIOLOGICAL

Individual 4 has teeth in good condition. Only a few caries are evident on the mandibular molars of this individual.

4.452 CULTURAL

Individual 4 contains no culturally significant remains.

4.5 BURIAL 5

4.51 STATUS

The cranial remains are extremely thin, fragmented and warped. A fragmentary left mandible is present. The post-cranial remains are small and fragmentary.

4.52 AGE

I have determined individual 5 to be 16-18 years of age. The estimation of age is primarily based on analyses of the mandibular teeth and the right radius. The left third mandibular molar is calcified but has not yet erupted therefore placing this individual at less than 18 years old. The left first mandibular molar shows tooth wear consistent with an individual in the age range of 16-20 years. The distal epiphysis of the right radius is unfused, indicating an age at death of less than 18 years.

4.53 SEX

I have identified individual 5 as a female. The estimation of sex incorporates attributes of the skull, mandible, and some post-cranial elements, all consistent with the determination of a female skeleton. The skull displays a small nuchal crest and supra-orbital ridge of the right frontal fragment. The mandible is very gracile and exhibits an obtuse gonial angle. The post cranial elements are all very gracile in nature.

4.54 RACE

I have identified this individual as "perhaps" having Aboriginal ancestry. The estimation of race is based on the presence of one maxillary tooth (LI^2) and one mandibular tooth (LI_2) which display signs of shoveling. Aboriginal groups are characterized by a higher frequency of shoveled incisors compared to Caucasians who rarely show pronounced or semi-shoveled traits (Hinkes 1990).

4.55 ADDITIONAL OBSERVATIONS OF POTENTIAL FORENSIC SIGNIFICANCE

4.551 BIOLOGICAL

This individual displays two wormian lambdoidal bones near the left lambdoidal suture. There is also an incomplete mylohyoid arch present on the left mandibular fragment.

4.552 CULTURAL

Coffin nails are the only cultural material present with this individual.

4.7 BURIAL 7

4.71 STATUS

The cranial remains are fragmented and warped. Only maxillary teeth are present for this individual. The post-cranial remains are also very fragmented.

4.72 AGE

I have determined individual 7 to be 17-19 years of age. The estimation of age is based on examination of, post-cranial epiphyses, teeth, and endocranial suture closure. Epiphyseal fusion is not present, at the distal end of the left femur or the left femoral head, on the cervical bodies or at the occipitomastoid suture. The first and second mandibular and maxillary molars show wear consistent with the age range of 16-20 years. The maxillary and mandibular third molars are present and exhibit a slight polish. All of this information is consistent with the age range of 17-19 years.

4.73 SEX

I have identified individual 7 as a female skeleton. Chartrand (1988) classified this individual as a male. Based on data collected and analyses performed by the present author, the conclusions obtained in the earlier report are not satisfactory.

The estimation of sex is established through analyses of the pelvis, mandible, and post-cranial elements. Due to the immaturity of this individual, it is difficult to

determine the sex for certain. However, all osteological material is representative of female skeletal remains.

The pelvis displays a wide sciatic notch angle, yet a pre-auricular sulcus is not present; there is a raised area on the auricular surface indicative of a female pelvis. The mandible is slightly robust. It exhibits a broad ramus with an obtuse gonial angle. The post-cranial elements, humerus, radius, ulnae, and femur, aided in favor of a slightly robust female skeleton.

4.74 RACE

These remains typify an individual of Aboriginal background based on the analyses performed by FORDISC 2.0, and the presence of semi-shoveled incisors and enamel extensions (Hellman 1928; Hrdlicka 1920).

4.75 ADDITIONAL OBSERVATIONS OF POTENTIAL FORENSIC SIGNIFICANCE

4.751 BIOLOGICAL

This individual's teeth are in good condition. There are only a few small caries present on the maxillary teeth. The upper, left incisors and right canine are beginning to show wear into the dentine area.

There are enamel extensions present on the following maxillary and mandibular teeth of this individual: LM^3, LM^2, LM^1, RM^3, RM^2, RM^1, LM_2, LM_1, RM_3, RM_2, RM_1. The maxillary left and right canines display wear patterns on the anterior surfaces and not

the posterior as commonly shown in these teeth.

4.752 CULTURAL

Individual 7 contains no culturally significant remains.

4.8 BURIAL 8

4.81 STATUS

Both the cranial and post-cranial remains are quite fragmented. The mandibular dentition is complete but the maxillary dentition is fragmentary.

4.82 AGE

I have determined individual 8 to be 18-21 years of age. The estimation of age is based on analyses of the teeth, as well as post-cranial elements. All osteological material concurs with the 18-21 year age range. Both mandibular and maxillary third molars are present and attrition patterns indicate an individual between 18 and 22 years of age. Complete fusion of the proximal right radius and incomplete fusion of the distal right radius is present. The epiphyses of the vertebral bodies are partially unfused. The right iliac crest displays complete non union of its epiphysis. Both, the proximal femoral heads and the proximal tibiae fused only recently before the time of death.

4.83 SEX

I have identified individual 8 as a female skeleton. The estimation of sex is established through analyses of the pelvis, mandible, and post-cranial elements. The pelvis displays a wide sciatic notch angle and a strong presence of a pre-auricular

sulcus. The mandible exhibits an obtuse gonial angle with small short rami. All post-cranial material is gracile in appearance. The data supports the conclusion for female skeletal remains.

4.84 RACE

This individual shows characteristics of Aboriginal ancestry based on the analyses performed by FORDISC 2.0, and the presence of shoveled incisors and enamel extensions (Hellman 1928; Hrdlicka 1920).

4.85 ADDITIONAL OBSERVATIONS OF POTENTIAL FORENSIC SIGNIFICANCE

4.851 BIOLOGICAL

This individual displays enamel extensions on the following maxillary and mandibular teeth: LM^3, LM^2, LM_2, and RM_2. This individual also exhibits a complete mylohyoid arch on both sides of the mandible.

4.852 CULTURAL

Individual 8 exhibits green copper staining on the, medial distal surface of the right humerus, anterior-superior surface of the right radius, medial aspect of the trochlear notch of the right humerus, and both mandibular rami. Cultural materials include, one straight pin and four silver earrings.

4.9 BURIAL 9

4.91 STATUS

The cranial material is partially damaged. The post-cranial remains are almost complete and exhibit only a slight amount of damage.

4.92 AGE

I have determined individual 9 as being 18-24 years of age The estimation of age is based on analyses of the mandible, pelvis, and post-cranial elements. Individual 9 displays mandibular and maxillary third molars that contain a slight polish. The first and second molars exhibit wear patterns characteristic of an individual 18-24 years old.

As well, the auricular surface of the os coxae shows billowing and very fine granularity. This individual displays recent fusion of the, medial epicondyle and the proximal end of the humeri, the proximal and distal ends of the right radius, and the distal end of the ulnae. There is complete fusion of the proximal ulnae, distal femurs, proximal and distal tibiae, and proximal and distal fibular epiphyses. Partial fusion is evident in the, heads of the ribs, vertebral bodies, and both femoral heads. Both the medial clavicular epiphyses and the first sacral transverse line display unfused epiphyseal elements. All of these characteristics typify an individual within this age range.

4.93 SEX

I have identified this individual as a male skeleton. The estimation of sex is established through analyses of the pelvis, mandible, post-cranial elements, and skull. The ventral arch, subpubic concavity, and pre-auricular sulcus are all absent. The ischiopubic ramus has a broad medial surface and the sciatic notch angle is very narrow. The mandible displays extremely robust characteristics: squared mental region, broad ramus with large coronoid processes, and a gonial angle nearing 90°.

All post-cranial elements are extremely robust; the femur exhibits very large linea aspera muscle attachments. The skull typifies a very large male skeleton: large, supra-orbital ridges, mastoid processes, and nuchal crest. All of these characteristics are consistent with the estimation of male osteological material.

4.94 RACE

The estimation of Aboriginal ancestry is based on the presence of an extra horizontal suture (Brues 1977), an elliptic palate with a straight suture (Gill 1986), and a trace of shoveled incisors (Hrdlicka 1920).

4.95 ADDITIONAL OBSERVATIONS OF POTENTIAL FORENSIC SIGNIFICANCE

4.951 BIOLOGICAL

Individual 9 displays a "sub-lambdoid suture" on the occipital bone; an extra horizontal suture across the occipital bone between the distal ends of the lambdoid suture (once referred to as an "os inca" bone) (plate 4). The right and left humeri exhibit well developed septal apertures, present because of hyper-extension of the elbow joint. The right side of the superior sacral spine is rotated slightly downwards. This individual also exhibits an incomplete mylohyoid arch on the left side of the mandible.

Although there are many small caries present on both the maxillary and mandibular dentition, the teeth of this individual are in excellent condition. Periodontal disease is also present in the premolar and molar regions of the mandible, and the molar regions of the maxilla. Individual 9 displays a paramolar cusp on the right, maxillary third molar (plate 5).

All muscle attachments of this individual are extremely robust. The extremely robust deltoid tuberosities, indicate a great amount of physical activity in the upper body.

4.952 CULTURAL

There is green copper staining present on the right anterior gluteal line of the os coxae, mid-lateral side of the left humerus, trochlear notch of the left ulna, mid-lateral

aspect of the left femur, mid-lateral aspect of the right tibia, and mid-medial aspect and superior-lateral aspect of the right fibula. Cultural material includes one straight pin.

4.10 BURIAL 10

4.101 STATUS

Both the cranial and post-cranial remains, as well as the dentition, are extremely fragmented and very brittle.

4.102 AGE

I have determined individual 10 to be 40-60 years of age. The estimation of age is based on examination of the mandible, skull, and post-cranial elements. The mandibular teeth, LC_1 and LP_3, exhibit very heavy attrition. The remainder of the mandible displays resorption which occurred well before the time of death. There is a large degree of osteophytes present on the articular surfaces of all vertebrae. The skull exhibits complete ectocranial fusion of the sagittal and coronal sutures, and partial union of the endocranial parieto-mastoid suture. All of these characteristics are consistent with an individual in this age range.

4.103 SEX

I have identified this individual as a female skeleton. The estimation of sex is established through analyses of the pelvis, mandible, post-cranial elements, and the skull. The pelvis exhibits a wide sciatic notch angle characteristic of a female skeleton. The mandible and post-cranial elements are all very gracile in appearance. The skull

displays a small left mastoid process and small supra-orbital ridges. All of these elements are representative of female osteological remains.

4.104 RACE

Biologically, racial affinity is inconclusive due to the extreme fragmentation and deterioration of the osteological remains present in this burial; the only racially defining characteristic present is the elliptic palate with a straight suture, characteristic of Aboriginal populations (Gill 1986). Culturally this individual is classified as having Aboriginal ancestry based on the burial mode and presence of hundreds of white seed beads possibly from "mukluks" or moccasins.

4.105 ADDITIONAL OBSERVATIONS OF POTENTIAL FORENSIC SIGNIFICANCE

4.1051 BIOLOGICAL

Individual 10 exhibits signs of arthritic development (Ortner and Putschar 1984:399). Osteophytes and extensive remodeling are present on the anterior surface of the odontoid process of the first cervical vertebra. Lipping is present on the medial aspect of both the left and right femoral condyles, as well as, on the superior and inferior articular surfaces of the cervical and thoracic vertebrae. This individual has two fused thoracic vertebrae and bony ankylosis is present on the remaining vertebral bodies.

4.1052 CULTURAL

This individual exhibits green staining on the proximal end of the left ulna and the distal end of the left radius, possibly due to the presence of a brass crucifix. Other materials present include, trade beads, a brass crucifix, a piece of brown fabric, and hundreds of white seed beads.

4.11 BURIAL 11

4.111 STATUS

Burial 11 was previously disturbed during the 1940's in the construction of a utilities trench; this led to the disappearance of entire cranium and majority of the thorax section.

4.112 AGE

I have determined this individual to be 18-25 years of age. The estimation of age is based on observations of the post-cranial skeleton. There is partial epiphyseal union of the vertebral bodies and rib heads, complete epiphyseal fusion of the metatarsals, and only recent epiphyseal fusion of the femoral head. Cortical bone is absent from the distal and proximal ends of the right femur, tibiae, and fibulae therefore observation of epiphyseal union is not possible. This data concurs with the age range of 18-25 years.

4.113 SEX

I have identified individual 11 as a male skeleton. The estimation of sex is established through analyses of the pelvis and post-cranial elements; the pelvis displays a narrow sciatic notch angle and the post-cranial skeletal material is quite robust in appearance. All of these observations are consistent with male osteological remains.

4.114 RACE

This individual shows characteristics of European ancestry based on analyses performed by FORDISC 2.0 and information regarding the mode of burial.

4.115 ADDITIONAL OBSERVATIONS OF POTENTIAL FORENSIC SIGNIFICANCE

4.1151 BIOLOGICAL

Individual 11 exhibits no biological anomalies or pathologies.

4.1152 CULTURAL

Individual 11 contains a sample of heavy woven cloth, bottle fragments, and nails and iron hardware, possibly from the coffin.

4.12 BURIAL 12

4.121 STATUS

The skull and post-cranial remains are all extremely fragmented. The mandible is in fairly good condition and contains much of the adult dentition. The maxilla is absent.

4.122 AGE

I have determined individual 12 to be 50-59 years of age. Chartrand (1988) classified this individual as being 38-42 years of age. Based on data collected and analyses performed by the present author, the conclusions obtained in the earlier report are not satisfactory.

The estimation of age is based on analyses of the pelvis, mandibular teeth, and post-cranial elements. The auricular surface of the os coxae concurs with the age range of 50-59 years old (Steele and Bramblett 1988:213). There is heavy attrition on the mandibular teeth; the right second molar and both third molars indicate a 45-55 year age range (Lovejoy 1985). There is complete fusion and almost obliteration of the endocranial sagittal suture. The endocranial coronal suture has completely fused and become absent. The endocranial lambdoid suture displays complete union but is still slightly present. The endocranial parieto-mastoid and masto-occipital sutures exhibit partial epiphyseal union.

4.123 SEX

I have identified individual 12 as a female skeleton. Chartrand (1988) classified this individual as being a male. Based on data collected and analyses performed by the present author, the conclusions obtained in the earlier report are not satisfactory.

The estimation of sex is supported by morphoscopic and FORDISC 2.0 analyses of the mandible and skull. The mandible is robust in appearance; it exhibits a squared mental region, broad ramus, and a gonial angle of almost 90°. The skull displays a large, nuchal crest and mastoid processes. All characteristics are suggestive of a very robust female skeleton.

4.124 RACE

This individual shows characteristics of European ancestry based on analyses performed by FORDISC 2.0, and cultural inclusions. The FORDISC 2.0 program classifies this individual with a 99.9% probability of being a white female.

4.125 ADDITIONAL OBSERVATIONS OF POTENTIAL FORENSIC SIGNIFICANCE

4.1251 BIOLOGICAL

There are osteophytes present on all vertebrae of this individual. The axis displays severe osteophytic development on the articular surface of the odontoid process.

There is extensive remodeling of the articular facets of both cervical and lumbar vertebrae indicating the existence of ankylosing spondylitis.

Individual 12 displays very robust muscle attachments for the deltoid tuberosities, linea aspera, and the left brachial tuberosity. This is indicative of an individual who is involved in an enormous amount of physical activity.

Eventhough there are only a few mandibular caries present, the condition of this individual's teeth is extremely bad. There is extensive wear into the dentine area as well as periodontal disease in the premolar and molar regions of the mandible. The mandibular molars of this individual exhibit the beginnings of concave wear patterns. This is possibly due to the presence of large amounts of grit in their diet (White 1991:353). This individual also displays an incomplete mylohyoid arch on the left side of the mandible.

4.1252 CULTURAL

A carved stone pipe was discovered with the remains of individual 12.

4.13 BURIAL UNKNOWN A

4.131 STATUS

The cranial and post-cranial material is nearly complete. Both mandibular and maxillary teeth are present in fair condition.

4.132 AGE

I have determined individual Unknown A to be 30-35 years of age. The estimation of age is established through analyses of the teeth, post-cranial elements, and skull. The mandibular teeth display heavy attrition characteristic of an individual 35-40 years old (Lovejoy 1985). All long bone, rib heads, and medial clavicular epiphyseal unions are complete. There is partial epiphyseal union of the vertebral bodies. The skull exhibits complete epiphyseal fusion of the sagittal and coronal sutures.

4.133 SEX

I have identified this individual as a male skeleton. The estimation of sex is based on analyses of the mandible, post-cranial elements, and skull. All display extremely robust characteristics. The mandible exhibits a squared mental region, broad ramus, and a gonial angle nearing 90°. The linea aspera on both femurs are very robust. The skull displays a very large nuchal crest, supraorbital ridges, and mastoid processes. All data typifies that of male osteological material.

4.134 RACE

The estimation of racial affiliation is very weak. The FORDISC 2.0 program classifies this individual as a European male but only slightly; individual Unknown A sits very near the sectioning line between European and Aboriginal male. Observation of the chewing muscles, robusticity, and general musculature indicates that these three similar characteristics also occur in burial 9, an Aboriginal male. As well, the green staining which appears on the osteological material of burial Unknown A, is also present in burials 1, 2, 8, and 9, all of whom are Aboriginal.

4.135 ADDITIONAL OBSERVATIONS OF POTENTIAL FORENSIC SIGNIFICANCE

4.1351 BIOLOGICAL

The left inferior articular facet of the axis, and left superior articular facet of the atlas, are 2.5 times larger than the right due to the presence of osteophytes; this may be the result of a stress related injury (plate 6). The left humerus shows signs of arthritic development: lipping on the lateral edge of the capitulum, medial edge of the trochlea, and lateral supracondylar crest. The right ulna also displays arthritic development; there is lipping present on the edges of the olecranon process, coronoid process, and radial notch. The left femur displays slight lipping on the medial edge of both the medial and lateral condyles, characteristic of arthritic development.

The distal end of the right ulna exhibits signs of an unhealed perifracture (plate 7). This non-union resulted in the formation of a pseudarthrosis, or false joint, near the articular surface of the wrist.

This individual's teeth are only fair in appearance. Periodontal disease is present in the canine and premolar regions of both the mandible and maxilla. The mandibular molars on both sides show a slight amount of concave wear. This is possibly due to a large amount of grit present in their diet (White 1991:353).

4.1352 CULTURAL

Individual Unknown A exhibits green copper staining near the medial section of both the left ulna and right radius.

4.14 BURIAL UNKNOWN B

4.141 STATUS

The cranial material and all dentition are absent. The post-cranial remains are extremely gracile and only slightly damaged.

4.142 AGE

I have determined individual Unknown B to be 40+ years of age. The estimation of age is supported by analysis of the pelvic remains. The auricular surface of the os coxae displays a "transition from course granularity to dense surface; this may take place over islands of the surface of one or both faces" (Steele and Bramblett 1988:213). This concurs with the age range of 40+ years.

4.143 SEX

I have identified individual Unknown B to be a female skeleton. The estimation of sex is based on analyses of the pelvis and post-cranial material, both typifying female skeletal remains. The pelvis displays a wide sciatic notch angle and the post-cranial material is all very gracile in appearance.

4.144 RACE

I have determined this individual to be of European ancestry. The estimation of race is based on analyses performed by FORDISC 2.0. Observations also show that identical robusticity and general musculature is present in burial 3, a European female.

4.145 ADDITIONAL OBSERVATIONS OF POTENTIAL FORENSIC SIGNIFICANCE

4.1451 BIOLOGICAL

Individual Unknown B exhibits no anomalies or pathologies.

4.1452 CULTURAL

Individual Unknown B contains no culturally significant remains.

5.0 ISOTOPIC ANALYSIS RESULTS

The overall results show a dietary trend of C_3 plants consumed by all individuals in this burial sample; the data ranges from -18.59‰ to -20.93‰. Nitrogen data are also available but, since there are no flora or faunal samples available for this study area, identification of individual species consumed is very difficult. The analysis indicates that both the Aboriginals and Europeans living within the fort were eating similar diets. The data are included in Appendix E for the individual burials. Further analyses, using comparative samples, are in process and may reveal more discriminating results.

6.0 CONCLUSION

The initial goal of this thesis was to assess the basic forensic parameters for each burial present in this sample, i.e., race, sex, age, and stature. The estimation of sex and age was possible for all burials. Stature calculations were only achieved for five of the thirteen individuals due to the fragmentary nature of the remaining burials. Estimation of racial affiliation was only biologically impossible in one instance; due to the extreme fragmentary nature of burial 10, the estimation of race was established by analyses of the burial mode and cultural inclusions present.

The historical information and the archaeological data support the hypothesis that the osteological remains recovered from DdKi-2 were associated with the fur trading activities occurring in the Fort Frances region during the 19th century. Rajnovich (1985) stated that the post consisted of individuals of European, Aboriginal, and Metis ancestry. This was confirmed through the present analysis of this site.

The osteological material indicates a population of twice as many females (n=9) as males (n=4), and an equal number of Aboriginals and Europeans (n=6), as well as, possibly one individual of Metis ancestry.

The analysis of pathological conditions reveals three individuals with arthritic development, one with an unhealed perifracture, and one with tuberculosis. It is possible that the cause of death for individual 2 was partially related, or directly due, to the *Mycobacterium tuberculosis* infection.

With one exception, all of the individuals with good to excellent teeth, are of Aboriginal ancestry; this includes four of the six Aboriginal individuals. The dental condition present in the majority of the European burials is fair to bad.

The second goal of this thesis was to assess whether and to what extent ethnic affiliation reflected nutritional and health status of the individuals buried in the Fort Frances cemetery. Results of the isotopic analysis illustrate no difference in the types of foods consumed, *i.e.* European, Aboriginal, and Metis individuals living at the fort all consumed carbon-3 plants.

REFERENCES

Acsádi, G. and J. Nemeskéri
1970 *History of Human Life Span and Mortality.* Budapest: Akadémiai Kiadó.

Ambrose, S.H., and L. Norr
1992 Experimental evidence for the relationship of the carbon isotope ratios of whole diet and dietary protein to those of bone collagen and carbonate, pp. 1-38. In Lambert, J.B. and G. Grupe (eds.) *Prehistoric Human Bone: Archaeology at the Molecular Level.* Berlin: Springer-Verlag.

Angel, J.L.
1966 Porotic hyperostosis, anemias, malarias, and marshes in prehistoric eastern Mediterranean. *Science* 153:760-63.

1967 Porotic hyperostosis or osteoporosis symmetrica. In Sandison and Brothwell (eds.) *Diseases in Antiquity.* Springfield, Illinois: C.C. Thomas.

1975 Paleoecology, paleodemography and health. In Polger, S. (ed.) *Population, Ecology and Social Evolution.* The Hague: Mouton.

1982 A new measure of growth efficiency: skull base height. *American Journal of Physical Anthropology* 58:297-305.

1984 Health as a crucial factor in the changes from hunting to developed farming in the eastern Mediterranean. In Cohen, M.N. and G.J. Armelagos (eds.) *Paleopathology at the Origins of Agriculture.* Orlando: Academic Press.

Bass, W.M.
1987 *Human Osteology: A Laboratory and Field Manual.* Columbia, Missouri: Missouri Archaeological Society.

Bender, M.M., D.A. Baerreis, and R.A. Steventon
1981 Further light on carbon isotopes and Hopewell agriculture. *American Antiquity* 46:346-353.

Blakey, M.L. and G.J. Armelagos
1985 Deciduous enamel defects in prehistoric Americans from Dickson Mounds: prenatal and postnatal stress. *American Journal of Physical Anthropology* 66:371-380.

Bombin, M., and K. Muehlenbachs
1985 $^{12}C/^{13}C$ ratios of Pleistocene mummified remains from Beringia. *Quaternary Research* 23:123-129.

Brooks, Sheilagh Thompson
1955 Skeletal age at death: the reliability of cranial and pubic age indicators. *American Journal of Physical Anthropology* 13:567-597.

Brothwell, D.R.
1981 Demographic aspects of skeletal biology, pp. 59-63. In Brothwell, D.R. *Digging up Bones: The Excavation, Treatment and Study of Human Skeletal Remains*, 3rd ed. Ithaca, New York: Cornell University Press.

Brown, F.S., M.J. Baedaker, A. Nissenbaum, and I.R. Kaplan
1972 Early diagenesis of a reducing fjord, Saanich Inlet, British Columbia, III: changes in organic constituents of sediments. *Geochimica et Cosmochimica Acta* 36:1185-1203.

Brues, A.M.
1977 *People and Races.* New York: MacMillan Publishing.

Cameron, J.
1930 A study of the width of the nasal aperture of the skull in representative types of modern man. *American Journal of Physical Anthropology* 14:284-292.

Chartrand, Jeff
1988 *The Osteology and Trace Element Analysis of DdKi-2, Fort Frances, Ontario.* Published M.A. thesis, University of Manitoba.

Chisholm, B.S., D.E. Nelson, and H.P. Schwarcz
1982 Stable isotope ratios as a measure of marine versus terrestrial protein in ancient diets. *Science* 216:1131-1132.

Dahlberg, A. A.
1951 The dentition of the American Indian, pp.138-176. In Laughlin, W.S. (ed.) *The Physical Anthropology of the American Indian.* New York: Viking Fund.

DeNiro, M.J., and S Epstein
1978 Influence of diet on the distribution of carbon isotopes in animals. *Geochimica et Cosmochimica Acta* 42:495-506.

1981 Influence of diet on the distribution of nitrogen isotopes in animals. *Geochimica et Cosmochimica Acta* 45:341-351.

DiBennardo, T. and J.V. Taylor
1983 Multiple discriminant function analysis of sex and race in the postcranial skeleton. *American Journal of Physical Anthropology* 61:305-314.

Dutour, O.
1986 Enthesopathies (lesions of muscular insertions) as indicators of the activities of Neolithic Saharan populations. *American Journal of Physical Anthropology* 7:221-224.

El-Najjar, Mahmoud Y., and K. Richard McWilliams
1978 *Forensic Anthropology: The Structure, Morphology, and Variation of Human Bone and Dentition.* Springfield, Illinois: Charles C. Thomas.

Ens, Denise
1995 *Sex Estimation of Osteological Elements.* Unpublished paper, University of Manitoba.

Ens, Denise
1997 *Diachronic Paleodietary Analysis of Prairie Fringe Peoples of Southeastern Manitoba.* Unpublished M.A. thesis, University of Manitoba.

Ferembach, D., L. Schwidetzky, and M. Stloukal
1980 Recommendations for age and sex diagnoses of skeletons. *Journal of Human Evolution* 9:517-549.

Frisancho, A.R.
1978 Nutritional influences on human growth and maturation. *Yearbook of Physical Anthropology* 21:174-91.

Genovés, S.
1967 Proportionality of long bones and their relation to stature among Mesoamericans. *American Journal of Physical Anthropology* 26:67-78.

Gilbert, B.M. and T.W. McKern
1973 A method for aging the female os pubis. *American Journal of Physical Anthropology* 27:375-378.

Giles, Eugene
1964 Sex determination by discriminant function analysis of the mandible. *American Journal of Physical Anthropology* 22:129-135.

1970 Discriminant function sexing of the human skeleton, pp. 99-121. In Stewart, T.D. (ed.) *Personal Identification in Mass Disasters.* Washington, D.C.: National Museum of Natural History, Smithsonian Institution.

Giles, Eugene and Orville Elliot
1962 Race identification from cranial measurements. *Journal of Forensic Sciences* 7:147-157.

1963 Sex determination by discriminant function analysis of crania. *American Journal of Physical Anthropology* 21:53-68.

Gill, G.W.
1984 A forensic test case for a new method of geographical race determination, pp. 32-339. In Rathbun, T.A. and J.E. Buikstra (eds.) *Human Identification: Case Studies in Forensic Anthropology.* Springfield, Illinois: Charles C. Thomas.

1986 Craniofacial criteria in forensic race identification, pp. 143-159. In Reichs, K. J. (ed.) *Forensic Osteology: Advances in the Identification of Human Remains.* Springfield, Illinois: Charles C. Thomas.

Gill, G.W. and B.M. Gilbert
1990 Race identification from the midfacial skeleton: American Blacks and Whites, pp. 47-53. In Gill, G.S. and S. Rhine (eds.) *Skeletal Attribution of Race.* Albuquerque, New Mexico: Maxwell Museum of Anthropology and the University of New Mexico.

Gill, G.W., S.E. Hughes, S.M. Bennett, B.M. Gilbert
1988 Racial identification from the midfacial skeleton with special reference to American Indians and Whites. *Journal of Forensic Sciences* 33:92-99.

Giraud, Marcel
1986 *The Metis in the Canadian West.*, volume 1. Edmonton: University of Alberta Press

Hanihara, K.
1967 Racial characteristics in the dentition. *Journal of Dental Research,* supplement 5:923-926.

Harris, R. Cole, and John Warkentin
1974 *Canada Before Confederation: A Study in Historical Geography.* Toronto: Oxford University Press

Harvey, W.
1976 Effects of sex, race, heredity and systematic disease on oral tissues, pp. 36-43. In Harvey, W. (ed.)*Dental Identification and Forensic Odontology.* London: Henry Kimpton Publishers.

Hellman, M.
1928 The racial characters of the human dentition. *Proceedings of the American Philosophical Society* 67:157-174.

Himes, J.H.
1978 Bone growth and development in protein-calorie malnutrition. *World Review of Nutrition and Diet* 28:143-87.

Hinkes, Madeleine. J
1990 Shovel-shaped incisors in human identification. In Gill, G.S. and S. Rhine (eds.) *Skeletal Attribution of Race.* Albuquerque, New Mexico: Maxwell Museum of Anthropology and the University of New Mexico.

Hobson, K.A., and S. Collier
1984 Marine and terrestrial protein in Australian and aboriginal diets. *Current Anthropology* 25:238-240.

Houghton, P.
1974 The relationship of the pre-auricular groove of the ilium to pregnancy. *American Journal of Physical Anthropology* 41:381-390.

Hrdlicka, A.
1920 Shovel-shaped teeth. *American Journal of Physical Anthropology* 3:429-465.

Hudson's Bay Company Archives, Provincial Archives Manitoba
B.105/d/1 Fort Frances Account Books
B.105/e/9 Fort Frances District Reports

Iscan, M.Y., S.R. Loth and R.K. Wright
1985 Age estimation from the rib by phase analysis: white females. *Journal of Forensic Sciences* 30:853-86.

Iscan, M.Y., S.R. Loth and R.K. Wright
1987 Racial variation in the sternal extremity of the rib and its effect on age determination. *Journal of Forensic Sciences* 32:452-466.

Jantz, R.L. and D.W. Owsely
1984 Long bone growth variation among Arikara skeletal populations. *American Journal of Physical Anthropology* 63:13-20.

Katz, Darryl and Judy Myers Suchey
1989 Race differences in pubic symphyseal aging patterns in the male. *American Journal of Physical Anthropology* 80:167-172.

Katzenberg, M.A.
1984 Chemical analysis of prehistoric human bone from five temporally distinct populations in southern Ontario. Ottawa: National Museum of Man, Mercury Series. Archaeological Survey of Canada, Paper 129.

Keil, E.
1930 Uber das Grössenverhaltnis der Hüftgelendpfanne zum Hüftbein. *Anthropologischer Anzeiger* 6:344-353. In Krogman, W.M. (ed.) *The Human Skeleton in Forensic Medicine*, pp. 29. Springfield Illinois: Charles C. Thomas.

Krogman, W.M. and M.Y. Iscan
1986 *The Human Skeleton in Forensic Medicine*, 2nd ed. Springfield, Illinois: Charles C. Thomas.

Lai, Ping and Nancy C. Lovell
1992 Skeletal markers of occupational stress in the fur trade: a case study from a Hudson's Bay Company fur trade post. *International Journal of Osteoarchaeology* 2:221-234.

Libby, W.F., R. Berger, J.F. Mead, G.V. Alexander, and J.F. Ross
1964 Replacement rates for human tissue from atmospheric radiocarbon. *Science* 146:1170-1172.

Lillie, Robin M.
1994 Aboriginal skeletal remains from the University of Iowa Museum of Natural History Collections. *Reports on Iowa Burial Projects: Osteology and Archaeology*, vol. 19, no.1, pp.1-60. The University of Iowa, Iowa City: Office of the State Archaeologist

Loth, S.R. and M.Y. Iscan
1989 Morphological assessment of age in the adult: the thoracic region, pp.105-136. In M.Y. Iscan (ed.) *Age Markers in the Human Skeleton.* Springfield, Illinois: Charles C. Thomas.

Loth, S.R., M.Y. Iscan and E.H. Scheuerman
1994 Intercostal variation at the sternal end of the rib. *Forensic Science International* 65:135-143.

Lovejoy, C.O.
1985 Dental wear in the Libben population: its functional pattern and role in the determination of adult skeletal age at death. *American Journal of Physical Anthropology* 68:47-56.

Lovejoy, C. Owen, Richard S. Meindl , T.R. Pryzbeck , and Robert P. Mensforth
1985 Chronological metamorphosis of the auricular surface of the ilium: a new method for the determination of adult skeletal age at death. *American Journal of Physical Anthropology* 68:15-28.

Lynott, M.J., T.W. Boutton, J.E. Price, and D.E. Nelson
1986 Stable carbon isotopic evidence for maize agriculture in southeastern Missouri and northeastern Arkansas. *American Antiquity* 51:51-65.

Macko, S.A., M.L.F. Estep, M.H. Engel, and P.E. Hare
1982 Stable nitrogen isotope effects in the transanimation of amino acids. Washington, D.C: Papers from the Geophysical Laboratory, Carnegie Institute.

Macko, S.A., M.L.F. Estep, P.E. Hare, and T.C. Hoering.
1982 Stable nitrogen and carbon isotopic composition of individual amino acids isolated from cultured micro-organisms. *Carnegie Institute of Washington Yearbook* 82:404-409.

Mayhall, J.T., S.R. Saunders and P.L. Belier
1982 The dental morphology of North American whites: a reappraisal, pp. 245-258. In Kurtén, B. (ed.) *Teeth: Form, Function and Evolution.* New York: Columbia University Press.

McKee, J.K. and S. Molnar
1988 Measurements of tooth wear among Australian Aborigines: 2. intrapopulational variations in patterns of dental attrition. *American Journal of Physical Anthropology* 76:125-136.

McKern, T.W. and T.D. Stewart
1957 *Skeletal Age Changes in Young American Males, Technical Report EP-45.* Natick, MA: U.S. Army, Quartermaster Research and Development Center.

Meindl, R.S. and C.O. Lovejoy
1985 Ectocranial suture closure: a revised method for the determination of skeletal age at death and blind tests of its accuracy. *American Journal of Physical Anthropology* 68:57-66.

Moore-Jansen, Peer H., Stephen D. Ousley, and Richard L. Jantz
1994 *Data Collection Procedures for Forensic Skeletal Material.* Knoxville: University of Tennessee Press.

Morton, Arthur S.
1939 *A History of the Canadian West to 1870-71.* Toronto: Thomas Nelson & Sons Ltd.

Norr, L.
1981 Prehistoric Costa Rican diet as determined from stable carbon isotope ratios in bone collagen. *American Journal of Physical Anthropology* 54:258-259.

Novotny, Vladimír, Mehmet Yasar Iscan and Susan Loth
1993 Morphologic and osteometric assessment of age, sex, and race from the skull, pp.71-88. In Iscan, Mehmet Yasar and Richard P. Helmer (eds.) *Forensic Analysis of the Skull: Craniofacial Analysis, Reconstruction, and Identification.* New York: Wiley-Liss.

Nute, Grace Lee
1950 *Rainy River Country.* St. Paul, Minnesota: The Minnesota Historical Society.

Olivier, Georges
1969 *Practical Anthropology*. Springfield: Charles C. Thomas.

Ortner, D.J. and W.G.J. Putschar
1984 *Identification of Pathological Conditions in the Human Skeleton*. Washington: Smithsonian Institution Press.

Phenice, T.W.
1969 A newly developed visual method of sexing the os pubis. *American Journal of Physical Anthropology* 30:297-302.

Rajnovich, Grace
1985 Rescue excavations of the Boise Cascade Burials (DdKi-2) in Fort Frances, Ontario. *Conservation Archaeology Report Northwestern Region*, Report Number 6.

Rhine, Stanley
1990 Non-metric skull racing. In Gill, G.S. and S. Rhine (eds.) *Skeletal Attribution of Race*. Albuquerque, New Mexico: Maxwell Museum of Anthropology and the University of New Mexico.

Sackett, W.M., W.R. Eckelmann, M.L. Bender, and A.W.H. Bé
1965 Temperature dependence of carbon isotope composition in marine plankton and sediments. *Science* 148:235-237.

Saunders, S.R., C. Fitzgerald, T. Rogers, C. Dudar, and H. McKillop
1992 A test of several methods of skeletal age estimation using a documented archaeological sample. *Canadian Society of Forensic Science. Journal.* 25:97-118.

Sauter, M.R. and F. Privat
1952 Une nouvelle méthode de détermination sexuelle de l'os coxal: l'indice cotylo sciatique. *Bulletin des Schweizersche Gesellschaft für Anthropologie und Ethnologie* 28: 12-13. In Krogman, W.M. and M.Y. Iscan *The Human Skeleton in Forensic Medicine*. Springfield Illinois: Charles C. Thomas.

Schoeninger, Margaret J. and Michael J. DeNiro
1984 Nitrogen and carbon isotopic composition of bone collagen in terrestrial and marine vertebrates. *Geochimica et Cosmochimica Acta* 48:625-39.

Schwarcz, H.P., J. Melbye, M.A. Katzenberg, and M. Knyf
1985 Stable isotopes in human skeletons of southern Ontario: reconstructing paleodiet. *Journal of Archaeological Science* 12:187-206.

Steele, D. Gentry
1970 Estimation of stature from fragments of long limb bones, pp.85-98. In Stewart, T.D. (ed.) *Personal Identification in Mass Disasters.* Washington, D.C.: Smithsonian Institution Press.

Steele, D.G. and C.A. Bramblett
1988 *The Anatomy and Biology of the Human Skeleton.* College Station, Texas: Texas A & M University.

Steele, D. Gentry and Thomas W. McKern
1969 A method for assessment of maximum long bone length and living stature from fragmentary long bones. *American Journal of Physical Anthropology* 31:215-228.

Stuart-Macadam, P.
1985 Porotic hyperostosis: representative of a childhood condition. *American Journal of Physical Anthropology* 66:391-98.

1992 Porotic hyperostosis: a new perspective. *American Journal of Physical Anthropology* 87:39-47.

Suchey, Judy Meyers., and Darryl Katz
1986 *Skeletal Age Standards Derived from an Extensive Multiracial Sample of Modern Americans.* [Abstract] *American Journal of Physical Anthropology* 69:269.

Thoms, H. and W.W. Greulich
1940 A comparative study of male and female pelves. *American Journal of Gynecology* 39:56-62. In Krogman, W.M. *The Human Skeleton in Forensic Medicine.* 2nd printing. Springfield Illinois: Charles C. Thomas.

Tieszen, L.L., M.M. Senyimba, S.K. Imbamba, and J.H. Troughton.
1979 The distribution of C_3 and C_4 grasses and carbon isotope discrimination along an altitudinal and moisture gradient in Kenya. *Oecologia* 37:337-350.

Tieszen, L.L., D. Hein, S.A. Qvortrup, J.H. Troughton, and S.K. Imbamba
1979 Use of $\delta^{13}C$ values to determine vegetation selectivity in East African herbivores. *Oecologia* 37:351-359.

Tieszen, L.L, T.W. Boutton, K.G. Terdahl, and N.A. Slade
1983 Fractionation and turnover of stable carbon isotopes in animal tissues: implications for $\delta^{13}C$ analysis of diet. *Oecologia* 57:32-37.

Todd, T.W.
1920 Age changes in the pubic bone I: the male white pubic. *American Journal of Physical Anthropology* 3:285-334.

Todd, T.W. and D.W. Lyon Jr

1954a Endocranial suture closure: its progress and age relationship. In Stewart, T.D. and Mildred Trotter (eds.) *Basic Readings on the Identification of Human Skeletons: Estimation of Age.* New York: Wenner-Gren Foundation for Anthropological Research.

1954b Cranial suture closure: its progress and age relationship. In Stewart, T.D. and Mildred Trotter (eds.) *Basic Readings on the Identification of Human Skeletons: Estimation of Age.* New York: Wenner-Gren Foundation for Anthropological Research.

Trotter, M.

1970 Estimation of stature from intact long limb bones. In Stewart, T.D. (ed.) *Personal Identification in Mass Disasters,* pp. 71-84. Washington: Smithsonian Institution Press.

Trotter, M. and G.C. Gleser

1951a The effect of aging on stature. *American Journal of Physical Anthropology* 9:311-324.

1951b Trends in stature of American whites and negroes born between 1840 and 1924. *American Journal of Physical Anthropology* 9:427-440.

1952 Estimation of stature from long bones of American whites and negroes. *American Journal of Physical Anthropology* 10:463-514.

1958 A re-evaluation of estimation based on measurements of stature taken during life and of long bones after death. *American Journal of Physical Anthropology* 16:79-123.

Ubelaker, Douglas H.

1978 Estimating sex, stature, and age. In Ubelaker, Douglas H. *Human Skeletal Remains: Excavation, Analysis, Interpretation,* pp.41-67. Chicago: Aldine Publishing.

Van der Merwe, N.J.

1982 Carbon isotopes, photosynthesis and archaeology. *American Scientist* 70:596-606.

Van der Merwe, N.J., and J.C. Vogel

1978 ^{13}C content of human collagen as a measure of prehistoric diet in Woodland North America. *Nature* 276:815-816.

Vogel, J.C.

1978 Isotopic assessment of the dietary habits of ungulates. *South African Journal of Science* 74:298-301.

White, Tim D.
1991 *Human Osteology.* San Diego: Academic Press.

Zivanovic, Srboljub
1983 A note on the effect of asymmetry in suture closure in mature human skulls. *American Journal of Physical Anthropology* 60:431-435.

Plate 1: Vertebrae with Tuberculosis.

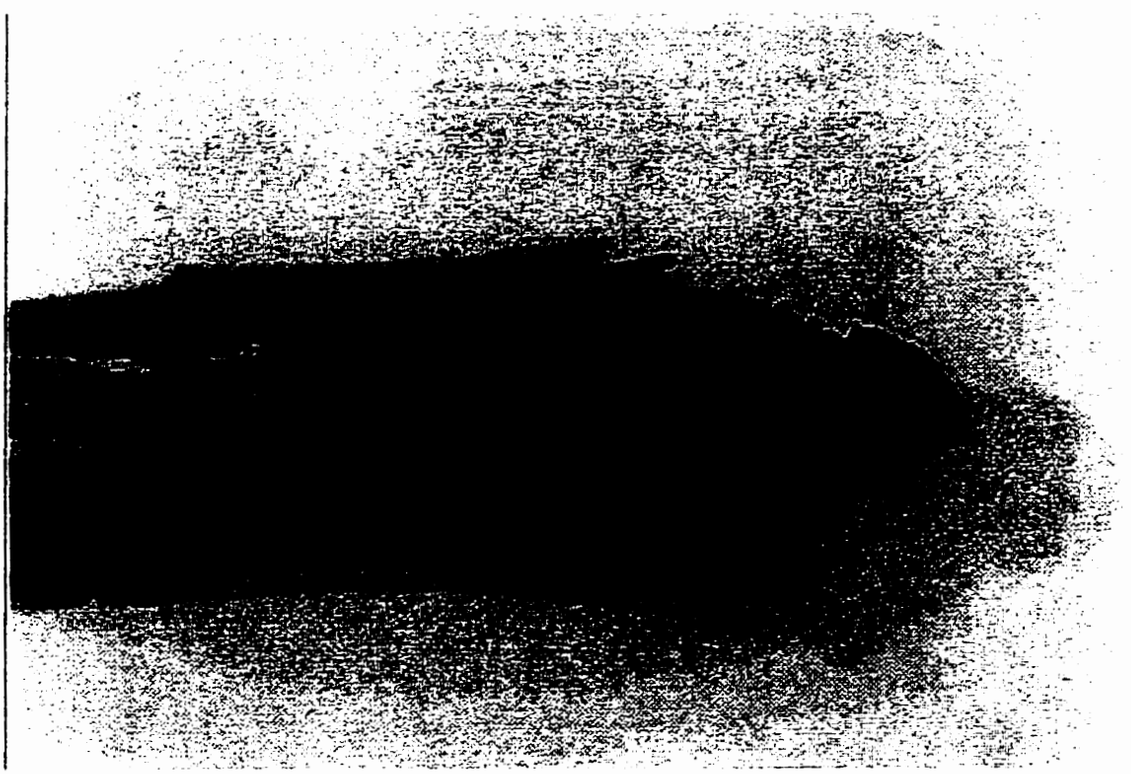

Plate 2: Fusion of Right Tibia and Fibula and Remodeled Talus due to Tuberculosis.

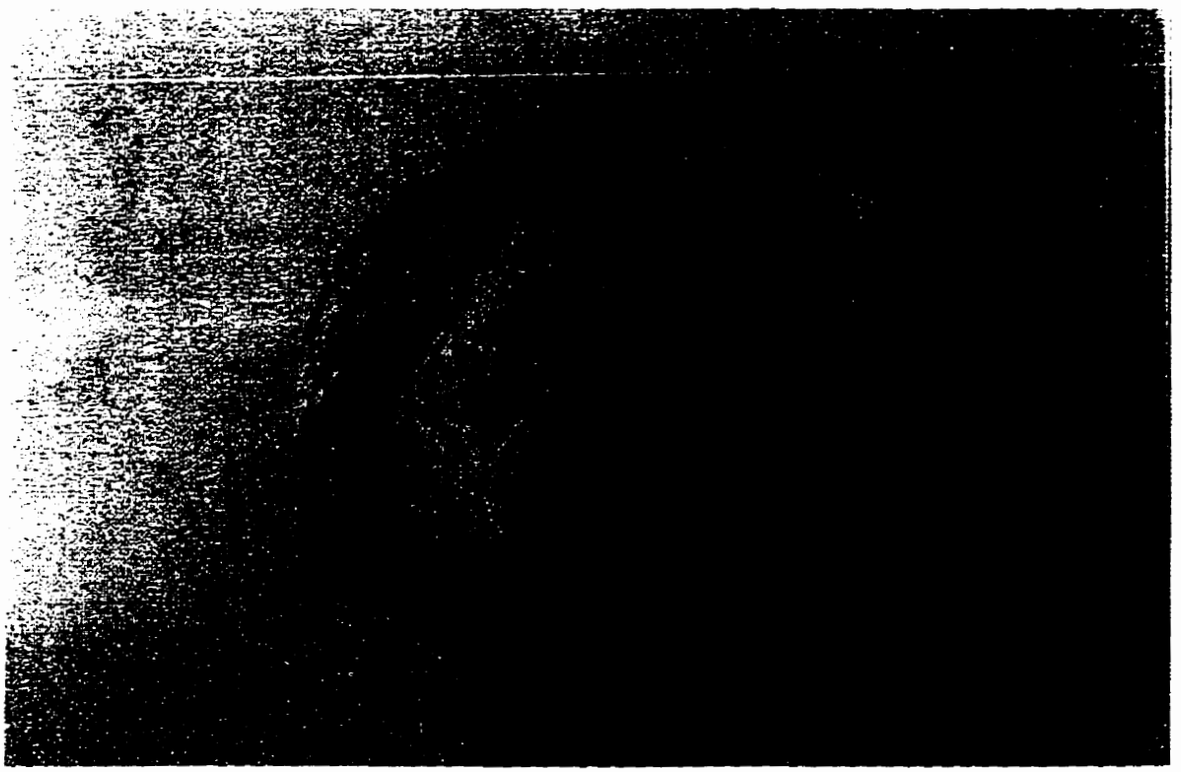

Plate 3: Unfused Metopic Suture of Individual 3.

Plate 4: "Sub-Lambdoid Suture" of Individual 9.

Plate 5: Paramolar Cusp of Individual 9.

Plate 6: Cervical Vertebrae of Individual Unknown A.

Plate 7: Unhealed Perifracture of Individual Unknown A.

APPENDICES

[ ] = Close Estimate, Very Little Missing; Included in Statistical Analysis

( ) = Reasonable Estimate; Not Included in Statistical Analysis

L = Left Side Bone

R = Right Side Bone

Stature is calculated using the FORDISC 2.0 program for individuals of European ancestry and Genovés (1967) formulae for individuals of Aboriginal ancestry.

APPENDIX A - OSTEOLOGICAL DATA

(mm.)

CRANIAL DATA	Burial 1 Female 22-24 yrs Aboriginal	Burial 2 Female 40-44 yrs Aboriginal	Burial 3 Female 22-25 yrs European	Burial 4 Male 23-28 yrs European
stature (cm)	N/A	161.37±3.82	N/A	N/A
max. cranial length	–	187.0	–	–
max. cranial breadth	–	145.0	–	–
bizygomatic diameter	–	141.0	–	–
basion-bregma height	–	134.0	–	–
cranial base length	–	106.5	–	–
basion-prosthion length	–	103.5	–	–
maxillo-alveolar breadth	–	63.0	–	–
maxillo-alveolar length	–	56.0	–	–
biauricular breadth	–	133.0	–	–
upper facial height	–	66.5	–	–
min. frontal breadth	–	90.5	–	91.0
upper facial breadth	–	104.0	–	(100.5)
nasal height	–	50.5	–	–
nasal breadth	–	29.0	–	–
orbital breadth	–	L 44.0	–	–
orbital height	–	L 33.5	–	–
biorbital breadth	–	97.5	–	91.0
interorbital breadth	–	18.5	–	–
frontal chord	–	110.5	–	–
parietal chord	–	121.0	106.0	–
occipital chord	–	96.0	–	–
foramen magnum length	–	34.5	–	–
foramen magnum breadth	–	27.5	–	–
mastoid length	–	L 30.0	–	–
chin height	–	27.5	23.5	–
height of mandibular body	–	L 29.0	23.0	–
breadth of mandibular body	–	L 13.0	10.0	–
bigonial width	–	81.0	81.0	–
bicondylar breadth	–	142.0	–	–
min. ramus breadth	–	L 35.0	L 27.0	(35.0)
max. ramus breadth	–	43.5	(42.5)	–
max. ramus height	–	57.0	62.0	–
mandibular length	–	79.5	(61.0)	–
mandibular angle	–	120.00	(134.50)	–

OSTEOLOGICAL DATA (CONTINUED)

CRANIAL DATA	Burial 5 Female 16-18 yrs Aboriginal	Burial 7 Female 17-19 yrs Aboriginal	Burial 8 Female 18-21 yrs Aboriginal
stature (cm)	N/A	N/A	161.11±3.82
max. cranial length	–	–	–
max. cranial breadth	–	–	–
bizygomatic diameter	–	–	–
basion-bregma height	–	–	–
cranial base length	–	–	–
basion-prosthion length	–	–	–
maxillo-alveolar breadth	–	69.0	61.5
maxillo-alveolar length	–	55.0	–
biauricular breadth	–	–	–
upper facial height	–	–	–
min. frontal breadth	–	–	–
upper facial breadth	–	–	–
nasal height	–	–	–
nasal breadth	–	–	–
orbital breadth	–	–	–
orbital height	–	–	–
biorbital breadth	–	–	–
interorbital breadth	–	–	–
frontal chord	–	–	–
parietal chord	–	–	–
occipital chord	–	–	–
foramen magnum length	–	37.0	–
foramen magnum breadth	–	29.0	–
mastoid length	–	–	–
chin height	–	32.5	31.5
height of mandibular body	–	33.5	27.5
breadth of mandibular body	–	13.0	12.0
bigonial width	–	(87.0)	78.0
bicondylar breadth	–	(134.5)	(111.5)
min. ramus breadth	–	33.5	29.0
max. ramus breadth	–	[44.5]	42.5
max. ramus height	–	62.0	55.0
mandibular length	–	70.0	84.0
mandibular angle	–	129.00	123.50

OSTEOLOGICAL DATA (CONTINUED)

CRANIAL DATA	Burial 9 Male 18-24 yrs Aboriginal	Burial 10 Female 40-60 yrs Metis (?)	Burial 11 Male 18-25 yrs European
stature (cm)	176.89±3.42	N/A	173.27±2.99
max. cranial length	–	–	–
max. cranial breadth	–	–	–
bizygomatic diameter	–	–	–
basion-bregma height	–	–	–
cranial base length	–	–	–
basion-prosthion length	–	–	–
maxillo-alveolar breadth	67.5	–	–
maxillo-alveolar length	–	–	–
biauricular breadth	–	–	–
upper facial height	–	–	–
min. frontal breadth	–	–	–
upper facial breadth	–	–	–
nasal height	–	–	–
nasal breadth	–	–	–
orbital breadth	–	–	–
orbital height	–	–	–
biorbital breadth	–	–	–
interorbital breadth	–	–	–
frontal chord	–	–	–
parietal chord	–	–	–
occipital chord	–	–	–
foramen magnum length	–	–	–
foramen magnum breadth	–	–	–
mastoid length	36.5	–	–
chin height	34.5	–	–
height of mandibular body	35.0	–	–
breadth of mandibular body	13.5	–	–
bigonial width	84.5	–	–
bicondylar breadth	[133.5]	–	–
min. ramus breadth	R 35.0	–	–
max. ramus breadth	R [44.0]	–	–
max. ramus height	70.0	–	–
mandibular length	85.5	–	–
mandibular angle	123.00	–	–

OSTEOLOGICAL DATA (CONTINUED)

CRANIAL DATA	Burial 12 Female 50-59 yrs European	Burial UN. A Male 30-35 yrs European	Burial UN. B Female 40+ yrs European
stature (cm)	N/A	168.46±2.99	N/A
max. cranial length	–	186.5	–
max. cranial breadth	143.5	146.0	–
bizygomatic diameter	–	–	–
basion-bregma height	129.5	–	–
cranial base length	–	–	–
basion-prosthion length	–	–	–
maxillo-alveolar breadth	–	–	–
maxillo-alveolar length	–	–	–
biauricular breadth	101.5	–	–
upper facial height	–	–	–
min. frontal breadth	–	103.0	–
upper facial breadth	–	(104.0)	–
nasal height	–	–	–
nasal breadth	–	–	–
orbital breadth	–	–	–
orbital height	–	–	–
biorbital breadth	–	–	–
interorbital breadth	–	–	–
frontal chord	–	119.5	–
parietal chord	110.5	118.5	–
occipital chord	99.5	–	–
foramen magnum length	42.5	41.0	–
foramen magnum breadth	33.5	31.0	–
mastoid length	23.0	28.0	–
chin height	33.5	31.5	–
height of mandibular body	29.5	26.0	–
breadth of mandibular body	14.5	11.5	–
bigonial width	81.0	84.0	–
bicondylar breadth	(131.0)	–	–
min. ramus breadth	L (35.0)	36.5	–
max. ramus breadth	–	38.0	–
max. ramus height	(52.0)	66.5	–
mandibular length	77.0	84.0	–
mandibular angle	121.50	110.00	–

OSTEOLOGICAL DATA (CONTINUED)

	Burial 1 Female 22-24 yrs Aboriginal		Burial 2 Female 40-44 yrs Aboriginal	
POST-CRANIAL DATA	LEFT	RIGHT	LEFT	RIGHT
clavicle: maximum length	(120.0)	(117.0)	–	–
ant.-post. diameter at midshaft	7.0	6.0	–	–
sup.-inf. diameter at midshaft	9.0	8.0	–	–
scapula: height	–	–	–	–
breadth	–	–	–	–
humerus: maximum length	–	(294.0)	–	–
epicondylar breadth	–	[49.0]	–	55.0
vertical diameter of head	–	[35.0]	–	–
max. diameter at midshaft	21.0	21.0	25.5	25.5
min. diameter at midshaft	16.0	17.0	17.5	19.0
radius: maximum length	–	219.5	–	–
ant.-post. diameter at midshaft	11.0	11.0	(13.5)	(12.5)
med.-lat. diameter at midshaft	14.0	16.0	(21.0)	(15.5)
ulna: maximum length	–	(239.0)	–	–
ant.-post. diameter	14.5	14.5	18.5	17.5
med.-lat. diameter	12.0	13.5	14.5	13.5
physiological length	(215.0)	(210.0)	–	–
minimum circumference	–	–	–	(50.0)
sacrum: anterior length	–	–	–	–
anterior superior breadth	–	–	–	–
max. transverse diameter of base	–	–	–	–
os coxae: height	–	–	–	–
iliac breadth	–	–	–	–
pubis length	–	–	–	–
ischium length	–	–	–	–
femur: maximum length	(62.0)	–	[431.0]	[432.0]
bicondylar length	–	–	[432.0]	[436.0]
epicondylar breadth	–	–	(69.0)	(68.0)
max. diameter of the head	–	–	[45.0]	[42.0]
ant.-post. subtrochanteric diameter	–	33.0	40.0	28.5
med.-lat. subtrochanteric diameter	–	24.0	28.0	27.5
ant.-post. midshaft diameter	–	27.0	34.0	29.5
med.-lat. midshaft diameter	–	25.0	27.5	27.5
midshaft circumference	–	80.0	96.0	91.0
tibia: length	–	–	–	–
max. proximal epiphyseal breadth	(52.5)	–	–	67.0
max. distal epiphyseal breadth	–	–	[46.0]	–
max. diameter at nutrient foramen	32.0	–	37.0	31.5

med.-lat. diam. at nutrient foramen	22.5	–	20.5	24.5
circumference at nutrient foramen	88.0	–	100.0	95.0
fibula: max. length	–	–	–	–
max. diameter at midshaft	–	–	(16.5)	–
calcaneus: maximum length	–	–	–	–
middle breadth	–	–	–	–

OSTEOLOGICAL DATA (CONTINUED)

POST-CRANIAL DATA	Burial 3 Female 22-25 yrs European		Burial 4 Male 23-28 yrs European	
	LEFT	RIGHT	LEFT	RIGHT
clavicle: maximum length	–	–	–	–
ant.-post. diameter at midshaft	–	–	–	–
sup.-inf. diameter at midshaft	–	–	–	–
scapula: height	–	–	–	–
breadth	–	–	–	–
humerus: maximum length	–	–	–	
epicondylar breadth	–	–	–	–
vertical diameter of head	–	–	–	–
max. diameter at midshaft	–	–	–	25.5
min. diameter at midshaft	–	–	–	21.0
radius: maximum length	–	–	–	–
ant.-post. diameter at midshaft	–	–	–	–
med.-lat. diameter at midshaft	–	–	–	–
ulna: maximum length	–	–	–	–
ant.-post. diameter	–	–	–	–
med.-lat. diameter	–	–	–	–
physiological length	–	–	–	–
minimum circumference	–	–	–	–
sacrum: anterior length	–	–	–	–
anterior superior breadth	–	–	–	–
max. transverse diameter of base	–	–	–	–
os coxae: height	–	–	–	–
iliac breadth	–	–	–	–
pubis length	–	–	–	–
ischium length	–	–	–	–
femur: maximum length	–	–	–	–
bicondylar length	–	–	–	–
epicondylar breadth	–	–	–	–
max. diameter of the head	–	–	–	–
ant.-post. subtrochanteric diameter	–	–	–	–
med.-lat. subtrochanteric diameter	–	–	–	–
ant.-post. midshaft diameter	–	–	–	–
med.-lat. midshaft diameter	–	–	–	–
midshaft circumference	–	–	–	–
tibia: length	–	–	–	–
max. proximal epiphyseal breadth	–	–	–	–
max. distal epiphyseal breadth	–	–	–	–
max. diameter at nutrient foramen	–	–	–	–

med.-lat. diam. at nutrient foramen	–	–	–	–
circumference at nutrient foramen	–	–	–	–
fibula: max. length	–	–	–	–
max. diameter at midshaft	–	–	–	–
calcaneus: maximum length	–	–	–	–
middle breadth	–	–	–	–

OSTEOLOGICAL DATA (CONTINUED)

	Burial 5 Female 16-18 yrs Aboriginal		Burial 7 Female 17-19 yrs European	
POST-CRANIAL DATA	LEFT	RIGHT	LEFT	RIGHT
clavicle: maximum length	(109.0)	(109.0)	–	–
ant.-post. diameter at midshaft	(11.0)	(11.5)	–	–
sup.-inf. diameter at midshaft	(6.5)	(7.0)	–	–
scapula: height	–	–	–	–
breadth	–	–	–	–
humerus: maximum length	–	–	–	–
epicondylar breadth	–	–	–	–
vertical diameter of head	–	–	–	–
max. diameter at midshaft	–	–	(15.5)	–
min. diameter at midshaft	–	–	(15.0)	–
radius: maximum length	(189.0)	(189.0)	–	–
ant.-post. diameter at midshaft	(9.0)	(9.5)	–	–
med.-lat. diameter at midshaft	(13.0)	(13.5)	–	–
ulna: maximum length	(224.0)	(223.0)	–	–
ant.-post. diameter	(14.5)	(13.5)	–	–
med.-lat. diameter	(11.0)	(12.0)	–	–
physiological length	(221.0)	(220.0)	–	–
minimum circumference	–	–	–	–
sacrum: anterior length	–	–	–	–
anterior superior breadth	–	–	–	–
max. transverse diameter of base	–	–	–	–
os coxae: height	–	–	–	–
iliac breadth	–	–	–	–
pubis length	–	–	–	–
ischium length	–	–	70.0	–
femur: maximum length	–	–	(468.5)	–
bicondylar length	–	–	–	–
epicondylar breadth	–	–	–	–
max. diameter of the head	–	–	[46.0]	–
ant.-post. subtrochanteric diameter	–	–	26.5	–
med.-lat. subtrochanteric diameter	–	–	31.0	–
ant.-post. midshaft diameter	–	–	[24.0]	–
med.-lat. midshaft diameter	–	–	[23.5]	–
midshaft circumference	–	–	[90.0]	–
tibia: length	–	–	–	–
max. proximal epiphyseal breadth	–	–	–	–
max. distal epiphyseal breadth	–	–	–	–
max. diameter at nutrient foramen	–	–	–	–

med.-lat. diam. at nutrient foramen	–	–	–	–
circumference at nutrient foramen	–	–	–	–
fibula: max. length	–	–	–	–
max. diameter at midshaft	–	–	–	–
calcaneus: maximum length	–	–	–	–
middle breadth	–	–	–	–

OSTEOLOGICAL DATA (CONTINUED)

POST-CRANIAL DATA	Burial 8 Female 18-21 yrs Aboriginal LEFT	RIGHT	Burial 9 Male 18-24 yrs Aboriginal LEFT	RIGHT
clavicle: maximum length	(133.0)	–	153.0	151.0
ant.-post. diameter at midshaft	(11.5)	–	12.5	13.0
sup.-inf. diameter at midshaft	(9.5)	–	11.0	12.5
scapula: height	–	–	–	–
breadth	–	–	–	–
humerus: maximum length	–	(293.0)	348.0	348.0
epicondylar breadth	–	–	66.0	67.0
vertical diameter of head	–	–	49.0	49.5
max. diameter at midshaft	–	(22.0)	24.5	25.0
min. diameter at midshaft	–	(18.5)	18.5	19.5
radius: maximum length	–	239.0	–	297.0
ant.-post. diameter at midshaft	–	11.5	–	13.0
med.-lat. diameter at midshaft	–	15.0	–	14.0
ulna: maximum length	–	(254.0)	293.5	[295.5]
ant.-post. diameter	13.5	16.0	17.0	17.5
med.-lat. diameter	11.0	12.5	14.0	14.5
physiological length	–	(232.0)	268.0	268.0
minimum circumference	–	–	37.0	40.0
sacrum: anterior length	[106.0]	–	121.0	–
anterior superior breadth	(99.0)	–	103.0	–
max. transverse diameter of base	[45.5]	–	53.5	–
os coxae: height	(197.0)	[207.0]	[222.0]	[220.0]
iliac breadth	–	152.0	(152.0)	158.0
pubis length	–	–	–	78.0
ischium length	80.0	79.0	80.0	85.0
femur: maximum length	430.0	–	489.0	489.0
bicondylar length	432.0	–	490.0	490.0
epicondylar breadth	75.5	[72.5]	85.0	85.5
max. diameter of the head	40.5	41.5	45.5	46.5
ant.-post. subtrochanteric diameter	25.5	26.0	28.0	28.0
med.-lat. subtrochanteric diameter	31.0	30.0	36.0	36.0
ant.-post. midshaft diameter	27.5	–	30.0	30.0
med.-lat. midshaft diameter	25.5	–	28.0	28.5
midshaft circumference	85.0	–	95.0	95.0
tibia: length	–	–	397.0	402.0
max. proximal epiphyseal breadth	[65.0]	(65.5)	82.0	82.0
max. distal epiphyseal breadth	–	–	54.0	55.0
max. diameter at nutrient foramen	–	–	(33.0)	35.0

med.-lat. diam. at nutrient foramen	–	–	29.5	30.0
circumference at nutrient foramen	–	–	106.0	108.0
fibula: max. length	–	–	387.0	387.0
max. diameter at midshaft	(15.5)	–	17.0	17.5
calcaneus: maximum length	–	–	80.5	–
middle breadth	–	–	45.0	–

OSTEOLOGICAL DATA (CONTINUED)

	Burial 10 Female 40-60 yrs Metis(?)		Burial 11 Male 18-25 yrs European	
POST-CRANIAL DATA	LEFT	RIGHT	LEFT	RIGHT
clavicle: maximum length	–	–	–	–
ant.-post. diameter at midshaft	–	–	–	–
sup.-inf. diameter at midshaft	–	–	–	–
scapula: height	–	–	–	–
breadth	–	–	–	–
humerus: maximum length	–	–	–	–
epicondylar breadth	–	–	–	–
vertical diameter of head	–	–	–	–
max. diameter at midshaft	(21.5)	–	–	–
min. diameter at midshaft	(16.5)	–	–	–
radius: maximum length	–	–	–	–
ant.-post. diameter at midshaft	–	–	–	–
med.-lat. diameter at midshaft	–	–	–	–
ulna: maximum length	–	–	(215.0)	–
ant.-post. diameter	12.0	–	14.0	–
med.-lat. diameter	14.0	–	11.5	–
physiological length	–	–	–	–
minimum circumference	–	–	–	–
sacrum: anterior length	–	–	–	–
anterior superior breadth	–	–	–	–
max. transverse diameter of base	–	–	–	–
os coxae: height	–	–	–	–
iliac breadth	–	–	–	–
pubis length	–	–	–	–
ischium length	–	–	–	–
femur: maximum length	–	–	[463.0]	[465.0]
bicondylar length	–	–	466.0	468.0
epicondylar breadth	–	–	–	–
max. diameter of the head	–	–	46.5	(45.0)
ant.-post. subtrochanteric diameter	–	–	(28.0)	29.0
med.-lat. subtrochanteric diameter	–	–	(36.0)	28.0
ant.-post. midshaft diameter	–	–	26.0	31.0
med.-lat. midshaft diameter	–	–	24.0	25.0
midshaft circumference	–	–	85.0	90.0
tibia: length	–	–	38.30	–
max. proximal epiphyseal breadth	–	–	[63.5]	–
max. distal epiphyseal breadth	–	–	45.0	42.0
max. diameter at nutrient foramen	–	–	36.0	(36.5)

med.-lat. diam. at nutrient foramen	–	–	26.5	(26.0)
circumference at nutrient foramen	–	–	104.0	(102.0)
fibula: max. length	–	–	(334.0)	–
max. diameter at midshaft	–	–	–	–
calcaneus: maximum length	–	–	–	–
middle breadth	–	–	–	–

OSTEOLOGICAL DATA (CONTINUED)

	Burial 12 Female 50-59 yrs European		Burial UN. A Male 30-35 yrs European	
POST-CRANIAL DATA	LEFT	RIGHT	LEFT	RIGHT
clavicle: maximum length	–	–	[147.0]	[146.5]
ant.-post. diameter at midshaft	–	–	[13.0]	(14.0)
sup.-inf. diameter at midshaft	–	–	[9.0]	[9.0]
scapula: height	–	–	–	–
breadth	–	–	96.0	98.0
humerus: maximum length	–	–	335.0	–
epicondylar breadth	–	–	68.5	–
vertical diameter of head	–	–	48.0	49.0
max. diameter at midshaft	–	–	25.5	–
min. diameter at midshaft	–	–	21.0	–
radius: maximum length	–	–	260.0	245.0
ant.-post. diameter at midshaft	–	–	14.0	14.5
med.-lat. diameter at midshaft	–	–	16.5	18.5
ulna: maximum length	–	–	269.0	(284.0)
ant.-post. diameter	–	–	18.0	19.5
med.-lat. diameter	–	–	14.0	14.5
physiological length	–	–	241.0	(283.0)
minimum circumference	–	–	44.0	(90.0)
sacrum: anterior length	–	–	–	–
anterior superior breadth	–	–	–	–
max. transverse diameter of base	–	–	–	–
os coxae: height	–	–	–	–
iliac breadth	–	–	–	–
pubis length	–	–	–	–
ischium length	–	–	–	–
femur: maximum length	–	–	445.0	–
bicondylar length	–	–	450.0	–
epicondylar breadth	–	–	78.0	–
max. diameter of the head	–	–	51.0	–
ant.-post. subtrochanteric diameter	–	–	29.0	30.0
med.-lat. subtrochanteric diameter	–	–	35.0	35.0
ant.-post. midshaft diameter	–	–	28.5	(27.5)
med.-lat. midshaft diameter	–	–	31.5	(31.0)
midshaft circumference	–	–	95.0	(95.0)
tibia: length	–	–	–	364.0
max. proximal epiphyseal breadth	–	–	–	76.0
max. distal epiphyseal breadth	–	–	–	51.5
max. diameter at nutrient foramen	–	–	–	38.0

med.-lat. diam. at nutrient foramen	–	–	–	25.5
circumference at nutrient foramen	–	–	–	100.0
fibula: max. length	–	–	–	356.0
max. diameter at midshaft	–	–	–	15.0
calcaneus: maximum length	–	–	–	–
middle breadth	–	–	–	–

OSTEOLOGICAL DATA (CONTINUED)

	Burial UN. B Female 40+ yrs European	
POST-CRANIAL DATA	LEFT	RIGHT
clavicle: maximum length	(136.5)	(136.5)
ant.-post. diameter at midshaft	(9.0)	(9.0)
sup.-inf. diameter at midshaft	(8.0)	(10.0)
scapula: height	–	–
breadth	–	–
humerus: maximum length	(323.0)	–
epicondylar breadth	–	–
vertical diameter of head	–	49.0
max. diameter at midshaft	(20.0)	–
min. diameter at midshaft	(17.5)	–
radius: maximum length	(208.0)	(206.0)
ant.-post. diameter at midshaft	(11.5)	(11.7)
med.-lat. diameter at midshaft	(13.5)	(13.5)
ulna: maximum length	(216.0)	(218.0)
ant.-post. diameter	(16.0)	(17.0)
med.-lat. diameter	(13.5)	(14.0)
physiological length	–	–
minimum circumference	–	–
sacrum: anterior length	–	–
anterior superior breadth	–	–
max. transverse diameter of base	–	–
os coxae: height	–	–
iliac breadth	–	–
pubis length	–	–
ischium length	–	–
femur: maximum length	[226.0]	[227.0]
bicondylar length	–	–
epicondylar breadth	–	–
max. diameter of the head	–	–
ant.-post. subtrochanteric diameter	[28.0]	[28.5]
med.-lat. subtrochanteric diameter	[30.0]	[31.5]
ant.-post. midshaft diameter	(28.0)	(28.0)
med.-lat. midshaft diameter	(27.5)	(29.0)
midshaft circumference	(84.0)	(85.0)
tibia: length	–	–
max. proximal epiphyseal breadth	–	–
max. distal epiphyseal breadth	[42.0]	[42.0]
max. diameter at nutrient foramen	37.0	36.0

med.-lat. diam. at nutrient foramen	26.5	26.0
circumference at nutrient foramen	102.0	98.0
fibula: max. length	–	–
max. diameter at midshaft	–	(11.0)
calcaneus: maximum length	–	–
middle breadth	–	–

APPENDIX B - MORPHOSCOPIC SEXUAL CHARACTERISTICS

Characteristics	Male	Female
General	Larger and heavier	Smaller and lighter
Muscular ridges (such as the occipital protruberence, temporal lines, and nuchal crests)	More rugose and prominent (especially the occipital protruberence)	More gracile
Supraorbital ridges, glabella and frontal sinuses	Larger and more prominent	Smaller and less prominent
Frontal and parietal bosses	Small frontal and parietal bosses; less rounded	Single frontal boss along midline and parietal bosses, giving head a rounded appearance
Cheek bones	Heavier, more laterally arched	Lighter and compressed
Zygomatic process	Well defined ridge, extends past external auditory meatus	Less defined, less long
Orbital shape and margins	Rounded margins; shape is squared and smaller	Sharp margins; shape is rounded and larger
Mastoid and occipital condyles	Larger	Smaller
Palate	Larger, broader and more U-shaped	Smaller and parabolic shaped
Teeth	Larger crown dimensions; M_1 more often 5-cusped	Smaller; molars most often 4-cusped
Mandible	More robust; gonial angle more right-angled and flared; mental region squarish	Smaller; gonial angle more obtuse; single prominence in mental region
Mandibular ramus	Broader, longer with larger coronoid process	Smaller and shorter

(Ens 1995)

APPENDIX C - DENTAL DATA

	Burial 2	Burial 3	Burial 4	Burial 5	Burial 7
LI^1	P	A	A	A	D
LI^2	A/R	D	A	A	D
LC	P	A	A	A	D
LPM^3	P	A	A	A	P
LPM^4	A/R	P	A	A	D
LM^1	P	P	A	A	P
LM^2	A/R	P	A	A	P
LM^3	A/R	P	A	A	P
RI^1	A	A	A	A	D
RI^2	A	D	A	A	D
RC	A	A	A	A	D
RPM^3	A/R	P	A	A	D
RPM^4	A/R	P	A	A	D
RM^1	A/R	A	A	A	D
RM^2	A/R	A	A	A	P
RM^3	P	P	A	A	D
LI_1	P	A	A	A	D
LI_2	P	A	A	P	D
LC	P	P	A	P	D
LPM_3	P	A	A	P	D
LPM_4	P	P	A	P	P
LM_1	A/R	P	A	P	P
LM_2	D	P	A	P	P
LM_3	P	A	A	P	P
RI_1	P	A	A	A	D
RI_2	P	A	A	A	D
RC	P	A	A	A	D
RPM_3	P	P	P	A	D
RPM_4	P	A	P	A	D
RM_1	A/R	P	P	A	D
RM_2	P	P	P	A	D
RM_3	P	A	P	A	D

P/A = Present / Absent
R = Resorbed
D = Damaged

DENTAL DATA (CONTINUED)

	Burial 8	Burial 9	Burial 10	Burial 12	Burial Unkn.A
LI^1	P	P	A	A	A
LI^2	A	P	A	A	A
LC	A	P	P	A	P
LPM^3	P	P	A	A	P
LPM^4	A	P	A	A	P
LM^1	P	P	A	A	P
LM^2	P	P	A	A	P
LM^3	P	P	A	A	A
RI^1	P	P	A	A	A
RI^2	P	P	A	A	A
RC	D	P	A	A	P
RPM^3	P	P	A	A	P
RPM^4	P	P	A	A	P
RM^1	P	P	A	A	P
RM^2	P	P	A	A	P
RM^3	P	P	A	A	P
LI_1	P	P	A	P	D
LI_2	P	P	P	P	D
LC	P	P	P	P	D
LPM_3	P	P	R	P	P
LPM_4	P	P	R	A/R	P
LM_1	P	P	R	P	P
LM_2	P	P	R	A/R	D
LM_3	P	P	R	P	P
RI_1	D	P	A	P	D
RI_2	D	P	A	P	A
RC	D	P	A	P	D
RPM_3	D	P	A	P	D
RPM_4	D	P	A	A/R	D
RM_1	D	P	A	A/R	P
RM_2	P	P	A	P	P
RM_3	P	P	A	P	P

P/A = Present / Absent
R = Resorbed
D = Damaged

APPENDIX D - DENTAL PATHOLOGIES

	Burial 2	Burial 3	Burial 4	Burial 7
LI^1				
LI^2				
LC				
LPM^3				
LPM^4				
LM^1		1 oc		1 oc
LM^2		1 oc		
LM^3				
RI^1				
RI^2				
RC				
RPM^3		1 oc		
RPM^4				
RM^1				2 oc
RM^2				
RM^3		1 oc		
LI_1				
LI_2				
LC				
LPM_3				
LPM_4		1 oc		1 oc
LM_1		1OC		1 oc
LM_2		1 oc		
LM_3	1 oc			
RI_1				
RI_2				
RC				
RPM_3				
RPM_4				
RM_1		1OC	1 b , 3 oc	1 oc
RM_2		1 oc		1 oc
RM_3			1 oc, 1 OC	

B = Buccal
OC = Occlusal
INT = Interproximal

1,2,3,... = Number of Caries
Upper/Lowercase = Lg/Sm Carie

DENTAL PATHOLOGIES (CONTINUED)

	Burial 9	Burial 12	Burial Unkn. A
LI^1			
LI^2			
LC			
LPM^3			
LPM^4			
LM^1	1 oc		1 oc
LM^2	1 oc		
LM^3	1 oc, 2 OC		
RI^1			
RI^2			
RC			
RPM^3			
RPM^4			
RM^1	1 oc		1 oc
RM^2	1 oc		
RM^3	1 OC		
LI_1			
LI_2			
LC			
LPM_3		1 INT	
LPM_4			
LM_1	1 oc		
LM_2	2 oc, 1 OC		1 OC
LM_3	2 OC	1 oc	1 int
RI_1			
RI_2			
RC			
RPM_3			
RPM_4			
RM_1	1 oc		
RM_2	1 oc	1 B , 1 int	2 oc
RM_3	1 oc, 1 OC	1 int	

B = Buccal
OC = Occlusal
INT = Interproximal

1,2,3,... = Number of Caries
Upper/Lowercase = Lg/Sm Carie

APPENDIX E - BURIAL ANALYSES

Indiv.	C	N	Burial Mode	Dental Cond.	Chewing Muscles	Robus-ticity	Gen. Musc	Cultural Incl.	Race	Sex
1	-19.97	11.31	3	N/A	N/A	1	2	1,3,3d,5,6	A	F
2	-18.76	11.56	1	1	1++,2++,3,4	3	3	2,3,6,8	A	F
3	-19.04	8.44	1	2	0?	2	1	7	E	F
4	-19.65	9.46	N/A	3	0	3	2		E	M
5	-20.57	11.154	1	4	0?	1	2	8	A	F
7	-20.70	11.69	1	3	0	2	2		A	F
8	-20.93	11.70	1	4	0	2	2	3,3a,6	A	F
9	-20.44	12.36	1	4	1++,2+	4	4	3,6	A	M
10	-19.18	11.33	2	1	?	1	1	1,3c,3d,7	?	F
11	-19.87	11.08	1	N/A	N/A	3	2	3d,3b,8	E	M
12	-20.52	11.37	1?	1	1++,2?,4	3	4	4	E	F
Un. A	-19.61	10.175	N/A	2	1++,2+,4	4	4	6	E	M
Un. B	-18.59	11.92	N/A	N/A	N/A	2	1		E	F

Mean	-19.83	11.042
S.Dev.	0.744	1.035

Burial Mode
1=Coffin
2=Flexed
3=Bundle

Dental Condition
1=Bad
2=Fair
3=Good
4=Excellent

Chewing Muscles
1=Medial pterygoid
2=Temporalis
3=Mandibular torus
4=Molar occl. concavity

Robusticity/Gen. Musculature
1=Very gracile
2=Gracile
3=Robust
4=Very robust

Cultural Inclusions
1=Trade beads
2=Coin(s)
3=Manufactured
- 3a=Earrings
- 3b=Bottle fragment
- 3c=Brass crucifix
- 3d=Woven fabric

4=Carved stone pipe
5=Bark, button
6=Green stain from coins
7=Seeds, wood from ?
8=Nail, iron hardware

Notes:
Other variables examined (and ultimate ly rejected due to inadequate sample size) for possible correlation with Appendix E variables include:
- infectious disease
- physical trauma
- arthritis
- several non-metric traits

APPENDIX F - DENTAL CARIES

Status	Key	Caries	Key
0	No tooth or alveolus	0	No caries
1	Tooth intact	-	No observation
5	Tooth absent, alveolus present	1	Caries present

Burial 1

	Left Maxilla								Right Maxilla							
Tooth	M^3	M^2	M^1	PM^4	PM^3	C	I^2	I^1	I^1	I^2	C	PM^3	PM^4	M^1	M^2	M^3
Status	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Occ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Left Mandible								Right Mandible							
Tooth	M_3	M_2	M_1	PM_4	PM_3	C	I_2	I_1	I_1	I_2	C	PM_3	PM_4	M_1	M_2	M_3
Status	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Occ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Burial 2

	Left Maxilla								Right Maxilla							
Tooth	M^3	M^2	M^1	PM^4	PM^3	C	I^2	I^1	I^1	I^2	C	PM^3	PM^4	M^1	M^2	M^3
Status	0	0	1	0	1	1	0	1	5	5	5	0	0	0	0	1
Occ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Mes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Dis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Buc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Ling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0

	Left Mandible								Right Mandible							
Tooth	M_3	M_2	M_1	PM_4	PM_3	C	I_2	I_1	I_1	I_2	C	PM_3	PM_4	M_1	M_2	M_3
Status	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1
Occ	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mes	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dis	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buc	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ling	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Burial 3

	Left Maxilla								Right Maxilla							
Tooth	M^3	M^2	M^1	PM^4	PM^3	C	I^2	I^1	I^1	I^2	C	PM^3	PM^4	M^1	M^2	M^3
Status	1	1	1	1	5	5	1	5	5	1	5	1	1	5	5	1
Occ	0	1	1	0	-	-	0	-	-	0	-	1	0	-	-	1
Mes	0	0	0	0	-	-	0	-	-	0	-	0	0	-	-	0
Dis	0	0	0	0	-	-	0	-	-	0	-	0	0	-	-	0
Buc	0	0	0	0	-	-	0	-	-	0	-	0	0	-	-	0
Ling	0	0	0	0	-	-	0	-	-	0	-	0	0	-	-	0

	Left Mandible								Right Mandible							
Tooth	M_3	M_2	M_1	PM_4	PM_3	C	I_2	I_1	I_1	I_2	C	PM_3	PM_4	M_1	M_2	M_3
Status	0	1	1	1	0	1	5	5	0	0	0	1	0	1	1	0
Occ	-	1	1	1	-	-	-	-	-	-	-	0	-	1	1	-
Mes	-	0	0	0	-	-	-	-	-	-	-	0	-	0	0	-
Dis	-	0	0	0	-	-	-	-	-	-	-	0	-	0	0	-
Buc	-	0	0	0	-	-	-	-	-	-	-	0	-	0	0	-
Ling	-	0	0	0	-	-	-	-	-	-	-	0	-	0	0	-

Burial 4

	Left Maxilla								Right Maxilla							
Tooth	M^3	M^2	M^1	PM^4	PM^3	C	I^2	I^1	I^1	I^2	C	PM^3	PM^4	M^1	M^2	M^3
Status	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Occ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Left Mandible								Right Mandible							
Tooth	M_3	M_2	M_1	PM_4	PM_3	C	I_2	I_1	I_1	I_2	C	PM_3	PM_4	M_1	M_2	M_3
Status	0	0	0	0	0	0	0	0	5	5	5	1	1	1	1	1
Occ	-	-	-	-	-	-	-	-	-	-	-	0	0	1	0	1
Mes	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0
Dis	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0
Buc	-	-	-	-	-	-	-	-	-	-	-	0	0	1	0	0
Ling	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0

Burial 5

	Left Maxilla								Right Maxilla							
Tooth	M^3	M^2	M^1	PM^4	PM^3	C	I^2	I^1	I^1	I^2	C	PM^3	PM^4	M^1	M^2	M^3
Status	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Occ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Left Mandible								Right Mandible							
Tooth	M_3	M_2	M_1	PM_4	PM_3	C	I_2	I_1	I_1	I_2	C	PM_3	PM_4	M_1	M_2	M_3
Status	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
Occ	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-
Mes	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-
Dis	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-
Buc	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-
Ling	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-

Burial 7

	Left Maxilla								Right Maxilla							
Tooth	M^3	M^2	M^1	PM^4	PM^3	C	I^2	I^1	I^1	I^2	C	PM^3	PM^4	M^1	M^2	M^3
Status	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Occ	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
Mes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Left Mandible								Right Mandible							
Tooth	M_3	M_2	M_1	PM_4	PM_3	C	I_2	I_1	I_1	I_2	C	PM_3	PM_4	M_1	M_2	M_3
Status	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Occ	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	0
Mes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Burial 8

	Left Maxilla								Right Maxilla							
Tooth	M^3	M^2	M^1	PM^4	PM^3	C	I^2	I^1	I^1	I^2	C	PM^3	PM^4	M^1	M^2	M^3
Status	1	1	1	5	1	5	5	1	1	1	1	1	1	1	1	1
Occ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Left Mandible								Right Mandible							
Tooth	M_3	M_2	M_1	PM_4	PM_3	C	I_2	I_1	I_1	I_2	C	PM_3	PM_4	M_1	M_2	M_3
Status	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Occ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Burial 9

	Left Maxilla								Right Maxilla							
Tooth	M^3	M^2	M^1	PM^4	PM^3	C	I^2	I^1	I^1	I^2	C	PM^3	PM^4	M^1	M^2	M^3
Status	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Occ	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1
Mes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Left Mandible								Right Mandible							
Tooth	M_3	M_2	M_1	PM_4	PM_3	C	I_2	I_1	I_1	I_2	C	PM_3	PM_4	M_1	M_2	M_3
Status	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Occ	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1
Mes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Burial 10

	Left Maxilla								Right Maxilla							
Tooth	M^3	M^2	M^1	PM^4	PM^3	C	I^2	I^1	I^1	I^2	C	PM^3	PM^4	M^1	M^2	M^3
Status	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Occ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Left Mandible								Right Mandible							
Tooth	M_3	M_2	M_1	PM_4	PM_3	C	I_2	I_1	I_1	I_2	C	PM_3	PM_4	M_1	M_2	M_3
Status	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Occ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Burial 11

	Left Maxilla								Right Maxilla							
Tooth	M^3	M^2	M^1	PM^4	PM^3	C	I^2	I^1	I^1	I^2	C	PM^3	PM^4	M^1	M^2	M^3
Status	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Occ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Left Mandible								Right Mandible							
Tooth	M_3	M_2	M_1	PM_4	PM_3	C	I_2	I_1	I_1	I_2	C	PM_3	PM_4	M_1	M_2	M_3
Status	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Occ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Burial 12

	Left Maxilla								Right Maxilla							
Tooth	M^3	M^2	M^1	PM^4	PM^3	C	I^2	I^1	I^1	I^2	C	PM^3	PM^4	M^1	M^2	M^3
Status	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Occ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Left Mandible								Right Mandible							
Tooth	M_3	M_2	M_1	PM_4	PM_3	C	I_2	I_1	I_1	I_2	C	PM_3	PM_4	M_1	M_2	M_3
Status	1	0	1	5	1	1	1	1	1	1	1	1	5	5	1	1
Occ	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mes	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
Dis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Ling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Burial Unknown A

	Left Maxilla								Right Maxilla							
Tooth	M^3	M^2	M^1	PM^4	PM^3	C	I^2	I^1	I^1	I^2	C	PM^3	PM^4	M^1	M^2	M^3
Status	0	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1
Occ	-	0	1	0	0	0	-	-	-	-	0	0	0	1	0	0
Mes	-	0	0	0	0	0	-	-	-	-	0	0	0	0	0	0
Dis	-	0	0	0	0	0	-	-	-	-	0	0	0	0	0	0
Buc	-	0	0	0	0	0	-	-	-	-	0	0	0	0	0	0
Ling	-	0	0	0	0	0	-	-	-	-	0	0	0	0	0	0

	Left Mandible								Right Mandible							
Tooth	M_3	M_2	M_1	PM_4	PM_3	C	I_2	I_1	I_1	I_2	C	PM_3	PM_4	M_1	M_2	M_3
Status	1	1	1	1	1	1	1	1	1	5	1	1	1	1	1	1
Occ	0	1	0	0	0	0	0	0	0	-	0	0	0	0	1	0
Mes	1	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0
Dis	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0
Buc	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0
Ling	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0

Burial Unknown B

	Left Maxilla								Right Maxilla							
Tooth	M^3	M^2	M^1	PM^4	PM^3	C	I^2	I^1	I^1	I^2	C	PM^3	PM^4	M^1	M^2	M^3
Status	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Occ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Left Mandible								Right Mandible							
Tooth	M_3	M_2	M_1	PM_4	PM_3	C	I_2	I_1	I_1	I_2	C	PM_3	PM_4	M_1	M_2	M_3
Status	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Occ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-