

## Nineteenth Century Burials from Peterborough, Ontario

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*This study examines human skeletal and cultural remains from the first burial grounds at Peterborough, Ontario, dated between 1827 and 1854. Approximately 32 individuals are represented, including ten skeletons and the commingled remains of 22 more individuals. They are described as to their age, sex, populational affinity, height and pathologies. The sample includes five subadults and possibly 35 adults. An overrepresentation of males is found compared to the 1851 Personal Census of Canada. Cranial measures prove the skeletons to be those of European settlers. Body height is a very tall 178.12 centimetres for males and an average 159.2 centimetres for females. Overall, the health status of the skeletons reveals severe signs of degenerative joint disease, nutritional-metabolic deficiencies and some fractures. Dentally, the high “diseased and missing” index in addition to a strong representation of periodontal diseases and abscesses shows again a poor health status. These are people who engaged in heavy, long-term, sustained physical activity, who had a poor diet during their developmental years, and who lacked good oral hygiene. These characteristics, in addition to the cheaper personal artifacts found with burials, are indicative of lower socioeconomic status. Burial patterns are consistent with the nineteenth century cultural trend toward increased embellishment following adoption of the larger Western ideology surrounding the “beautification of death”.*

### Introduction

Historical records and human skeletal remains provide the anthropologist with complementary information about the past, with data to cross-check assumptions and with the ability to synthesize a variety of sources in order to reconstruct the life of past people. Here we investigate human skeletal remains and historical artifacts from the site of the first burial grounds at Peterborough, Ontario, which were in use between 1827 and 1854 (Dobbin 1943; Jones and Dyer 1987). Under instruction from The Canada Company, the block bounded by Aylmer, George, Murray and McDonnel Streets (Figure 1) was reserved as a cemetery in 1825. As Figure 1 shows, Lots 1-3 in this block were designated as a “General [Protestant] Burial Ground” and Lots 4-6 were reserved for the “Roman Catholic Church”. Lot 7 was retained by the Anglican Church but was never used for interment. It eventually was sold and developed for housing in the mid-1850s. By the mid-1850s, too, lands adjacent to the Burial Ground, originally situated well north of the settled area, were becoming built up and the cemetery was increasingly held to be not only a sani-

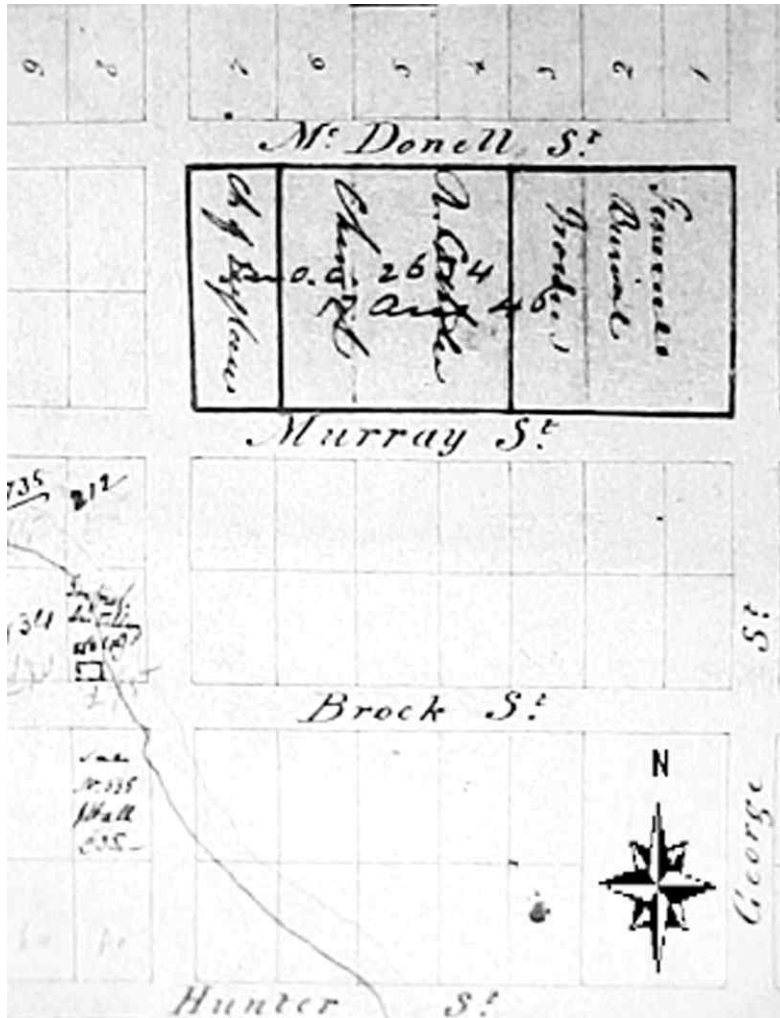
tation and health hazard but also a blight on the good appearance of the town “as there was no one retained to look after it” (Dobbin 1943:232).

During the summer of 1851, the *Weekly Despatch* (July 31, 5[32]) ran an editorial that argued for closure of the Burial Ground,

...which from its central situation in the town—the unsuitable nature of its soil—the want of all order and regularity in the mode of interment—and the general delapidation of the premises is generally regarded as a disgrace and a nuisance to the community.

The editorial evidently had the desired effect, for the Town Council Minutes for August 1, 1851, record that:

the present burial ground within the limits of this Town is from various causes daily increasing as a nuisance and an insufferable evil to the community.... [I]t is the intention of the Town Council after granting...a reasonable and convenient time to prepare other grounds to have the present burial grounds enclosed with a substantial



**Figure 1.** Part of The Town Reserve of Peterborough, by John Huston 1843, showing the Burial Ground bounded by George, Murray, Aylmer, and McDonnell (here spelled "McDonnell") streets. The easternmost section is labelled "General Burial Ground", the middle section "R. Catholic Ground", and the westernmost section "Ch. of England" (Map Collection D7, Ontario Archives).

fence and in such manner to allow the same to remain in a state of disuse.

The Burial Ground was formally closed by by-law on May 15, 1854, its nature rather graphically documented by an editorial in the April 21, 1854, *Peterboro' Review* (2[15]), the same issue that ran the first publication of the "By-Law to prohibit the burial of the dead in the Town of Peterborough":

Let any one pass by the cemetery on a summer day, when the scorching rays of the sun descend with intense vigour, imparting a feeling of languid oppressiveness and he will at once become sensibly impressed with the fact that an

effluvia of the most dangerous and disagreeable character is constantly arising. The frequent opening of graves for the interment of the dead, and the consequent exposure of bodies but a short time held beneath the sod, and in the very worst stage of decomposition: the crowding of friends and the lately deceased person around the grave in which he is being interred, inhaling the atmosphere that arises, and carrying with them the seeds of diseases.... That the cemetery whose closure we now advocate is already overcrowded, that it is almost impossible to dig a fresh grave

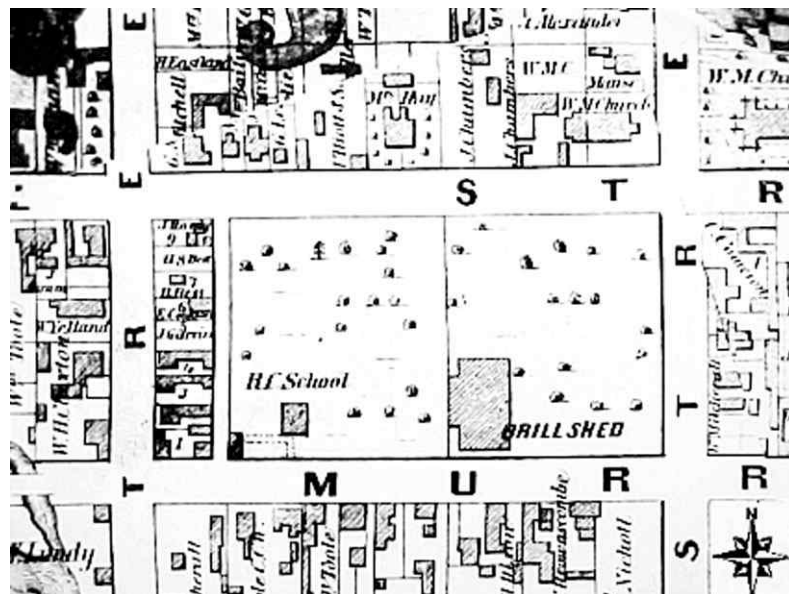
without exposing to a certain extent the remains of those already interred, everyone acquainted with the place will admit.

Although a penalty of £5 plus costs or 70 day's imprisonment was levied against any attempt at interment after the Burial Ground was formally closed (*Peterboro' Review* 2[15]), the Town Council Minutes for July 3, 1854, record that such an infraction had already taken place. To put the £5 fine (100 shillings) into perspective, at the time "four shillings was the maximum wage in all occupations" (Dobbin 1943:38), so a 100 shilling fine meant at least 25 days of work in order to render payment.

Subsequent to closure of the Burial Ground, it was determined that remains buried there were to be removed to the newly opened Little Lake (then multid denominational) or Wesleyan Methodist cemeteries, sited to the south and north, respectively, of the built-up areas of town (Kidd 1985:27). According to Perry and Spurway (1967:139), it was expected that remains would be relocated by relatives. There are no sources that detail these relocations, so we do not know precisely how or when they occurred. We may infer, because a portion of the former Burial Ground was developed in the mid-1860s, that removals proceeded prior to this date. It is noteworthy that there is

no extant register for the Burial Ground; indeed, it is doubtful that one ever existed (Kim Reid, personal communication 2001). In the absence of such a document and/or of local friends and relatives willing and/or financially able to move a deceased's body, it perhaps is not surprising that some remains were never relocated. This was found to be the case elsewhere in Ontario where cemeteries had been closed and removal advised (e.g., Kogon and Mayer 1995; Pfeiffer et al. 1989). Furthermore, it seems likely that those who were clandestinely and illegally interred at the Burial Ground after it was formally closed (presumably to avoid fees charged by the Little Lake and Wesleyan Methodist cemeteries) would not have been relocated.

In 1865, a two-and-one-half storey brick schoolhouse and outbuilding was erected for the Roman Catholic School Board on the half of Lot 6 facing Murray Street (Earle 1999:5; Poole 1867:118). In response to the Fenian raids of 1866, a two-storey wooden drill shed was built on the Murray Street half of Lot 3 (Earle 1999:5; Jones 1995:25). Both of these buildings appear on the Romaine Map of 1875 (Figure 2). Between 1867 and 1883, the West Riding Agricultural Fair was held each fall on the old Burial Ground, where the new militia shed provided indoor exhibit space (Jones 1995:25). By



**Figure 2.** Part of Town of Peterborough and Village of Ashburnham, by Robert Romaine, 1875, showing the locations of the drill shed and school on the former Burial Ground (Map 01-1024, Trent University Archives).

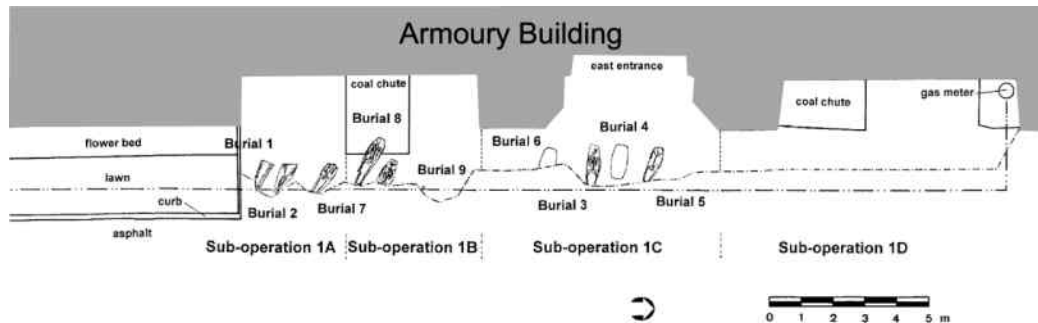
1868, the former Burial Ground had been enclosed by a high board fence, and the area "became a haven for vandals" (Kidd 1983; Jones 1995:25). At the Town Council Meeting of August 18, 1884, it was moved that the area be named "The Central Park" (renamed in 1927 as Confederation Park) and that the fence and shed associated with the fair grounds be disposed of "and the proceeds be applied to the improvement and fixing the grounds". At its April 4, 1887 meeting, the Town Council gave permission to the Peterborough Agricultural Society to develop the park by planting trees and beautifying the grounds. To these ends, the Society was issued a sum of \$200. The drill shed was destroyed by fire in 1907 and its remains demolished (Kidd 1985:27; Earle 1999:6). That same year, work was begun on a substantial two-storey brick and stone armoury located on the Murray Street side of Lots 4 to 6. This landmark building was completed in 1909, the same year that the Peterborough Collegiate Institute was erected on Lots 4 and 5 on the McDonnell Street side of the former Burial Ground (Brunger 1987:3; Earle 1999:6). At various times during the twentieth century, as the original structure of the Peterborough Collegiate Institute was expanded or as work was conducted around the foundations of the Peterborough Armoury, the *Peterborough Examiner* carried articles attesting to the presence of burials that had not been relocated from the original Burial Ground. Today, Confederation Park is restricted to the south and north halves of Lots 1 and 2, the area to the east of the collegiate and armoury having been paved for parking (Earle 1999:6). Currently, the former Burial Ground forms a visually and historically significant portion of the City of Peterborough's central core.

In 1998, construction at the east side of the armoury revealed a skull and other human bones. Further excavation at the site yielded remains of some 20 individuals. These remains come from that section of the old Burial Ground that had been reserved for the Roman Catholic Church, albeit close to its boundary with the General Burial Ground. One year later, construction at the south side entrance of the

armoury revealed the skeleton of an infant and a few fragments of an adult. These remains come from that section of the old Burial Ground that had been reserved for the Roman Catholic Church. It is suspected that a number of skeletons of early settlers still lie underneath the pavement adjacent to the building. The remains of up to 38 individuals of all ages and both sexes represent some two percent of the one-time, historical population of Peterborough, which in 1850 was stated at 1,812 inhabitants (Anonymous 1945). The Census of the Canadas 1851-1852, however, listed the population at a higher number, 2,191 individuals with 1,135 males and 1,056 females (Census of the Canadas 1851-1852:22). In addition to the much larger historical samples from Belleville (McKillop et al. 1989; Saunders et al. 1995a, 1995b) and Newmarket (Pfeiffer et al. 1989) and a number of other biohistorical works on Upper Canadians (Cook et al. 1986; Cybulski 1988; Pearce 1989; Spence 1989; Lazenby and Saunders 1990; Pfeiffer and Williamson 1991; Saunders et al. 1997), the armoury skeletons give us an opportunity to assess biological and medical data that are not available from historical documents and allow us a glimpse into the socio-cultural life, the health and death of people in rural Upper Canada approximately 150 years ago.

### Material and Methods

The osteological and historical materials for this study were brought to us in October 1998 by the local Canadian Armed Forces building inspectors Mr. V. Haggerty and Mr. M. Jaeger. They were unearthed by backhoe and shovel and consequently no longer were in any context. Subsequently, Heritage Quest Inc., of Kingston, was called upon to conduct a proper excavation along a very restricted area near the east wall of the Peterborough Armoury where a series of burials was found. A report on the excavations was prepared by Mr. J. Earle (1999). This later excavated material, labeled Burials 1-9 (Figure 3) and two boxes of commingled remains, was passed on to the senior author for further analysis. A small number of artifacts were included with the human remains. These artifacts are



**Figure 3.** Plan of excavation showing locations of Burials 1-9 relative to the east wall of the Peterborough Armoury (Map drawn by Jeff Earle and reproduced courtesy of Heritage Quest Inc.).

described by the second author. In October 1999, further work at the Murray Street entrance of the armoury unearthed an almost complete skeleton of a child and two fragments of an adult. Permission to study the human remains was given by Canadian Armed Forces Defense Construction Canada, to whom the armoury belongs. To facilitate a detailed analysis, all the material was cleaned by students and investigated by the authors in the laboratory at Trent University. The osteological investigation focused on individual description, age and sex structure, populational affinities, body height, skeletal pathology, and dental pathology. Tables 1 and 2 provide summaries of the metric data on the osteological remains. The human remains, artifacts and burial pattern are described and interpreted in the context of early Peterborough's history and compared and contrasted with other early nineteenth century burial data from southern Ontario.

The methods of osteological investigation are those listed by Bass (1987), Buikstra and Ubelaker (1994), Giles and Elliott (1962), Gill (1984), Knussmann (1988), Schwartz (1995), and Ubelaker (1989). The measuring technique follows the guidelines described by Bräuer (1988). In addition to these methods, the computerized data applications of Fordisk 2.0 (Ousley and Jantz 1996) were used to determine the sex and investigate the populational affinities of the skeletons. In general, methods of age and sex determination are those listed by Bass (1987), Buikstra and Ubelaker (1997), Schwartz (1995), Sjøvold (1988), Szilvassy (1988), and Ubelaker

(1989). Body height was reconstructed after the formulae of Trotter and Gleser (1952, 1958) for White-Europeans.

Depending on preservation, all possible age indicators such as endo- and ectocranial suture closure, the appearance of the pubic symphysis, the auricular facet, epi- and diaphyseal closure, length of long bones, dental eruption stages and attrition were used. More detailed descriptions of analysis are given in each section. Since both Cook et al. (1986) and Saunders et al. (1995a, 1995b) expressed "grave" doubts about the reliability of osteological age determinations, the true chronological age of Peterborough's early inhabitants cannot be accurately assessed.

For the determination of sex, both morphological observations and metric analysis were applied, again subject to the preservation of the material. The analysis of populational affinities follows the recommendations of Bass (1987) and the computer program Fordisk 2.0 (Ousley and Jantz 1996). More specialized techniques such as the application of the discriminant functions of Giles and Elliott (1962) for the differentiation between the major geographical subdivisions among the human species are explained in each of the paragraphs.

For comparative purposes and in order to give a more balanced view of life in rural Ontario around the middle of the nineteenth century, the studies of the Harvie Family Burial Ground in North Dumfries, which was used between 1829 and 1894, (Saunders and Lazenby 1991), the Newmarket Prospect Hill Cemetery dated between 1824-1827 and 1879 (Pfeiffer et al.

**Table 1.** Measures used in the analysis of the Peterborough Armoury skulls and mandibles. Measurements are in millimetres except the mandibular angle, which is in degrees.

	Individual 1	Individual 2	Burial 3	Burial 4	Burial 5	Burial 7	Burial 8	Burial 9	Burial 10 (1999) (>170)
Maximum cranial length	207	—	177	193	—	180	195	187	155
Maximum cranial breadth	143	—	139	142	—	134	145	129	—
Bizygomatic diameter	139	—	—	130	—	114	—	(125)	—
Basion bregma height	137	—	115	135	—	125	132	128	—
Cranial base length	113	—	93	102	—	100	—	106	—
Basion-prosthion length	109	—	(84)	88	—	88	—	97	—
Maximum alveolar breadth	—	—	—	46	—	63	—	—	—
Maximum alveolar length	—	—	—	44	—	48	—	50	—
Biauricular breadth	121	—	110	122	—	107	125	117	133
Upper facial height	69	—	73	75	—	67	—	68	—
Minimum facial breadth	104	—	—	104	—	96	93	90	—
Upper facial breadth	112	—	—	107	—	98	—	99	—
Nasal height	50	—	53	59	—	51	—	48	—
Nasal breadth	25	—	25	(22)	—	26	28	22	20
Orbital breadth	47	—	38	37	—	34	—	(40)	36
Orbital height	34	—	34	38	—	32	—	(34)	(43)
Biorbital breadth	106	—	92	100	—	90	—	93	91
Interorbital breadth	21	—	—	—	—	24	—	15	—
Frontal chord	116	—	103	113	—	108	114	112	—
Parietal chord	117	—	107	112	—	104	120	108	120
Occipital chord	107	—	90	100	—	97	100	88	97
Foramen magnum length	38	—	40	37	—	32	37	35	38
Foramen magnum breadth	29	—	34	31	—	26	30	28	—
Mastoid length	—	—	31	32	30	23	32	32	—
Chin height	—	38	25	40	—	28	40	32	25
Height of mandibular body	—	32	26	36	36	30	37	29	22
Breadth of mandibular body	—	12	11	12	11	12	12	11	10
Bigonial width	—	90	95	104	—	94	105	106	—
Bicondylar breadth	—	117	101	123	—	105	—	111	—
Minimum ramus breadth	—	27	25	25	28	28	31	33	27
Maximum ramus breadth	—	36	35	40	39	36	(46)	46	—
Maximum ramus height	—	67	41	43	66	52	(51)	53	44
Mandibular length	—	68	74	82	—	83	84	77	—
Mandibular angle	—	131	—	139	—	123	129	122	—

1989) and, in particular, of the large St. Thomas Church Cemetery in Belleville (1821-1874) (McKillop et al. 1989) proved to be most suitable.

### Description and Results

#### *Unproveniented Remains*

Individuals 1, 2, 3 and 4 were unearthed by backhoe in 1998 and are consequently not counted as "skeletons". Since remains of only four individuals are represented, their identification was easy and unequivocal. Though found together, one upper skull and a mandible did not show the expected fit between mandibular fossa and condyles and must belong to two individuals. Individual 1 was an old (45-50 years) male, represented by an upper cranium, atlas, ribs, left

humerus, radius, talus and some thoracic vertebrae. The application of cranial measures by the Fordisk 2.0 program confirmed a clearly male sex. Individual 2 was represented by the mandible of an older (> 40 years) person who was probably female, although metrically, the Fordisk 2.0 testing procedures resulted in a possible male identification. Individual 3 was identified on the basis of a skull roof and additional cranial fragments, some blackish-stained left arm bones, clavicle and innominate fragments plus femur head, and was judged to be a male of over 50 years age. Additional remains excavated following the initial discovery of the site added more definable parts to this male. Individual 4 was represented by one fragment of a proximal tibia. According to the size of this element, this

**Table 2.** *Body height of the Armoury skeletons and skeletal material.*

	Sex	Long Bone	Length (mm)	Estimated Body Height (cm)	Average Height (cm)
Burial 1	Male	Femur	489	178.99	179
Burial 2	Male	Radius	253	175.3	173.2±3.8
		Ulna	271	177.5	
		Femur	451	170.2	
		Tibia	363	169.8	
Burial 3	Female	Radius	221	159.7	161.0±2.8
		Ulna	237	159.0	
		Femur	446	164.2	
Burial 4	Male	Humerus	334	174.6	171.8±2.5
		Radius	238	169.6	
		Ulna	254	171.1	
Burial 7	Female	Humerus	276	150.7	150.8±0.7
		Radius	201	150.2	
		Ulna	217	150.4	
		Femur	396	151.9	
Burial 8	Male	Humerus	338	175.8	177.2±2.8
		Radius	253	175.3	
		Ulna	279	180.4	
Burial 9	Male	Humerus	315	169.1	170.8±3.8
		Radius	234	168.1	
		Ulna	265	175.2	
Commingled	Male	Humerus	357	181.3	
Commingled	Male	Humerus	353	180.1	
Commingled	Female	Humerus	316	164.0	
Commingled	Male	Humerus	360	182.1	
Commingled	Male	Radius	269	181.4	
Commingled	Female	Radius	213	160.9	
Commingled	Male	Ulna	273	178.2	
Commingled	Male	Ulna	286	183.1	
				Average male (n=11)	178.0±4.1
				Average female (n=4)	159.2±5.0

person was a child of unknown sex aged between eight and 12 years.

In addition to the human remains, a coarse earthenware sherd, one horseshoe branch, two spikes, 44 nail fragments, and a coffin handle were excavated from construction backfill.

The ceramic artifact is a buff-coloured porous earthenware basal sherd with sparse sand tempering. Severe scouring has destroyed interior striations, ridges or grooves from wheel throwing and any traces of glaze or slip that originally might have coated the vessel's interior. The exterior is smooth and indicates a large, flat-bottomed pan or open utility bowl with gently outflaring sides. The form is consistent with a nineteenth century date, but greater chronological precision is not possible given sherd's size and condition.

Represented by a branch, or one half, a ferrous artifact is deemed to be a horseshoe rather than an ox shoe owing to its size and breakage through the toe. The branch is approximately 152 mm

long, has faces between 22 and 26 mm wide (i.e., of fairly uniform width) and margins that are minimally nine millimetres thick. Intact, the shoe would have had a typical nineteenth century oval shape with relatively wide, inward-curving branches and heels lacking calkins (turned down ends). Owing to heavy corrosion, the style, location and extent of fullering (the groove into which the nail holes are sunk) cannot be observed, hence it is not known whether this is a hand-made or machine-made shoe (Chappell 1973: 105). As the shoe lacks a toe tip, it most likely predates the mid-nineteenth century (Noel Hume 1970:239).

Two headless wrought ferrous spikes, one 19.5 cm (7 3/4 inches) and the other in excess of 13.5 cm (5 1/4 inches) long, were excavated from the backfill. Both have sharp points and square sections.

A minimum of 32 wrought ferrous nail and nail shaft fragments, represented by a total of 44

pieces, were recovered from construction back-fill. Of these nails, 11 have flat heads, seven have rose heads and one has a T-head. Intact specimens range from six to ten centimetres (2 3/4 to 3 7/8 inches) in length, with the majority being 7.5 cm (three inches) long. Sections are square.

The coffin handle is a shallow, plain U-shaped wrought iron object with one end missing. Made of plain rod eight to nine millimetres in diameter, the intact end of the object, which is heavily corroded, has a large accretion at the intact end. The handle fragment is 125 mm long; originally the artifact was perhaps 145 mm long. It most closely resembles the wire coffin handle illustrated by McKillop (1995:Figure 7c) from an adult burial at the St. Thomas Anglican Churchyard in Belleville, Ontario. Her data indicate that machine-made versions of this coffin handle type were in use throughout much of the nineteenth century, but were perhaps more common prior to 1860 (McKillop 1995: 88).

#### *Excavated Burials*

Following the discovery of these remains, the subsequent excavation resulted in more complete individuals, but also a large mixture of single bones that were most difficult to reassemble to single, specific individuals of specifiable age and sex. Many seemingly complete skeletons were incompletely excavated due to the spatial limitations near the armoury wall. However, a small number of more defined skeletons permit short descriptions of individual burials. These are given below. These burials were oriented northwest to southeast with heads to the northwest and arms extended along each side of the body (Earle 1999: Figures 9, 12, 13). Soil stains and wood fragments indicate that each interment had been in a hexagonal "pinch toe" coffin.

The first batch of material from the cemetery (1998) was washed by osteology students, at which time the second author observed approximately six mother-of-pearl buttons which were subsequently misplaced, hence are not fully described in this report. On the basis of a cursory visual inspection made as the artifacts dried following their cleaning, the buttons were principally of the size worn on blouses or shirts

(approximately 10-12 mm in diameter and two millimetres thick). Their profiles were bifacially flat with depressed centre fronts, and they had either two or four sew-through fasteners. A few specimens had an encircling bead just in from the edge; they were otherwise plain.

In the following description, material remains are grouped by burial number. Nail types are grouped into 1/8 inch (three millimetre) length intervals. These intervals constitute the smallest recorded fractional divisions from the early nineteenth century (Wilson and Southwood 1976:37). Artifact types and/or counts do not necessarily correspond to those given by Earle (1999) for each burial; rather they reflect what actually was made available to the second author for study. Apparently, some artifacts disintegrated during cleaning and provenience data for others was incorrectly recorded by the students. In addition, there are a few artifacts described here that came from clumps of soil adhering to the bones. These are not discussed by Earle (1999).

Burial 1 consisted of the well-preserved parts of the lower extremities, left hand bones, and one innominate fragment. Given that all long bone diaphyses were closed, and showed no signs of osteoarthritis and an auricular facet age between 27 and 35 was indicated, this male individual most likely reached an age of 30-35 years. A single flat head wrought nail shank fragment was the only portable artifact assigned to this burial in the lab. This nail originally would have been in excess of eight centimetres (three inches) in length. Its cross-section is square. Soil stains and fragments of coffin wood indicate that this male was buried only about a metre below grade, the north side of the grave cutting into the shaft of the earlier Burial 2 (Earle 1999:15, 21). Field notes document that 12 nails were recovered from Burial 1 (Earle 1999:21).

Burial 2 included well-preserved parts of the lower extremities, feet, and a right hand. Their robust morphology unambiguously points to a male identification. With all epiphyses fully fused, completely obliterated sacral lines and the appearance of the auricular facet, this male suffered severe osteoarthritis, which together place him into an advanced age of 40-50 years. The



burial contained three (originally 15 [Earle 1999:21]) wrought iron nail mid-sections ranging in length from eight to nine centimetres. Their cross-sections are square. Eleven irregularly shaped pieces of stamped tin approximately two millimetres thick likely are the remains of a fragmented coffin plaque or name plate. Depending on orientation, the stamped pattern is linear with a raised or depressed semicircular cross-section, ten millimetres wide and five millimetres deep. According to Earle (1999:21), this burial also contained a four-hole shell button. The coffin wood appears to be pine.

Burial 3 consisted of well-preserved upper body parts, but lacked the tibiae, patellae, left fibula and feet. For reasons of the overlap of parts, however, it cannot be derived from the individual represented by Burial 2. Both cranial and postcranial morphology clearly establishes a female sex. The morphological sex is confirmed by both upper skull and mandibular data application by the Fordisk 2.0 program. The open cranial sutures, some open sacral lines, little dental wear, but fusion of epi- and diaphyses point to an age of  $35\pm 5$  years. Earle (1999:34) comments

that this female was buried very close to the surface. There were no recorded artifacts.

Burial 4 included well-preserved elements of a cranium, cervical, thoracic, lumbar vertebrae, a sacrum, bones of the upper extremity including left and right carpal bones, and even a hyoid and cricoid bone. Lower body parts were lacking, however cross-checking between Burial 1 and 4 revealed the overlap of both right and left innominates, precluding the possibility that these two sets of remains represent the same individual. The edentulous maxilla (Figure 4) raised the question as to whether or not the mandible with its incisors, canines, premolars and left M1 and M2 belonged together, but their proper articulation established that they do. The considerable underbite may well have interfered with proper mastication. The very large size and robust morphology of the long bones, the robust features and muscle markings on the cranium make this a male individual. The result is confirmed by the upper skull and full cranial measures as processed by Fordisk sex determination. Complete endocranial and almost complete ectocranial suture closure, the advanced deterior-

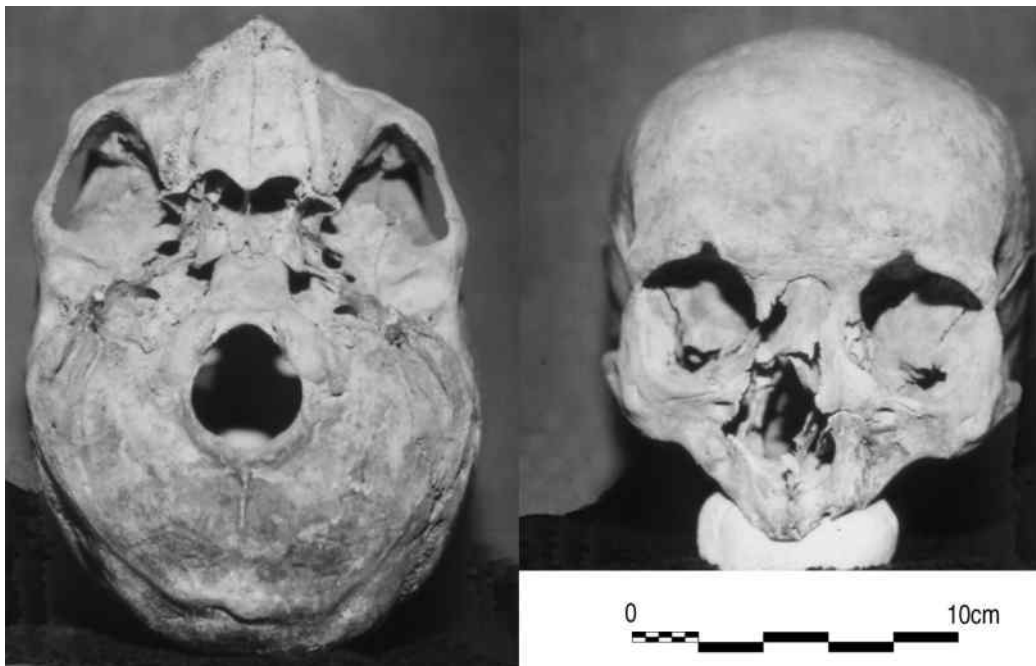


Figure 4. Distal and frontal views of the edentulous maxilla of Burial 4.

ration of the auricular facet and the pubic symphysis and the advanced ankylosis of right innominate and sacrum point to an advanced age of over 50 years. There was no coffin hardware associated with this badly disturbed burial (Earle 1999:36).

Burial 5 consisted of a skeleton lacking the right side of the cranium, the right innominate, the sacrum and the lower distal extremities, but which was otherwise well preserved. A strongly receding forehead, strong supraorbital arches, a square chin and strong muscle markings on both cranial and postcranial bones all testify to a male. The age estimate, between 35 and 50 years, is based on the left auricular facet (38-45 years), the closure of all epi- and diaphyseal lines and a midlambdoid fragment (closure stage 2-3). Five wrought rose head, three wrought flat head nails and four shaft sections were catalogued as associated with this burial, although Earle (1999:36) states that "no coffin hardware was retrieved from Burial 5". Nail sections are square; none of the specimens is complete enough to permit length estimates. A single, exfoliated mother-of-pearl button, 45 mm in diameter and approximately two millimetres thick was also recovered near this male. The profile is bifacially flat and there are four sew-through fasteners. Ferris (1984:7) notes that shell buttons of this larger size were "used for waistcoats... and full-length coats". A small brass "suspension ring", of one millimetre rod, has an outside diameter of 11 mm. The coffin outline was not as distinct for this burial as it was for others, possibly owing to severe disturbance (Earle 1999:36).

A femur and radius fragments were the only remains associated with Burial 6. Both come from an adult of indeterminate sex, but no other analysis was possible. Soil stains and wood fragments indicated very shallow coffin burial (Earle 1999:32).

Though otherwise very well preserved in the upper body, the lower extremities of Burial 7 were cut off and missing. The characteristic expression of the subpubic angle and area, the wide-open greater sciatic notch, the presence of a preauricular sulcus, small sized mastoid processes and weak muscle lines all establish a female sex.

The morphognostic and the metric sex determination by Fordisk 2.0 are congruent. The pubic symphysis (stage 2) and completely open cranial sutures, the incomplete fusion of the sacral elements 1 and 2 and a very slight epiphyseal fusion line at the distal ends of the radius allow the age of this skeleton to be established at 20-25 years. A minimum of six wrought iron nails and shaft fragments, represented by a total of eight pieces, were recovered from this burial. One of these nails has a rose head, another a flat head. The most complete of these artifacts would have exceeded 7.5 cm (three inches) in length; their sections are square. Earle's (1999:21) report on the excavations notes that there originally had been a fragile ferrous name plate, screw and several crushed pieces of coffin wood found with this burial although none of these was available to the second author for analysis.

Burial 8 consisted of a very well preserved skeleton from which only parts of the sacrum, right ischial bone and some pieces of the left facial skeleton were missing. The relative completeness of the remains allowed a number of metric attributes to be assessed, leading to a clear identification of the remains to be those of a male. Morphological observations confirm this assessment. With advanced osteophytosis of lumbar vertebrae, advanced suture closure and strong periodontal disease, this male must have reached at least 50-60 years of age. The sex determination by Fordisk 2.0 agrees in both upper cranial and full cranial data applications. Burial 8 contained two wrought iron nail shank mid-sections (originally 11 [Earle 1999:30]), two rose head and one L-head nail fragments with square cross-sections. Wood fragments clearly showed the outline of the coffin, which had been placed in a shallow grave less than a metre below grade (Earle 1999:30). A single heavily corroded four-holed button is stamped from ferrous metal. It appears to have a flat rim, a concave front and a convex back. It is 19 mm in diameter. Ferris (1984:5) observes that buttons of this type "were used almost exclusively for pant suspenders", congruous with the male sex of the burial. A second button of this type recovered from the burial was not in the collection submitted to the sec-



**Table 4.** *Age and sex estimates for the excavated burials.*

	Age (yrs)	Sex
Burial 1	30-35	Male
Burial 2	40-50	Male
Burial 3	35±5	Female
Burial 4	>50	Male
Burial 5	35-50	Male
Burial 6	"Adult"	Unknown
Burial 7	20-25	Female
Burial 8	50-60	Male
Burial 9	40-45	Male*
Burial 10	4-5	Male?

\*excluding one atlas (female)

human remains on the basis of which a fine-tuned age profile cannot be given. For these reasons, all finds were divided into four age categories: infant (age 0-16), juvenile (16-20), young adult (20-30), general adult (20-50), and old adults (50 and older) (Tables 3 and 4). The generic name "subadult" is applied to all individuals under 16 years of age following Pfeiffer (1989) and Saunders (1992; Saunders and Hoppa 1993; Saunders et al. 1995a, 1995b). Table 3 shows the number of individuals among the variably disturbed remains (individuals and commingled material) and their sex combined for each age bracket. The impression of multiple individuals may often arise though several bones may originate from one and the same individual. Table 4 provides the age and sex estimates for the individuals excavated from more or less intact graves.

Similar remarks regarding problems of clear identification apply to the determination of sex, which in subadults and for single bones or bone fragments cannot be satisfactorily stated. The age and sex of the major elements in each of the three groups are shown in Tables 3 and 4. Again, it

must be cautioned that a mix-up of bones may distort the picture of true sex ratios. The first group consists of two males, one questionable female and one young individual of unknown sex. The burials contained six males and two females plus two burials of unknown sex. Possible bias towards the male sex is shown by the commingled remains, with up to 15 males and nine females. It is probable that among the mixture of bones in particular, some individuals were represented by several elements and thus, were counted more than once. A summary of all attainable sexes would reveal a heavily biased sex ratio, 12 females versus 23 males (34.3 percent females to 65.7 percent males). In contrast to the skeletal ratio, the 1851-1853 Census (Table 5) revealed only a slightly uneven sex ratio (1,056 females versus 1,135 males, or 48 versus 52 percent). Interestingly, similar low ratios of females to males were found among the skeletal populations at the roughly contemporaneous Stirrup Court Cemetery (six females to 12 males, or 33.3 to 66.6 percent) and at the Prospect Hill Cemetery (15 females to 22 males, or 40.5 to 59.5 percent) (Cook et al. 1986:109; Pfeiffer et al. 1989:35). However, the sex ratio of the much larger skeletal sample (n=576) from the St. Thomas Anglican Church at Belleville was more evenly balanced by 44 percent females and 56 percent males, which corresponds well with the church registry ratio of 41 percent females versus 59 percent males (Shelley Saunders, personal communication 2001). A taphonomically caused, random overrepresentation of one sex over the other is therefore the most likely explanation for our Peterborough sample. Support for

**Table 5.** *Demography of Peterborough Town recorded in the 1851 Census, compared to the Armoury skeletal remains.*

	Population as Recorded in the Census*							
	Total		Subadults (< 15)		Adult (15-60)		Old (>60)	
	N	%	N	%	N	%	N	%
Males	1135	51.8	488	52.0	622	52.1	23	46.9
Females	1056	48.2	451	48.0	571	47.9	26	53.1
Total	2191	100.0	939	100.0	1193	100.0	49	100.0
%age group				42.8		54.5		2.2
	Armoury Skeletal Remains							
Males	23	65.7			22	95.6	1?	4.4
Females	12	34.3			12	100.0		
Total	35	100.0			34	97.1	1?	2.9

\*discrepancies in the population figures are those of the Census records

this conclusion is thought to exist in the data from both the Peterborough census and the Belleville church registry.

Four skeletons were found to belong to the subadult, unknown-sex age group compared to 35 adults (11.4 percent). In comparison, Pfeiffer et al. (1989:35) found 38 subadult (0-16 years.) out of 77 skeletons (49 percent) at the historically similar Prospect Hill,-Newmarket cemetery, and Saunders et al. (1995a:78) report an even higher 50.5 percent ratio of subadults in the St. Thomas', Belleville, cemetery. At the Stirrup Court Cemetery, two children versus 19 adults were found (Cook et al. 1986:107). Real life data (Table 5), however, are available from the 1851 census for Peterborough. A summary of the persons between birth and age 15, and the number of deaths between these ages, lists 939 children and 13 deaths (ten males and three females), or 1.4 percent. Accordingly, all the cemeteries' subadult skeletons overrepresent the true infant death rate.

### Populational Affinity

It is of biological as well as legal importance whether the skeletal remains originate from people of Native Amerindian or from European ancestry. The quest for final storage, repatriation and reburial would warrant a close look at the problem which was in former times called "race" and is better phrased in terms of biological-geographical origins. This is amplified by the earlier discovery of a Native burial only one block and perhaps approximately 100 to 200 metres south of the Peterborough Armoury, called the "Brock Street burial" (Kenyon and Cameron 1961). Only some skulls are sufficiently well preserved to allow the detailed observations, measures and tests for the analysis of geographical origins. Dental traits such as shovel-shape incisors are well-known, valuable traits to identify Native Amerindians. Postcranial bones show such large variation and overlap of traits that the author did not attempt to base any conclusions on these. Schwartz (1995:288) lists numerous cranial characteristics, but since a number are the same (i.e. Nasal bridge: "narrow") for both Amerindian

and European, morphognostic observations were prioritized lower than measures.

Bass (1987:83-92) recommends more specific tests. The primarily retreating zygomatics in Europeans ("Caucasoids") as opposed to the projecting ones of "Mongoloids" (including Native Americans) (Bass 1987:83, Figure 46) can be easily tested by placing a ruler vertically on the mandible, front teeth and anterior nasal spine where they should be in line and be touched by the ruler. This is true for skeletons from Burials 1, 3, 4, 7 and 9. A second simple test is to set the ruler horizontally across the nasal aperture: in Europeans the zygomatics are far behind the ruler's edge so that a finger can be inserted between the two. Again, this is true for skeletons from Burials 1, 3, 4, 7 and 9 which, therefore, would clearly qualify as Europeans. All individuals have sharp nasal sills with a rectangular angle into the nasal floor. None of the front teeth show a clear and strong shovel-shape, and none of the crania show an edge-to-edge bite that could be more typical of Native American ancestry. Following Bass (1987:89) eight cranial measures (maximum cranial length and breadth, bizygomatic diameter, brasion bregma height, cranial base length, basion-prosthion length, upper facial height, and nasal breadth [Table 1]) can be applied to four crania (Individual 1, Burials 4, 7, and 9) for discriminant function analyses. These statistical functions are designed to maximize the distances between different individual measures and result in one general probability measure or score which allows for the distinction of individuals in a multi-dimensional space. A "Negro" affinity would be indicated by a score of >89.27 for males and 92.2 for females. For Native American affinity, the score should be >22.28 for males and >130.1 for females. Individual 1 scores at 81.2 and 14.81, male Burial 4 scores 30.38 for the "White/Negro" and 16.85 for the "White/Native American" discriminant functions, male Burial 9 scores 45.87 and 13.51. All three males score well outside the Non-European limits. It can be safely stated that these individuals were recent immigrants from Europe. The female skull from Burial 7 scores at 80.2 and 7.75 and also shows clear European affinity. The

discriminant scores agree well with the first observations on the dental trait and the vertical and transversal facial traits support a European ancestry. In addition to these tests, the Fordisk 2.0 measurement battery was applied for the testing of affinities. Depending on the availability of measures and the previous determination of sex, either White or Amerindian test procedures were applied. All skulls (Individual 1, Burials 3, 4, 7, 8, and 9) were found to be "White". The results agree with the 1853 Census of the Canadas which lists neither "Coloured people" nor "Indians" for Peterborough.

#### *Body Height*

Body height or stature was calculated for "Whites" following the formulae by Trotter and Gleser (1952, 1958) for adult males and females since all other samples used here follow this procedure. Though such long bone-length stature is not exactly identical to a stature measured alive in an upright position, it still provides a useful comparative measure among skeletal samples and a useful biological indicator in a chronological-historical context. Table 2 shows long bone lengths, the height of the individual burials and the height calculated from the commingled, single bones. Table 6 compares our body heights with other skeletal samples from Ontario and abroad.

Judging from these data, the male Peterborough citizens (n=<13) were considerably taller than other people from these skeletal populations, whereas females (n=4) are roughly of same height. In three samples, small sample size might distort true statures, but Belleville (McKillop et al. 1989) should be more representative, with males being considerably shorter and females being nearly the same. It is interesting to

see how stature compared in England at about this time. The excellent data from the church at Spitalfields in London (deaths from 1729 to 1852) date in part earlier, but are fortunately, much larger in numbers. Here, males averaged 168.9 centimetres and females 157.7 centimetres (Molleson and Cox 1993:33; recalculated). The few Peterborough females did not deviate substantially from the Spitalfields sample, whereas our males seem to have been almost ten centimetres taller. In England, the difference between the two sexes amounts to 12 centimetres in that females stood at 93.4 percent of the height of their male counterparts. In Belleville, females average 93.2 percent of male heights; in Newmarket, females are 92.9 percent; and in Peterborough, females compared at 89.4%. The relative heights show that the Belleville, Newmarket and London skeletal populations were similarly proportioned, but among the Peterborough sample, the height difference between the sexes was much more extreme. At least two explanations could be given for this phenomenon. Very tall males were also observed by Cybulski (1988:69) for the soldiers found in the walls of Quebec who died about a century earlier. There, males averaged a height of 173.29 centimetres (n=30) with females at 155.77 centimetres (n=3) or 89.9% of males. Even taller were the American soldiers at the Snake Hill sample from Fort Erie, Ontario, who had an average height of 176.3 centimetres (Saunders 1991:195). One explanation, favoured here because of the small sample size, would be that the difference in male and female height is a product of accidental sampling due to unknown taphonomic factors. The other possibility is that this pattern reflects actual emigration patterns,

**Table 6.** *Body heights of Peterborough Armoury remains compared with other skeletal samples.*

	Males		Females	
	N	Mean Body Height (cm)	N	Mean Body Height (cm)
Peterborough Armoury	13	178.0	4	159.2
Harvie Family Burial Ground, fgfghfghf	5	170.8	4	161.0
Prospect Hill, Newmarket	17	173.4	11	161.17
St. Thomas', Belleville	120	172.1	87	160.3
Parc de L'Esplanade, Old Quebec City	30	173.3	3	155.8
Spitalfields, fgdfghdfg	182	168.9	180	157.7
Snake Hill, Fort Erie	25	176.3	—	—

whereby tall males may have been more likely to come to the new country. This explanation, however, is not strongly persuasive since the average stature of English males in 1998 increased only to 175.51 centimetres (Department of Trade and Industry [U.K.] 1998:2). In comparison, the latest (1972) all-Canadian data (Demirjian 1980:28) show males aged 20-59 years averaged 172.6 centimetres while females averaged 159.7 centimetres (92.5% of males). Whether or not the heights of the nineteenth century Peterborough sample are simply the result of a biased, small sample size and taphonomic or random factors, or if they truly represent the result of tall men emigrating to the "new" world, remains testable, provided that a larger skeletal sample becomes available.

#### *Skeletal Pathology*

The diseases of past populations are of great interest to both the historian and the bioarchaeologist, since they reveal medical techniques and knowledge, are of relevance to the question of cultural-environmental interactions and reflect overall living conditions. As usual, even in such a small and incomplete sample of skeletons and bones, pathologies can be observed for many of the deceased. No statistical comparisons are attempted because of the small numbers.

*Individual 1.* Assuming the right radius belongs to the upper skull identified as Individual 1, this male suffered a fracture of that bone, as indicated by a strong exostosis at its medial midsection and a dislocation. As well, both humeri showed considerable osteoarthritis at the heads. The very strong muscle markings at the deltoid tuberosity, though not pathological, are an indication of this male's strong upper arm musculature.

*Individual 2.* At the right mandibular condyle of what is possibly Individual 2, a fracture of the right coronal process and signs of osteoarthritis were observed. On a fragment of a thoracic vertebra (possibly belonging to Individual 1), clear signs of osteoarthritis and eburnitis were visible; the same pattern was observed at the atlanto-axial joint and the anterior articular facet. On the sternal end of the clavicular fragment, which is

possibly Individual 2 as well, arthritic changes were also present.

*Burial 2.* This male suffered extensively from osteoarthritis in his hands, with eburnitis in his left scaphoid, his left calcaneus, talus and cuneiforms 1-3. One left foot phalanx was severely deformed. The left distal pedal phalanges suffered from the effects of a severe crushing injury and resulted in severe osteoarthritic changes. On both feet, the second phalanges of the big toe were also affected by osteoarthritis. It is quite possible that his left foot was immobile to flexion and may well have been very painful over a long period of time. Arthritic changes in both hands would also have made work painful and cumbersome. This strongly built man showed bony exostoses on his left patella and both tibial tuberosities indicating that he possessed very strong leg muscles.

*Burial 3.* This middle-aged female suffered from two fractured left side middle ribs and some slight osteoarthritis in her cervical vertebrae, which were also abnormally thin. Both ulnar trochanteric notches showed minor signs of arthritis. The upper plate of both orbital roofs showed clear signs of cribra orbitalia, indicating a metabolic and/or nutritional deficiency, internal parasites, genetic predisposition or any combination thereof.

*Burial 4.* This individual was an old male who must have suffered very badly from several pathologies. Two fractures in two left ribs, and fractured nasal bones that were acutely bent to the left, must have occurred early in his life. The latter injury seemingly also affected his orbital margin. Strong osteophytosis was present at the lumbar and thoracic vertebral bodies and was moderate to slight in his cervical bodies. As a result, trunk mobility would have been either restricted and/or painful. In his right hip, ankylosis strongly linked his sacrum and iliac blade and effectively immobilized this articulation. The same process had started at his left sacroiliac joint, but was only marginal. Strong ossifications of the first ribs and manubrium sterni also affected his chest movements. Otherwise, the vertebral column does not show the telltale signs of ankylosing spondylitis (Bechterew or

Marie-Strumpell disease). However, life, work and mobility must have been painful and somewhat restricted for this old male.

*Burial 5.* This middle-aged male showed osteoarthritis at both distal femora and one lumbar vertebra.

*Burial 7.* Though her young age may have precluded her from some of the usual ravages of old age diseases, she was not free of the effects of physical stress. Signs of porotic hyperostosis and cribra orbitalia were present, though they were only minor. Clear indications of osteophytosis were visible on her lumbar (L3-5) vertebrae as were extensive Schmorl's nodes. A hole in her sacrum between the first and second segment was noted, but this trait is not really pathological. An asymmetrical nasal septum and superior nasal conchae may have contributed to breathing difficulties and infections. Of interest also are her strong humeral muscle development marks, which point to the hard work this young woman must have performed.

*Burial 8.* The degree and extent of this male's pathologies are unusual. He suffered from anemia as evidenced by cribra orbitalia. In his vertebral column, C3 to C5 were fused into a block that would have been totally immobile, while C5, C6, and C7 showed very strong osteophytosis. C6 and C7 were compressed considerably. T8 and T9 were fused. Strong osteophytosis was evident at all thoracic and lumbar vertebrae, and was particularly advanced at L1 and L2, leading to the destruction of the body of L5. Also, the costal articulations of T12 were arthritic. Thus, the complete vertebral column of this old man was severely altered by the combined forces of osteophytosis, arthritis and spondylosis. Osteoarthritis also affected the acromial and sternal ends of his clavicles. His left femur developed deep new bone formation with incipient arthritis. Several foot phalanges were flat and appeared almost to have dissolved, again as a consequence of osteoarthritic changes. This old male must have suffered very badly from the combined effects of general and extensive degenerative joint disease. His mobility and his ability to work would have been severely hindered.

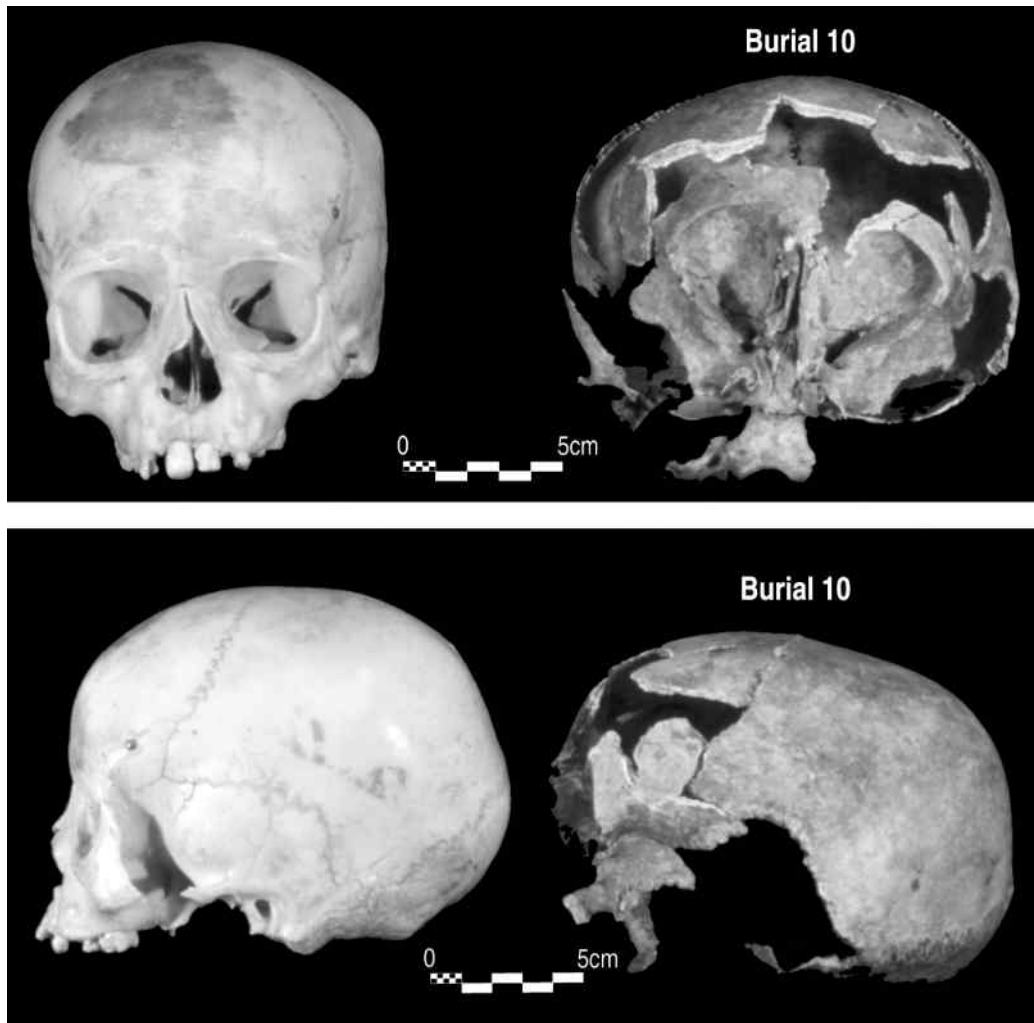
*Burial 9.* Though of much younger age than

Burial 8, this man also suffered from osteophytosis in his lumbar and thoracic vertebrae. In addition, arthritic alterations were observable in the heads and tubercles of several left and right ribs, in his left humerus and in both clavicular-acromial joints. The left orbital roof showed cribra orbitalia. This is the fourth individual with this condition, confirming the wide distribution of cribra orbitalia among early settlers.

*Burial 10.* This young child (Figure 5) was not very well preserved. His (?) skull could not be fully reassembled though most parts were present (Table 1). With a maximum breadth of 155 millimetres and an estimated length of well over 170 millimetres, this cranium was unusually and pathologically large. The overall size of the skull, in addition to the thinness of cranial bones (two millimetres at the bregma), may well point towards hydrocephalus. In addition to possessing a very large and flat base, the orbital roofs were shallow, extended and showed very strong digital impressions on the upper-inner roof. The best overall similarity between this cranium and any pathological condition would point towards Crouzon syndrome (craniofacial dysostosis), an autosomal-dominant trait with incomplete penetrance (Aufderheide and Rodriguez-Martin 1998:54-55). However, the sutures were still wide open and no crowding and malocclusion of teeth could be found as would be expected in this disease. Thus, the diagnosis of Crouzon syndrome is not fully supported by the evidence. Hydrocephalus, therefore, may be a preferable diagnosis.

Summarizing the results of the skeletal pathology analysis, and subtracting those individuals whose preservational status precluded detailed observations, the early settlers of Peterborough must have suffered very badly from a number of occupational diseases. Foremost was degenerative joint disease, which none of the older individuals escaped, coupled with other pathological states of the vertebral column such as osteophytosis. Disregarding the four to five year-old child, eight individuals were afflicted, often to a severe degree. Another prominent pathology was the very high frequency of cribra orbitalia caused, presumably, by metabolic-nutritional deficien-



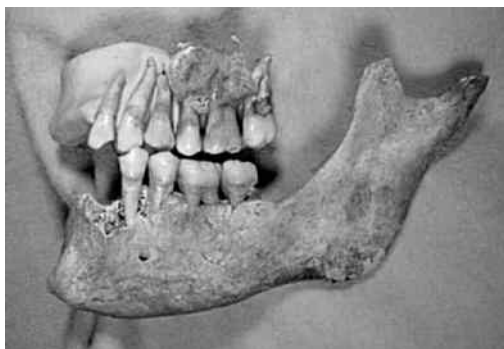


**Figure 5.** Frontal and lateral views of the skull of Burial 10 compared with those of a normal child, aged 6-7 years.

cies. Interestingly, Pfeiffer et al. (1989:43) observed three traces of porosity among 23 juveniles and two slight to moderate cases of cribra orbitalia in the Prospect Hill population from Newmarket. Since humans from Northern Europe do not usually harbor otherwise more common genetic anemias (Hb S, C, thalassemias), it is safe to assume that metabolic and nutritional deficiencies caused the porotic orbital roof condition (Stuart-MacAdam 1989). These must have been common among the early settlers. Fractures were observed within the Peterborough group, but only one individual was afflicted by an injury to a major long bone.

#### *Dental Pathology*

Teeth are especially important in bioarchaeological studies because “they...reflect age-at-death, diet health, disease and genetic affiliation” (Buikstra and Ubelaker 1994:47). Here, dental disease (and by extension: absence of dental/oral health) is discussed. In addition, cultural habits may be revealed, such as the probability that Individual 5, a male of 35-50 years of age, was a dedicated pipe-smoker (Figure 6). Pfeiffer et al. (1989:39) observed the same dental wear facets in a male (50A) from the Prospect Hill cemetery in Newmarket. In the interest of brevity dental health need not be detailed for each single skele-



**Figure 6.** Dentition of Burial 5 showing wear patterns indicative of habitual pipe-smoking.

ton. Rather, the general picture of dental caries, abscesses and loss of teeth is described.

Dental caries can be observed with considerable degrees of certainty even though dark spots could be caused by soil and root discoloration. Dental loss was ascertained when the crown was broken off, even though the roots or parts thereof were still present, because the functional role of such a tooth was lost and it would have been only a matter of time until the remaining root(s) would have been lost too. It is assumed that unless clear indications of congenitally missing third molars are visible, a permanent dentition consists of 32 teeth. Caries will be reported as to frequency (i.e., number of cavities) per individual, per tooth and per upper and lower jaw of permanent dentitions.

Out of the ten dental individuals (six full dentitions with upper and lower jaws, three mandibular and one maxillary individuals), nine individuals suffered from caries (90 percent). This agrees well with the Spitalfields data in which 87% of the individuals were found to have caries. The ten individuals could be expected to possess 254 teeth. Individual 8 had one supernumerary incisor. Of these, 132 teeth were completely present (52 percent); 51 teeth were missing postmortem (20 percent) and 71 teeth (28

percent) were lost antemortem. Out of the 132 complete teeth, 50 or 37.9 percent had at least one carious lesion (= total percent caries) and the total number of such lesions amounted to 53. The so-called DM (diseased-missing) index is calculated as the percentage of carious and teeth lost antemortem, divided by the total number of teeth observed and resorbed sockets. It equals  $(71+50): 121/254$  or 47.6 percent, though it must be stated that no filled teeth were observed, confirming that dental hygiene was sorely lacking. Individual 4 was edentulous in his maxilla, and only the commingled mandible of Individual 3 had no caries, thus nine out of ten adult individuals had a combination of decayed and missing teeth. More recent data from the Nutrition Canada Dental Report (1977) are not much different: 20 percent of males and 16.1 percent of females over the age of 19 years were edentulous in both arches and 98 percent of both sexes had one or more carious teeth.

Table 7 reports the incidences of dental pathologies in Peterborough and other, contemporary skeletal series from Ontario and England. Though mandibular pathologies are similar between the three Ontario towns, maxillary and thus, overall pathology frequencies differ. The Peterborough sample is considerably more heavily affected by caries and dental loss than the Newmarket, Belleville and Spitalfields samples. Judging from the Armoury sample, the average Peterborough resident had five carious teeth, but had lost seven teeth before death. This number is probably biased by the one edentulous maxilla (Burial 4) out of the ten individuals. In comparison, Saunders et al. (1997:73) observed 31 edentulous cases out of 276 adults from Belleville (11.2 percent). It is a fair conclusion that dental health must have been poor in the three Ontario towns. This is supported by the high incidence of abscesses in the Peterborough sample: four of the

**Table 7.** Dental pathology of the Peterborough remains compared other populations.

	Mandible		Maxilla		Sum	
	Lost	Caries	Lost	Caries	Lost	Caries
Peterborough	27/141 (19.1%)	25/90 (27.8%)	44/113 (38.9%)	25/42 (59.5%)	71/254 (27.9%)	50/132 (37.9%)
Prospect Hill	41/229 (17.9)	49/170 (28.8%)	52/240 (21.7%)	39/145 (26.9%)	93/469 (19.8%)	88/315 (27.9%)
St. Thomas'	792/3180 (22.9%)	647/2522 (25.7%)	773/3180 (24.3%)	787/2083 (37.8%)	1565/6635 (23.6%)	1434/4605 (31.1%)
Spitalfields	—/— (—)	—/— (—)	—/— (—)	—/— (—)	—/— (9.0%)	—/— (17.9%)

ten individuals suffered from a combined total of 21 abscesses. Six individuals showed calculus formation, of which only one was weak and the other five were heavy to very heavy. Periodontal disease was present in five of the nine adult dentitions (Burials 3, 4, 5, 8, and 9). Enamel hypoplasia was not observed, but this may be due to the often heavy attrition and/or loss of teeth.

Considering dental pathology, the early inhabitants of Peterborough were adversely affected, most likely by insufficient and cariogenic nutrition, poor medical-dental facilities and a lack of availability of dental care. Even the young females (Burials 3, 7) had very poor dental health. Among the older individuals, this picture worsened and in the case of the old male (Burial 4), no upper teeth were left. The dental status supports the conclusion drawn from the high frequency of cribra orbitalia, that nutritional-metabolic deficiencies were abundant, possibly owing to poor nutrition in the home country and possibly to scurvy (Ortner and Putschar 1981:442; Stuart-MacAdam 1989: 204). Similar conclusions were reached for the Harvie family skeletons (Saunders and Lazenby 1991) and for the Belleville remains (Saunders et al. 1997). Life in the new country was hard and poor; a person's health suffered or was neglected. Though the body heights of the two sexes were not stunted, both the skeleton and the teeth provide clear indications of the hardships these people endured.

### Artifacts and Economy

All artifacts, with the exception of the pan or utility bowl sherd, spikes, horseshoe branch, and the obviously intrusive twentieth century plastic ring are consistent with materials recovered from nineteenth century burial contexts elsewhere in southern Ontario. Presumably, the sherd and spikes relate to the period subsequent to the site's legitimate use as a place of interment because none of the defined burials is associated with artifacts of this type. By 1855, a house had been built on a portion of Lot 7, abutting the Burial Ground (Kidd 1978:10), and in 1865 a school house and shed were erected on part of Lot 6

within the confines of the former cemetery (Earle 1999:5; Poole 1867:118). It may be that refuse created by the occupiers of these, or other nearby structures was discarded in the old Burial Ground. Wrought spikes were used in construction to secure interior framing members or door and window frames until the late nineteenth century in this part of Ontario (Betty-Glen Rowe, personal communication 1990). The horseshoe appears to be a unique artifact insofar as the Ontario literature does not document similar specimens from nineteenth century burial contexts. Nonetheless, one might anticipate that as draught or riding animals, horses would have contributed extensively to nineteenth century burial practice. As the artifact is without good provenience it may equally well post-date use of the site as a cemetery.

Hand-wrought nails were used in construction as late as the 1850s in the Peterborough area (Jamieson 1996:98). The most common form from the site is the general purpose rose-head sharp-pointed nail (Wilson and Southwood 1976:44) of approximately 3 1/2 inches in length. Nails of this form and length were designed to secure planking (Wilson and Southwood 1976:42-43); they do not represent specially made "coffin nails". However, low nail counts suggest that several coffins were held together principally through joinery. Apart from the plain wire handle recovered from construction backdirt, the only other coffin embellishments were the coffin plaques from Burials 2 and 7. There were no hinges, no small tacks of the sort used to fasten cloth lining, nor larger tacks of the type used to mark out initials on coffin lids.

During the 1827-1854 period, it was the usual practice to prepare the body in the home and to have a very plain coffin made using utilitarian construction materials if, indeed, a coffin were used (Kogon and Mayer 1995:155). Soil stains and wood fragments recovered from undisturbed contexts indicate that burial in plain hexagonal "pinch toe" coffins was the norm for the section of the Peterborough burial grounds discussed in this article.

Around 1860 in southern Ontario, and consistent with a broader Western cultural pattern

which centered on the "beautification of death" (Little et al. 1992:411-414), coffins and caskets began to receive a greater degree of embellishment (e.g., Kogon and Mayer 1995:158-160; McKillop 1995:81; Pearce 1989:6; Woodley 1991:44, 1992:58). This initially took the form of coffin plaques, "metal plates, usually fastened to the coffin lid, which usually provide the name, and date of death" (Woodley 1992:47). Painted pressed metal plaques, such as the specimen from Burial 7, are the earliest form of decorative element (Kogon and Mayer 1995:158). For example, at the Stirrup Court Cemetery, London (Ontario), a stamped tin-plated iron plaque was found to date from 1855 (Woodley 1992:51-53). It is likely that both of the ferrous plaques from the Peterborough Burial Ground had been stamped and plated but they cannot be dated owing to their friable condition. Photographs taken at the time of excavation clearly show that Burial 7's plaque was rectangular in shape (Earle 1999:Plates 9, 10). The plaque from Burial 2 was too fragmentary, even at the time of excavation, to render a conclusion as to its probable original shape (Earle 1999:21). Woodley (1992:58-59) suggests that these types of relatively plain plaques were manufactured at least as early as 1850.

Shell or mother-of-pearl buttons became popular after about 1820 and, as an inexpensive fastener, continued so throughout the early part of that century (Kenyon et al. 1984:14). Although declining in popularity, shell buttons continued to be used through the late 1800s. The single example examined for this report is either from a gentleman's waistcoat or coat. The stamped metal brace button is also an inexpensive variety. Noel Hume (1970:90) dates this variety of brace button between 1837 and 1865. In contrast, Ferris (1984:5) notes that comparable buttons "are found throughout the nineteenth century". The buttons indicate that these two males were interred with clothing. It would be useful to determine whether or not the misplaced shell buttons came from male or female burials, or both, as this would illuminate burial practices, particularly as these might relate to the use of shrouds. There are no metal stains on the bones nor were any pins recovered that would confirm the use of shrouds.

The final artifact is a small brass "suspension" ring of the sort that might have been attached to a fine brass, hair or fibre pocket watch guard. It would have been an inexpensive alternative to a gold fitting. A similar item was recovered from a nineteenth century context at Lake Lodge, Niagara-on-the-Lake (Jamieson 1990:162).

The relative paucity of personal artifacts not only is consistent with the early nineteenth century Ontario burial pattern (e.g., Woodley 1991:47, 1992:51-56; McKillop 1995:87; Pearce 1989:6), it also is echoed elsewhere in North America (e.g., Little et al. 1992:402-403). What is notable about the Peterborough burials, though, is the consistently inexpensive nature of the items in question.

There is a small body of literature which provides detailed analyses of artifacts recovered from nineteenth century cemeteries in southern Ontario: Stirrup Court, London (Woodley 1992); Wise, Richmond Hill (Pearce 1989); Harvie, North Dumfries (Woodley 1991); St. Thomas, Belleville (McKillop 1995); and Wesleyan Methodist, Weston (Kogon and Mayer 1995). In addition, artifacts from Harmony Road in Oshawa and Prospect Hill in Newmarket, along with all of cemeteries noted above, were analyzed by Chris Dudar during the course of his doctoral studies at McMaster University. Unfortunately, Dudar's dissertation is not available either from McMaster or the National Library of Canada, so its contents are not incorporated into this analysis.

What is most striking is that these artifact analyses all point to considerable inter-cemetery variability during the same chronological span. This also is true of the Peterborough Burial Ground data. Inter-cemetery variability has been interpreted as a reflection of specific historical economic factors relating to the degree of access to manufactured coffin hardware at each locus of study (e.g., McKillop 1995:91; Woodley 1991:48, 1992:61). On the basis of specificity of cultural context, Woodley (1991:48, 1992:62) concludes that status only can be inferred through intra-cemetery cost analyses of contemporaneous coffin hardware.

Yet, as Little et al. (1992) and McKillop (1995)

point out, inter-cemetery variability also occurred within a general nineteenth century historical process which “beautified” death through increasing elaboration of death ritual (Canon 1989; Coffin 1976; Pike and Armstrong 1980). Because “beautification” was a cyclical process, we cannot automatically assume a direct correlation between cost and social status (Canon 1989). Connected to this trend was the rural cemetery movement, in which burial grounds began to be designed as parks for the living (Farrell 1980). This movement was expressed in Peterborough after 1850 when Little Lake Cemetery was developed as a treed setting which invited visitors to stroll through its grounds while abiding by certain rules of decorum (Little Lake Cemetery Company 1852). This cemetery was formally opened in July, 1851 (*Weekly Despatch* 5(32), July 31, 1851). Its information pamphlet appealed to certain aspects of sentiment surrounding death: “The grounds selected by the Company, while they are sufficiently remote from the Town to ensure security against those violations of the grave—which the rapid growth of our American Towns so frequently subject them to, are yet so near being within one mile of the market square—as to render them easy access” (Little Lake Cemetery Company 1852:3-4). The rural Wesleyan Methodist Cemetery, developed and opened in 1850 (Perry and Spurway 1967:139) and less elaborate in design, was yet another expression of this trend to “beautify” death.

### Conclusions

Peterborough was first established as Scott’s Plains in 1821, when Adam Scott developed a saw and grist mill operation, followed by a distillery (Heintzman 1967:187; Poole 1867:2). The number of inhabitants swelled in 1825 when Peter Robinson settled impoverished Irish emigrants in the area, a few of whom—as tradesmen or possessing other marketable skills—remained in Scott’s Plains (Bennett 1987:6, 18, 25; Poole 1867:2-12). According to Poole (1867:13), “In the Spring of 1825, the site of the Town was still in a state of nature”. It contained

frame and log buildings along with “rude huts or wigwams, composed of slabs, bark, or the branches of trees and sods” (Poole 1867:5,14-17). The total population was less than 500 (Poole 1867:97). Renamed Peterborough in 1827 in honour of Peter Robinson (Poole 1867:15), within a decade the village had grown to some 150 houses, two churches, two meeting houses and a population of around 900 (Poole 1867:12, 97). Various commodities could be had in local shops. For example, one could obtain, from A. Warke’s general store, a large “Assortment...of cloathing”, hardware, crockery, and groceries, including “Brandy, Gin, Spirits,...Shaving and Bar Soap” (*Cobourg Star* 1834:2, July 16). Nonetheless, the young Sandford Fleming was by no means impressed with the Peterborough he witnessed in 1845, a “rather poor little place, the stumps of trees still in the middle of the streets, wooden houses here and there, with a few good villas, with verandahs, in the suburbs.... some good shops and a large Court House.... A small steamer plies between Peterborough and Rice Lake” (Hall 1967:166). The Rice Lake steamship service was linked to Cobourg and Port Hope by a road often not passable owing to a combination of wet ground and frost damage (Corley 1967:209; Poole 1867:4). During these early years, Peterborough was “essentially a lumbering and milling town” (Whitehouse 1967:195), marginally connected to the outside world. Known for its taverns, the village was a rather rough and lawless sort of place throughout the early and middle nineteenth century: public events were routinely marked by drinking and fighting (Dobbin 1943:234, 236; Jones 1995:10). Cash was at a premium and the barter system flourished (Jones 1995:10; Mulholland 1967:270). Cash flow improved only after an act was passed in 1850 to establish freedom of banking (Mulholland 1967:272-273). Then, in 1852, rail service was opened between Peterborough, Cobourg, and Port Hope (Corley 1967:209). From the mid-century onwards, Peterborough truly started to prosper (Poole 1867:65). The village became incorporated as the Town of Peterborough in January, 1850, and the Town Council immediately embarked on a round of

urban renewal and development (Poole 1867:10) that included the preparation and opening of Little Lake Cemetery and the closing of the old Burial Ground. The *Census* of 1853 records 333 houses, 350 families, and a population of 2,191, largely of Irish, English, or Scots origin. By 1855, the population was 3,400 and in 1861 it was 3,841 (Poole 1867:14).

Although Peterborough had been well-served by medical doctors since 1825 (Scott 1967:283), dentists are not thought to have moved there until the mid-1860s (Craig 1967:263). It is not known whether itinerant dentists ever visited Peterborough (Craig 1967:263). Following the British tradition, dentistry of a crude sort was most likely done by the barber or the blacksmith (Webber 1969:122).

The Robinson immigrants brought yellow fever with them, and several died soon after their arrival in Scott's Plains and were buried in the cemetery that is the focus of this study (Dobbin 1943:231-232). The widespread cholera epidemic of 1832 killed 23 people in the village (Poole 1867:25), smallpox visited the area in 1839 (Moodie 1988:460-461), and an influx of British immigrants brought typhus to Peterborough in 1847, killing 33 individuals including Dr. Hutchison, one of the village's four medical doctors (Scott 1967:283-284). Those who died from these epidemics also were interred in the Burial Ground. There, in October 1847, Sandford Fleming "Planted a Weeping Willow over poor Dr. Hutchison's grave" (Hall 1967:167).

Given this specific historical context, access to manufactured coffin hardware would have been limited during much of the period that the Burial Ground was in use. Until the early 1850s, contact with larger centres was circumscribed by transport options and cash was in short supply. Indeed, only two of the coffins evince any decoration, and this in the form of simple plaques. These burials are inferred to date between ca. 1850 when plaques came into use and 1854 when the cemetery was closed. Such plaques, as coffin embellishment, are an early manifestation of the "beautification of death" ideology and not, perforce, a marker of status. By this time, the park-like Little Lake Cemetery and the rural

Wesleyan Methodist Cemetery had been developed as yet another expression of the Victorian "beautification of death".

Both the archaeological and historical data from Peterborough confirm that the ideology surrounding the "beautification of death" became generally accepted there by the mid-nineteenth century and uphold the broad cultural trend toward increased death ritual and sentiment as it is visible in southern Ontario's archaeological record (e.g., Kogon and Mayer 1995; McKillop 1995; Woodley 1991, 1992). It is possible, however, that within this general trend relatively more elaborate coffin decoration may have been used to support desired status (e.g., Little et al. 1992:412-415; Parker Pearson 1982) although these cannot be satisfactorily distinguished in the Peterborough artifactual remains alone owing to the fact that the sample is small, hence likely to be biased, and that the individual burials are undated. The sample size also precludes any meaningful discussion of gender or age differences in burial treatment.

However, there may be other ways to infer socioeconomic status from these burials. Evidence presented above clearly indicates that the health of the individuals studied here was poor. Adults exhibit severe signs of degenerative joint disease and some broken bones; a high incidence of periodontal disease, abscesses, caries, and dental calculus; and nutritional-metabolic deficiencies. Below we discuss adult Burials 2, 3, 4, 5, 7, 8, and 9. Burials 1 and 6 are too incomplete for us to draw meaningful conclusions and Burial 10 was that of a child for which we do not have good archaeological context.

Well-defined muscle attachments and joint disease indicate that both males and females engaged in long-term, sustained heavy labour (Ortner and Putschar 1981:419). While we acknowledge that nineteenth century Peterboroughians would have engaged in a greater degree of physical labour than their modern counterparts, those with higher social standing did not usually partake in long-term heavy labour. Rather, they are known to have hired help of various sorts (e.g., Moodie 1988:587, 597-598; Traill 1971:98-99). Therefore, we infer that Burials 2, 3, 4, 5, 7, 8, and 9 are people of the

working-class. Many of the burials also exhibit bone fractures, although it is not possible to determine whether or not the broken ribs suffered by the people represented by Burials 3 and 4, the crushed foot of Burial 2, or the broken lower arm of Individual 1 received medical treatment. However, as the broken nose of Burial 4 was left untreated, he may not have sought medical care for his ribs. Evidently, this man had been badly beaten in a fight when younger, either as part of the rough and tumble Peterborough social scene or elsewhere, and could not afford the cost of medical care. Again, this speaks to lower economic position, as medical care would have been available both sides of the Atlantic.

Diets high in carbohydrates (such as flour and sugar) typically result in high frequencies of caries which, if left untreated, can lead to abscesses (Ortner and Putschar 1981:439). Rations distributed by Peter Robinson indicate that a diet high in flour content can be equated with lower economic position, a diet high in sugar with higher economic position (Bennett 1987:7; Poole 1867:6). Presumably, as transportation routes to Peterborough were improved and as cash became more readily available, these patterns would have begun to break down after circa 1850. None of the teeth had been filled, either because professional dental care was not available or could not be afforded. Presumably not all those individuals represented here would have rejected dental care had they access to it. Periodontal disease has multiple causes, among these is an inflammatory response to calculus and nutritional-metabolic problems (Ortner and Putschar 1981:442). It too can lead to abscesses (Ortner and Putschar 1981:442). Dental calculus is found in six individuals, indicating poor oral hygiene. By the early nineteenth century, toothbrushes were available although not in general use as "few could afford to buy such luxuries" (Muir 1982:68). Furthermore, as there were various methods of cleaning teeth described in earlier writings by the British well-to-do and upper class (Muir 1982:68-70), we infer that dental calculus is most likely to be indicative of a lower economic status. Burials 3, 4, 5, 8, and 9 have periodontal disease.

The nutritional-metabolic deficiencies speak to poor diet, most likely during the period in which bones were developing. Burials 3, 7, 8, and 9 exhibited signs of poor nutrition and/or anemia. It also is unlikely that these individuals received adequate health care. This may be interpreted as yet another argument for reduced economic status as a child and young adult, insofar as lack of privilege is expressed through nutritional disease stress.

The few personal artifacts recovered from the burials are of the more inexpensive variety. As there were several general stores in the village from which one could purchase or barter for an array of personal goods, we infer that the cheaper varieties of buttons and brass ring from Burials 2, 8, and 5/9 are consistent with a lower socioeconomic status.

Finally, we comment on the fact that there were four very shallow burials (Burials 1, 3, 6, and 8), less than a metre below original grade as determined from soil profiles at the time of excavation. These may represent cold weather interments (e.g., Pearce 1989:13), individuals hastily buried during one of the epidemics addressed above, or even clandestine burials made after the Burial Ground was formally closed in 1854. We know that Burial 1 cuts into the deeper shaft dug for Burial 2, which it postdates (Earle 1999:15, 21). Shallow burials evidently were a recognized problem during the period that the Burial Ground was open, for a proposed amendment to by-law 71 (which ultimately passed without the amendment and prohibited burial within the town limits) recommended that interment continue to be permitted in the Burial Ground "provided always that any such grave....shall not be less than eight feet deep" (Town of Peterborough Council Minutes, April 17, 1854). For this reason, we do not favour the interpretation that these were illegal burials.

In summary, we concur with Canon (1989) that a good understanding of historical process is essential to the interpretation of burial data. However, we disagree with Canon's (1989) inference that the cyclical process which involves the rise and fall of the nineteenth century ideal of the "beautification of death" provides adequate historical context for interpretation of our archaeo-

logical and osteological data. Rather, as *Annales* archaeologists argue, there are different temporal and spatial scales to change that operate simultaneously and must be given their due consideration (e.g., Bintliff 1991; Hodder 1987; Knapp 1992). Among other things, this means that cultural content must also be sought in specific historical contexts as they play out against the larger backdrop of widespread ideology. Without an awareness of both historical process and context, we would not have been able to conclude that the remains from Peterborough's first Burial Ground analyzed here most likely represent working-class people who adopted a particular ideology surrounding burial practice.

*Acknowledgments.* Our thanks go out to many individuals who made this analysis possible: Mr. M. Jaeger and Mr. V. Haggerty from Defense Construction Canada, Canadian Armed Forces made the human remains available for study. Students T. Bell, K. Dougherty, L. Foster, T. Mayer, J. Reid, A. Ritchie, L. Shantz and L. Wilson worked with great diligence and enthusiasm on the cleaning and reassembling of the remains. Graduate students S. Gibbs and K. McDonald and Dr. D. Norman added their considerable expertise to the analysis. Our colleagues Dr. E. Jones (Department of History, Trent University), Dr. B. Dodge (Trent University Archives), Mr. J. Leonard (City of Peterborough Archives), Ms. K. Reid (Peterborough Centennial Museum), and Dr. M. Kidd (Peterborough Historical Society) provided much needed information on the history of the town. Special thanks are due to the Trent University Committee on Aid to Research in the Sciences, which supported this project financially. Last, but not least, we thank our colleagues who made their own research available to us: Dr. S. Saunders (McMaster University) kindly provided her Belleville body height data, while Drs. A. Herring (McMaster University), R. Lazenby (University of Northern British Columbia) J. Mayhall (Faculty of Dentistry, University of Toronto), and S. Pfeiffer (University of Toronto)

provided much valuable help. Special thanks go to Mr. C. Junker-Andersen (Ministry of Culture) who secured an extended loan of the skeletal sample and to Mr. H. Daechsel (Heritage Quest Inc.) who provided a copy of the original site report and excavation drawings. Both the report and drawings, one of which is duplicated here as our Figure 3, were prepared by Mr. J. Earle.

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