THE ARCHAEOLOGICAL EXPERIENCE AT ST LUKE'S CHURCH, OLD STREET, ISLINGTON

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Summary

Oxford Archaeology (formerly the Oxford Archaeological Unit) undertook an archaeological recording action at the Grade I listed St Luke's Church, Islington between July and December 2000 on behalf of ABL Cultural Consulting Limited. Oxford Archaeology was in attendance on Necropolis for the duration of the work. The work took place in advance of construction and refurbishment works in order to provide new educational and rehearsal facilities for the London Symphony Orchestra. The work comprised recording of funerary architecture, and the crypt structure along with exhumation of all burials in the northern and southern churchyards as well as clearance of all the burials in the crypt. A total of 1053 burials have been recorded and removed.

Osteological analysis on all the skeletal material was largely undertaken on site and completed in Oxford. The skeletal sample of 896 was divided into high and low resolution samples. The high resolution sample comprised 241 named individuals who were osteologically recorded in full. The remainder were unnamed individuals; for this group basic demographic information was recovered, stature was calculated where possible, a detailed dental record was compiled and pathology recorded where seen. Dental samples were recovered from the named individuals with the aim of refining microscopic ageing techniques.

A total of 712 coffins were recorded and removed for reburial. These comprised lead, wood, zinc and iron. A variety of coffin fittings have also been identified and recorded.

Acknowledgements

The project was managed by Angela Boyle who was also responsible for the project design. David Score ran the work in the field. Janet Millar of WS Atkins was the archaeological consultant and Professor Margaret Cox was the academic advisor. The exhumation company was Necropolis and we would particularly like to thank Peter Mitchell, Tony McHale, Karen McHale and Roy Lander for their hard work and co-operation under what were often difficult circumstances. Osteological recording was carried out by Julie Roberts, Annsofie Witkin and Angela Boyle. Melanie Richmond recorded the coffin fittings. Much of the day to day site work was carried out by Andrew Norton, Darko Maricevic and Dan Sykes. Illustrations were produced by Ros Smith, Georgina Slater and Laura Kirby.

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CHAPTER ONE INTRODUCTION

by Angela Boyle

Location and topography

St Luke's Church, Old Street (NGR TQ 32320 82423), is a Grade 1 listed 18th-century church which at the commencement of the Enabling Works was a disused, roofless structure. The walls of the nave, vestry and tower, which is attributed to Hawksmoor, survive (Plate 1.1). Beneath the church there is a crypt, with a number of vaults or bays containing coffined human remains. The church lies within its churchyard, set back from the busy east-west running Old Street, within the London Borough of Islington, in the parish of St Giles without Cripplegate. It is bounded by Helmet Row to the west, Ironmonger Row to the east, Old Street to the south and Mitchell Street to the north (Figure 1.1). The site lies on the Third Terrace above the river Thames. Where it has not been quarried away, the underlying natural substrate is brickearth, overlying Thames terrace gravels. The site is flat and the present-day ground level is *c* 20.5 m OD.

Archaeological and historical background

The church is located at the extreme north-west limit of the `Moorfields Marsh' which is known to have been landfilled in the early post-medieval period. Accounts made at the time of the construction of the church mention marshy conditions (MoLAS 1996, 20). St Luke's was constructed as part of the Commission for Fifty New Churches, which was set up in 1711; at this time the parish of St Giles Cripplegate was reported to have 4600 houses. The church was consecrated in 1733. Repairs to the structure of the church were undertaken in 1734, 1869, 1877, 1914 and 1951. The building has been prone to subsidence and cracks were visible in the north and south walls prior to commencement of the work. The church was built over a semi-subterranean crypt, constructed of brick as an integral part of the church structure. Although it was initially prohibited from use for burials the Vestry minutes first list fees for burial in the crypt in 1740 (see Chapter 2 below). There were known to be both earthen and

vaulted graves within the churchyard which had been landscaped. No headstones survived *in situ* but a small number of chest tombs remained. The chest tombs, railings and gate are listed Grade 2.

An archaeological watching brief was undertaken by MoLAS on five test pits excavated against the exterior walls of St Luke's in order to assess the composition and state of repair of the foundations to the church and the material in which they were constructed. It was not clear from the test pits whether the foundations to the church were constructed in a trench or whether the surrounding material was dumped later. No archaeological levels demonstrably earlier than the church were revealed. This investigation suggested that there were likely to be few inhumations in the immediate vicinity of the church. Inhumations were encountered in test pits 1 and 2, those in the former at a depth of only 0.8 m. Burial vaults were identified in test pits 2 and 3. In the northern churchyard burials were found to be at least 1.5 m beyond the north wall and 0.90 m from south wall in the south churchyard during OA investigations.

A desk-based assessment produced by MoLAS (1996) details all existing documentary sources. This was followed by an assessment of the archaeological potential of the site, particularly in relation to the study of post-medieval human remains, and the development of recommendations for archaeological mitigation (Cox 1997; 1998). A conservation plan for the site and building was prepared by Purcell, Millar and Tritton.

Palaeolithic and Mesolithic remains (450,000-4,000 BC) are found within the natural deposits of the area. The London region is an important area for finds of Palaeolithic implements which elsewhere in northern Europe have been removed by the action of successive Ice Ages. The distribution of such finds is more or less random and the chances of their occurrence on individual sites is very low; however, two Lower (earlier) Paleolithic flint hand axes have been recovered from within 400 m of the site.

Remains are rarely encountered in central London for the settled periods of prehistory (4,000 BC-AD 50); however a socketed wrought iron spearhead, considered to be Iron Age (700 BC-AD 50) was found at Golden Lane (*c* 200 m from the site).

The Roman city of Londinium was founded soon after the conquest of lowland Britain, *c* AD 50 and the area of the site is thereafter part of the hinterland of the largest and most complex urban settlement in Britain.

A large fort occupied the area of the city closest to the site in Roman times. It has been assumed to have been founded as a response to the sacking of the city in the native revolt of AD 60 and the recent identification of a tile of the British Fleet (Classis Britannia, inscribed CLBR), from excavations at 34 Noble Street, may indicate a continued military presence into the 3rd century but this by no means conclusive.

It has been suggested by Grimes (1968) that present day Old Street is a Roman road, part of an east-west communications line of which the existing road is only a small part. On the early maps Old Street does not appear as a continuous feature, but in spite of breaks in the Bethnal Green area it appears that to the east it made for the crossing of the river Lea at Old Ford. To the west the course of the road has various possible courses. Its present course in Clerkenwell and Farringdon is apparently quite a recent development. One 17th-century version by way of Long Acre, Kingsgate (the equivalent of the northern part of modern Kingsway), and Theobalds Road was used by King James I to by-pass the City on his way to his country seat at Theobalds, near Cheshunt. Another version of it appears to have joined Watling Street (modern day Oxford Street) to the north-west of St Giles-in-the-Fields.

The link with the Roman road has led to the identification of Old Street itself as a Roman road, though the fact that it ignores the city and may therefore have been in existence before the Roman occupation has been noted by Margary (1967). Old Street is often regarded as a branch of Oxford Street, on the assumption that together they may have formed a prehistoric route which was taken over by the Romans and developed a more southerly branch along the line of Holborn with the foundation of London.

Grimes suggested that Old Street may have had a more important purpose in that it may have formed part of a link, located on the 50 ft gravel terrace between two important river crossings, at Old Ford and Putney.

Rodwell (1975), while trying to define the limits of London's town zone, suggested that the northern boundary was the early road from Colchester to Silchester, believed to underlie Old Street.

Gravelled surfaces with stratified Roman coins were revealed in Victorian sewer excavations in Old Street during 1867. A vase and bronze armlets were found *c* 290 m and 340 m east of the site in 1912 and they may have been roadside grave goods. A coin of Nero was recovered in 1941. At Whitecross street, *c* 250 m to the south, a coin and gaming pieces were found and a residual sherd of samian pottery was found in a secondary (post-Roman) deposit on the Whitbread Brewery site (WTC76). These finds are scattered and would not have led to the build up of a stratified sequence of deposits as often occurs within the city walls.

Archaeological discoveries in the vicinity of the site

A series of test pits were observed at 76-78 Old Street (OLD89) which showed post-medieval dumping and medieval stratigraphy overlying brickearth. The majority of the pits were too shallow to reveal the full extent and nature of archaeological survival on the site.

During excavation at 125 Golden Lane (GOL90) a block of dressed sandstone, pottery provisionally dated to the Tudor period and a post-medieval yellow glazed tile were found along with layers containing small greensand fragments.

Extensive areas of 17th-century brick quarrying were exposed during an archaeological evaluation at 198-208 Old Street. Large landfill deposits were found which included remains of industrial processes as well as domestic rubbish and building rubble. These deposits had been cut through by 18th-century features, including several walls and a well containing several whole wine bottles, porcelain and eastern influenced European tin glazed ware. These may be the remains of St Luke's workhouse. Structures of 19th-century date were also recorded.

At 122-128 Old Street (OLS94) an archaeological deposit was found along the east side of the site. It was interpreted as probable late 17th-century dumping, carried out as part of a large landfill event.

The probable boundary walls (BAH96) for the cemetery of St Luke's poor ground, known as the Pest House Ground, were recorded in an attempt to define the limits of the cemetery. A large quantity of disarticulated human bone was observed, probably from a charnel pit and articulated remains were seen in the trench sections.

Project background

The St Luke's project involved the refurbishment of the Grade I church to provide rehearsal and educational facilities for the London Symphony Orchestra. Partial funding had been obtained from the Heritage Lottery Fund. The refurbishment work included the underpinning of the external walls, the provision of a new roof, conservation of the structure and the clearance of the crypt and part of the churchyard to accommodate the construction of additional space at basement level. It was predicted that the work would impact on the archaeological resource in three ways:

- Human remains needed to be removed from the crypt and graveyard
- Construction work in the graveyard and crypt was likely to disturb potential archaeological layers beneath the lowest burial levels
- The works would require disturbance to and the removal of some elements of the building structure, including the crypt.

As a result of the potential impact on the archaeological resource it became part of the planning condition that the Enabling Works must be archaeologically monitored. A Brief was produced by WS Atkins Heritage Consultants on behalf of St Luke's Centre Management Company and the job was put out to tender. Oxford Archaeology produced a Project Design in response to the Brief and was awarded the contract. The archaeological recording action took place between July and December 2000. OA were in attendance on Necropolis. Osteological recording continued at OA until February 2001 after which the remains were re-interred.

Academic objectives

Project Aims

The main aim of this archaeological recording action was to record and interpret as much detail as possible within the parameters of a relatively rapid exhumation and reinterment exercise. It was believed that the archaeological data collected would contribute to the history and development of funeral trends and the demography of the population of the crypt and that part of the graveyard being disturbed. In addition, it

was anticipated that any data relating to taphonomy would be collected with a view to informing mitigation on future projects.

Specific objectives of the archaeological work included the recording of the preservation conditions within the crypt and churchyard, the inscriptions on coffin plates, and recording of the human remains and limited sampling of human skeletal remains with biographical data. The aims are detailed in chapter 6 where consideration is given to the degree to which they were achieved.

Archaeological methodology

Fieldwork Methodology

All overburden and grave fills in the churchyard were removed to the uppermost levels of articulated remains (ie not including disturbed charnel) by the Enabling Contractor (Necropolis) under supervision of the Archaeological Contractor (OA). Where machining was not possible the Enabling Contractor was responsible for the hand-removal of the spoil and initial grave overburden. The Enabling Contractor was responsible for the removal of disarticulated remains from this spoil prior to its disposal. Removal of spoil within the crypt was also the responsibility of the Enabling Contractor.

A 10 m site grid covering the area of investigation was established. Within the churchyard a 5 m grid was deemed most appropriate. A temporary bench mark related to Ordnance Datum was created.

Excavation by Necropolis employed a grid system. Thus the churchyard was excavated in a series of 2 m^2 trenches, the spoil from each being used to infill the previous grid square, after it had been cleared of all charnel. As burials were revealed they were archaeologically recorded and removed.

Recording system

A single context recording system was not thought to be appropriate in this circumstance. Therefore, the focus of recording became the skeleton. Each interment was assigned a unique number from a continuous running sequence. The same number was assigned to the coffin and any associated fittings. This system had previously been applied successfully during the archaeological watching brief at St Bartholomew's, Penn, Wolverhampton which was carried out by OA in attendance

upon Necropolis (Boyle 2004). During this project 400 post-medieval burials were removed over an eight-week period.

All other contexts, ie vaults, brick-shaft graves and soil layers within the graveyard were assigned an individual context number. Preservation and completeness of skeletons was recorded *in situ* prior to osteological analysis on a scale of 1-4. Specialised recording forms were available for the recording of both coffins and skeletons. Charnel and disarticulated remains were not recorded although they were carefully cleared from all spoil prior to its disposal by the Enabling Contractor. Written descriptions were recorded on proforma sheets comprising factual data and interpretative elements.

Plans

Measured plans of the churchyard and the crypt were produced at a scale of 1:50 and all burials were located on these. Individual skeletons and coffins were not planned; provision was made for photographic recording as deemed appropriate. A register of plans was kept.

Sampling strategies

Soil samples for pedological analysis were taken during works within the churchyard in order to characterise the nature of the burial environment.

Coffins and coffin fittings

Wooden and lead coffins and any associated fittings, including nails, were recorded on the coffin recording sheet. All surviving coffin fittings were recorded in detail by reference to the published corpus of material from Christ Church, Spitalfields (Reeve and Adams 1993) as well as the unpublished catalogue of material from St Nicholas, Sevenoaks (Boyle 1995) and St Bartholomew's, Penn (Boyle 2004). Where individual types could not be paralleled they were drawn or photographed as appropriate. Condition of coffins and their associated fittings was recorded on a scale of 1-4. In addition there are detailed coffin recording sheets with supporting illustrative and photographic records.

Photographic policy

A black and white and colour (35 mm transparency) photographic record was maintained. The photographic record also included working shots to illustrate more generally the nature of the archaeological work. A colour slide lecture set has been compiled. A photographic record of the chest tombs was made prior to their removal (see Chapter 3). Photographs were recorded on OA Photographic Record Sheets.

Large and medium format photography was carried out by The Downland Partnership. They have been supplied to OA as high resolution TIF images on CD-ROM.

Osteological methodology

Low-resolution recording

Skeletons which could not be identified were subjected to low-resolution recording. This includes a skeletal and dental inventory, age and sex assessments, gross pathological observations, and basic metrical recording for use in the determination of stature and sex. The aim was to provide enough information to reconstruct the demography of the skeletal assemblage.

High-resolution recording

Named individuals and those of intrinsic osteological interest were recorded in more detail. The latter can be defined as those with unusual pathology, evidence of surgical or dental intervention and exceptionally good preservation. This level of recording entailed the addition of detailed descriptions of pathology and differential diagnosis, additional metrical recording, and a study of non-metric traits.

Health and safety

At the time of the archaeological works the London Diocesan Fund held the freehold for St Luke's Church and the surrounding burial ground. As the church was then redundant, the exhumations did not require a Faculty. Rather, section 65 of the Pastoral Measure applied. For reasons of decency and dignity, the Church Diocesan Fund stipulated that sealed coffins should not be opened and that such coffins should be sleeved on site and removed for reburial. This stipulation was complied with at all times.

Home Office directions are required for the removal of buried human remains. A Home Office order was granted for the exhumations at St Luke's Church. The Home Office order relating to the exhumation works (dated 21 January 1999) stipulated that the removal shall be subject to agreement with the Chief Environmental Scientist for the London Borough of Islington.

OA had to demonstrate that that they had planned a safe working practice by providing the Planning Supervisor and Principal Contractor with a Risk Assessment

and developed Health and Safety plan of all work to be done by the archaeological team, a current Health and Safety policy and the detailed specification for the archaeological watching brief.

The Health and Safety at Work Act 1974, under which the Personal Protective Equipment at Work Regulations are made, was complied with at all times by OA.

Funerary archaeology presents a specific and complex range of hazards. The risk of anyone contracting smallpox is remote but the potential threat to the population at large is such that it must be taken seriously. All staff wore protective clothing at all times.

Where wood coffins were used there may be an increased risk of infection due to occasional good preservation of bodies and other materials. The highest risk category is that of the sealed lead coffins. If any soft tissue remained the hazard presented was treated as potentially severe and suitable protective systems were used. It is not only the human remains themselves that present a risk but also the coffin linings and pads, and the result of the body's decomposition, a viscous black liquid. The greatest potential risk presented by this activity is that of contracting anthrax or smallpox. The risk for the archaeologist associated with working with the remains of a recorded anthrax death are thought to be small. A higher risk is gained from the well-preserved horse hair or woollen materials used in the coffin pads, pillows and packing. Minimum precautions are to wear the correct level of protective equipment. Shower facilities were provided by Necropolis.

There is a possibility of increased lead levels in blood due to the concentration of lead in the atmosphere. Constant monitoring of the health of the workforce was required for the duration of the work. A slight increase which was still within acceptable limits, was observed in all staff.

Strict adherence to the site Health and Safety policy produced by Necropolis was observed at all times. Personal protective clothing worn on site was not be worn outside the compound area. Mess, sanitary and washing facilities were provided by Necropolis.

All work was carried out to the requirements of *Health and Safety at Work, etc. Act 1974*, *The Management of Health and Safety Regulations 1992,* the OA Health and Safety Policy, any main contractors requirements and all other relevant H and S regulations.

Coffin liquor, disposable paper suits and respiratory protection equipment are all classified as clinical waste and must be collected and incinerated by approved contractors. Lead can be stored and recycled. Rotting wood from coffins can be disposed of by agreement with the local waste regulation authority. The disposal of decontaminating fluids into sewers requires approval and possibly a license. All of the above was the responsibility of Necropolis.

Lead coffins can weigh up to one third of a ton. Their removal was undertaken by Necropolis.

Structure of the report

Chapter 2 is a consideration of the documentary sources relating to the church itself such as Vestry Minutes and Faculties as well as parish registers (birth, marriage and death). It is not an exhaustive account. Chapter 3 describes the archaeology of the church and the graveyard while Chapter 4 looks in detail at coffins and their fittings; Chapter 5 considers the skeletal assemblage. Finally, Chapter 6 presents some overall conclusions about the data and evaluates the success of the particular methodological approach applied at St Luke's, particularly in relation to the reburial debate. Appendix 1 is a detailed catalogue of all the skeletons, coffins, fittings and vaults that were excavated and recorded.

CHAPTER 2:THE DOCUMENTED HISTORY OF THE PARISH AND THE BURIAL GROUND

by Angela Boyle

Archaeological and historical background

There are no historical records or archaeological finds which throw light on the area in the early medieval period. Finsbury was a manor in later medieval times and has been given a Saxon origin by some scholars (the *burh*, or fortified residence, of the family, *Finnes*); however, it is likely that it was a later medieval creation by sub-division. There is certainly no extant early charter, and its name may be derived from fen, describing the local topography of the Moorfield to the south-east. To the south-west of the site lay a signal tower called the Barbican, and later a house built on the spot is called Base Court. It is likely that this is a Saxon foundation that is cognate with Bassishaw (*Basingahaga*) a parish, ward and probable Saxon estate in the same fashion as the parish of St Mary Staining has its origin in the estate of the manor of Staines (*Staingahaga*).

When the Domesday Book was compiled the nearest manor mentioned was that of Hoxton and at that time this manor, together with Islington, the liberty of Bishopsgate and the Manor of Stepney belonged to the Canons of St Paul's Cathedral. The later manor of Finsbury was also part of their estate. The large area they controlled (most of the modern boroughs of Tower Hamlets, Hackney and large parts of Islington) reflecting the political necessity for areas near the city to be in the hands of Norman placemen: the bishop and other Diocesan appointments.

The area around the city was largely taken up with varieties of market gardening or dairy pasture. A later medieval tenement in Golden Lane had the name of *Le Mykelvine* (the Much Vine). The area of the ridge, to the east of the site, became built up as a suburb of the city. Whitecross Street is first recorded as *Everardes Wellestrata* in 1253, although then it may only have run as far north as Chiswell Street. It is recorded as *Wytecroychstrate* in 1285. The Abbot of Ramsey maintained an Inn, or large townhouse, on the corner of Whitecross Street and Beech Street. To the east of the site lay the three open fields of Finsbury manor (Mallow, Finsbury and Bunhill).

By the 15th century the land was owned by the Knights of St John. This can be seen from a transcript of St John Cartulary, the original document held at the Museum of the Order of St John of Jerusalem, Clerkenwell (Baildon Translation of Cotton MS Nero VI).

- *The Prior's charter of a vacant parcel of land in Old Street.*

Indenture by which Brother Walter Grendon, Prior of the Hospital, lets to farm to William Russell, citizen and fishmonger of London, a vacant parcel of land lying in Old Street, Co Middlesex, in breadth between the land of the said prebend on the north and the highway on the south; from Christmas next for 60 years at a rent of 3s 4d with power of distress, and of re-entry if no sufficient distress can be found. Dated at Clerkenwell (Date not filled in, Grendon was Prior 1400-1416).

- *The Hospital charter of seven gardens and two cottages built in Old Street.*

Indenture by which Prior Robert Mallory lets to farm to John Grene seven gardens lying together with two cottages built upon them, between the lane leading to Wallokkesberne on the east, the high street called Old Street on the south, the highway leading to Islington on the west, and land of Thomas Frowyke on the north and east, with the issues and profits of the courtyard to the same gardens and cottages belonging; for 4-score years from the Nativity of St John the Baptist last (1439) at a rent of 33s 4d. The tenants to keep the premises in repair, as to the fences, hedges, ditches etc and to discharge all burdens and services due thereon; with power of distress, and of re-entry if rent is in arrears for 3 months or the premise in disrepair. Given at our house of Clerkenwell at the celebration of our Chapter there, Tuesday 30 June 17 Henry VI.

There is a reference for the site in the Greater London Sites and Monuments Record as being the possible location of a medieval manor house, recorded as St Luke's Manor House. There is no other reference to this and it must be considered suspect, as most of the land in the area was owned by the Knights of St John, while the parish name of St Luke's only appears after the foundation of the church in 1711. The reference may originally have been derived from Aga's map of 1560 which shows buildings on the site.

In Tudor times the area around the site was still largely open and most likely used for horticultural purposes. The Drapers company built almshouses north of Beech Street and Richard Gallard founded some on Golden Lane, which continued a medieval tradition of almshouses and hospitals on the city fringes that continued well into the post-medieval period. Stow in his Survey of London, first published in 1598, describes Old Street thus:

'...the way stretcheth up towards Isledon and on the right hand, or East side, at a Red Crosse turneth into Ealdstreete, so called, for that it was the old highway from Aldersgate Streete for the Northeast parts of England before Bishopsgate was builded, which street runneth East to a Smithes Forge, sometimes a Crosse before Shoreditch Church, from whence the passengers and Carriages were to turne North to Kings land, Tottenham, Waltham, Ware, &c.'

The most obvious archaeological deposit associated with the beginning of the post-medieval period is a large landfill dump to the north of the City. Often referred to as the filling of the Moorfields marsh it is clear now that it far exceeded the boundaries of the marsh itself. The deposits were formed mostly of a mixture of nightsoil[1] and demolition debris and at Whitbread's brewery were 0.03 m thick. Under waterlogged conditions sometimes leather waste is also recovered and occasionally important industrial material is found. At Old Broad Street crucible fragments were recovered from Mansell's monopoly *Cristallo* glassworks; a factory which employed a free, international workforce, drawing on the most advance glassmaking techniques of the Muranesi glasshouses and decorative skills from the Netherlands.

In part this deposit represents a growth in the productive resources of the city as it often fills brickearth quarries used to rebuild London in brick; quarries which are not always recognized by the archaeological record as their sides often exceed the areas examined by archaeologists. Also the increased use of coal as a fuel meant that nightsoil was less useful as an agricultural fertiliser. The increase of the City's population at this time, as guild restrictions eased and the closure of the monasteries gave space to expand, may have overburdened traditional means of disposal.

[1] Excrementitious matter taken from cesspools etc at night.

The Commission for Fifty Churches

St Luke's was constructed as part of the Commission for Fifty New Churches, which was set up in 1711, to alleviate the lack of places of worship caused by the Great Fire and exacerbated by rapid population growth at the time. The committee calculated that an additional 72 churches were required, although this was rounded down to 50 only 12 of which were actually built. Other well known examples include Christ Church, Spitalfields (begun 1723) (Reeve and Adams 1993, 3), St Anne Limehouse (1712), St George-in-the-East (begun 1715) and St George, Bloomsbury (begun 1716).

In response to the growing needs of that part of the town, St Luke's was taken out of the parish of St Giles Cripplegate. In 1711 St Giles Cripplegate was reported to have 4600 houses. The area which was used to form the parish of St Luke's was known as The Lordship. The parish of St Luke's is shown in Figure 2.1.

The land upon which the church was built was purchased from the Ironmongers' Company for the sum of £900, although it is clear from the minute books of the Commission that the construction process was a lengthy one.

The building of the church

The architect of the church is traditionally disputed; the body of the church may have been built by John James, while the west tower, spire and flanking staircase are attributed to Nicholas Hawksmoor. The design has often been wrongly attributed to George Dance the Elder, a member of the Vestry who was buried there in 1768. His children commemorated him with a black marble slab 20 years after his death which has since gone.

The church was consecrated on the festival of St Luke, 1733, by Dr Hare, Dean of St Paul's and Bishop of Chichester.

The Minute Books of the Commissions for Fifty New Churches (1711-27)

Minutes of the Commissioners

5th December 1711

Mr Williams offered a site for a church etc called the Mermaid Brewhouse in White Cross Street in St Giles Cripplegate at £550.

Minutes of the Building Committee

24th September 1712

Skeat delivered Ironmongers' Company's proposal for church near Old Street, Cripplegate.

Mr Wren and Mr Marlowe desired to view sites belonging to…Ironmongers' Company in St Giles Cripplegate and report.

30th March 1713

Agree to Ironmongers' Company proposal of 23rd March for site in St Giles Cripplegate, providing Company consent to build street leading thereto from Old Street before 25th March next. Otherwise, agree to proposal of 24th September last.

Minutes of the Commissioners

10th August 1716

Agree to give Ironmongers' Company £900 for their site in St Giles Cripplegate parish.

25th July 1717

A debate arising upon the fifth article of the Ironmongers' Company's proposals, resolved that no houses should be nearer than 25ft to churchyard wall, and no buildings nearer than 10ft.

12th September 1717

James to bring designs of a church for the Ironmongers' Company site in St Giles Cripplegate parish by next meeting; masonry between the compartments of windows to be range work of rag stone; Surveyors (Hawksmoor and James) to call on masons employed in churches to give estimates for rag stone.

10th October 1717

James submitted design of church for Ironmongers' Company site, St Giles Cripplegate. The said plan approved, James to bring two estimates to next meeting; one built with ashlar, the other with rag stone.

28th November 1717

Notice to be given in Saturday's Gazette for bricklayers' proposals for new church in Old Street `with the best hard burnt bricks, free from sammel or 'under burnt bricks'.

23rd January 1717/18

Notice to be given in Gazette for receiving bricklayers and brickmakers' proposals for Old Street church this day fortnight.

13th February 1717/18

Surveyors reported on brickmakers proposals; referred to next meeting. Wilson, as most reasonable of the bricklayers' proposals, appointed for Old Street church.

20th February 1717/18

John and Thos. Waxham to make good, hard, well-burnt bricks for Old Street church.

27th February 1717/18

Notice to be given in Gazette for proposals for digging foundations of Old Street church by this day fortnight.

13th March 1717/18

Form of contact with workmen for Old Street church to be considered at next meeting.

19th February 1718/19

Petition of James Wilson about one of the houses to be demolished on Ironmongers Company site to be complied with.

12th March 1718/19

On Dr Bennet's request, Surveyors to give orders for clearing ground in order to begin work on church in Old Street. James to prepare a plan and estimate for building in brick.

25th March 1720

Surveyors to estimate charge of fencing site in Old Street; Skeat to consult Wilson about preventing soil being laid there in future. Hawksmoor reported that the ground in Cripplegate (Old Street) purchased of Ironmongers Company is large enough for erecting a tabernacle without obstructing building a church on another part of it when Board is enabled to do so.

17th April 1721

Agent submitted proposals for parts of ground in Old Street from Jas Wilson, bricklayer and John Wilson. Wilson to be allowed the ground upon which a church is intended to be built, to be cleared and given up at 3 months notice

3rd May 1721

John Wilson attending, the Board refused to let him the ground in Old Street upon which a church is intended to be built unless he consented not to raise it above present level, with which he would not comply.

20th March 1723/4

Solicitor to have fresh directions to prosecute any who lay dirt or rubbish on site purchased in Old Street.

15th May 1724

Bennet reported that, having acquainted vestry of St Giles Cripplegate that he had delivered to Commissioners the vestry's agreement to convey to them Bear and Ragged Staff Yard provided they would allow parishioners to bury in the ground in Old Street, and that Commissioners had answered that they were willing, as soon as conveyance was made to divide the parish and give parishioners of Old Street church district free leave to bury there, vestry unanimously acquiesced.

23rd June 1727

A plan for a new church to be erected in parish of St Olave, Southwark was laid before Board, and another plan of a church to be built in Old Street in parish of St Giles Cripplegate, both approved. Surveyors ordered to direct workmen to begin digging foundations without loss of time.

24th July 1727

Goff's proposals for smith's at Old Street church approved; Solicitor to prepare contract. Advertisement ordered for mason's proposals for Old Street church.

4th August 1727

Mason's proposals for Old Street church referred to Surveyors.

25th August 1727

Surveyors having examined mason's proposals for Old Street church, Thos Shepherd to be employed.

11th September 1727

Solicitor to prepare contract with Jas Wilson and Benj. Prosser, bricklayers for Old Street Church.

22nd September 1727

John Beven to be employed as watchman, Old Street church.

27th October 1727

Read petition from Wilson, now in prison, praying he may be permitted to go on with brickwork of Old Street church. Surveyors to learn what proposals he will offer about finding security for his performance.

10th November 1727

De la Motte, an assignee of estate of Jas Wilson, bricklayer, a bankrupt, declared on behalf of creditors that he had no objection to Commissioners discharging Wilson from his contract and agreeing with another.

Hawksmoor and James having some time ago complained to Wilson of his not setting about bricklayers work at Old Street church, and he promising to set about it and to bring good security to Board this day for performing the contract, or he would be content to waive it, and Wilson not having begun it, or brought any security, and being a bankrupt and prisoner in Ludgate for upwards of a year, Commissioners judged that he ought not to be employed at Old Street church.

Benj. Prosser and Wm Cooper, bricklayers, proposing to do the work on the terms in Wilson's contract, proposal accepted. Solicitor to prepare contract.

The church was consecrated on the festival of St Luke 1733 by Dr Hare, Dean of St Paul's and Bishop of Chichester, and seems to have started subsiding soon after completion. The first account of repairs dates from 1734, with further attempts in 1869, 1877, 1914 and 1951. The church suffered some war damage in the 1940s but it is though that the dry summer of 1956, combined with the effect of heavy bombing on nearby sites, caused more recent movement. In 1959 the roof was removed which not surprisingly, has had a disastrous effect on the rest of the structure. At the commencement of archaeological works the church was currently a 'ruin' with the subsidence evident on the north and east walls.

The following extract from *London Churches Ancient and Modern* by T. Francis Bumpus, (1908) describes the church prior to its virtual destruction:

Externally it is a plain substantial stone structure, devoid, however of a sanctuary, with a western tower, rising properly from the ground, and surmounted by a fluted obelisk of graceful outline. On either side of the tower are square erections roofed with lead domes and containing the staircases to the galleries.

Within, St Luke's is dignified and imposing, and divided into a nave and aisles by lofty colonnades of the Ionic Order. The roof over the nave is semi-circular, as are those of the aisles which are vaulted transversely, in as many compartments as there are arcades, from the tall Ionic columns to consoles in the walls. The stonework is

painted white, and the details of the columns, etc are picked out in gold with pleasing effect.

Rich stained glass - mostly by Messers Heaton and Butler - fills the double series of windows on either side, the same artists being responsible for the very beautiful paintings in the three square panels of the altarpiece which has been profusely covered with gold. The glass in the east window, composed of a round headed centre and square wings, was inserted sixty years ago by Cluttertbuck. The subjects the Nativity, Crucifixion and Ascension, are treated in the Cinquecento Flemish style, and much of the colouring is rich and fine.

Unfortunately by some blunder in taking the dimensions of the window, the central picture was painted much too large for its place, and it had to be cut down through figures in every direction. The group, which has caught all the coarse literal fidelity of the Cinquecento School is confused, there is an almost total absence of symbolic allusion, and of the devotional effect there is not a trace.

There are galleries on the north, south and west sides, and in the latter which is supported on Ionic columns, is the organ, a large plain instrument, presented to the church by a brewer of Old Street, named Buckley. Built in 1734, this organ in St Luke's is ascribed by some to Bridge, by others to Jordan, and it is said to be the first church organ to which the tremulant was applied. The swell, dub and super octaves were probably the earliest made in England.

This organ in St Luke's has some interesting associations. The Churchwardens of St Luke's had a property left them by the Ironmongers Company for church purposes, which grew into so large a sum that they did not know what to do with it. After much discussion it was decided that it should be spent on enlarging and improving the organ, the work to be done by Messers Gray and Davison. Davison was an old friend of the distinguished English church composer, Henry Smart, who at that time (1843 or thereabouts) greatly wished to have the use of a large organ, and thus it was not long after the giving of the order, Henry Smart heard of the fine instrument that was being built in St Luke's, Old Street, and the churchwardens received an application from him for the post of organist.

It should be mentioned that the then organist of St Luke's was blind, had given much dissatisfaction, and was deemed unfit to manipulate the new organ properly. Henry Smart was then a well-known man, and when he told the churchwardens that his chief object was to secure the use of a fine organ, and that he would, therefore,

come for £50 per annum, they accepted his offer, and also agreed to his one stipulation, that sufficient money should be allowed him to pay a professional quartet in his choir. He held the post of organist from 1844 to 1864.

The organ case and font are now in St Giles without Cripplegate, with which the parish of St Luke's was reunited in 1959. A list of 1759 shows the plate weighed in ounces, drachms and grammes; the curtains and curtain rods were counted; and objects in the vestry room were enumerated: 'an umbrella, a table of fees, an Almanack, 8 Pewter Dishes, a knife to cut the sacrament bread, 2 Ink Stands, and a Chamber Pott.' Building alterations were carried out in 1877-78 by Sir Arthur Blomfield, when the east end was chancelled up a little and the reading desk removed. Until the 1930s two small domes surmounted the flat roofs on either side of the tower.

The building is Grade I listed (status ref. 635-1/75/6, dated 29/12/1950; area ref CA/1003/15); the railings and gate are Grade II listed (ref. 635-1/75/6, dated 29/9/1972). The Caslon family tomb in St Luke's Churchyard is listed Grade 2 (ref. 635-1/75/1, dated 28/9/1995). This is an 18th-century chest tomb of Portland Stone with a ledger slab of Welsh limestone. It contained William Caslon the Elder (1692-1766) and his son William (1720-1778), who were distinguished type founders, after whom a typeface is named.

The burial grounds are described by Mrs I Basil Holmes, in her *London Burial Grounds*, published in 1896, as being;

'…in two parts. The size of the whole grounds, nearly one and three quarter acres. The piece round the church is closed, and full of large later tombs, ivy being planted most profusely. There is a great deal of rubbish in it. The part on the north side was laid out as a public garden in 1878, and is maintained by the vestry.'

The church was built over a semi-subterranean crypt, constructed of brick, as an integral part of the church structure. This space was originally prohibited from use for burial but this did not remain the case for long. The Vestry minutes hold no mention of burial within the crypt below the church until 1740, when the fees are listed.

By 1810 the vaults were being described as large and commodious but dark, damp, neglected and highly offensive. Sufficient ventilation had not been secured and wooden coffins rather than lead had been admitted. The Committee recommended

that funerals of opulent individuals should be promoted in the vaults and churchyards; that the fees for interment in the vaults and churchyards should not be enhanced, that hereafter no corpse be permitted to be placed in the vaults except in leaden or metal coffins and that apertures should be made in the walls at the east and west ends of the church, of 3 ft in diameter to ventilate the vaults.

In 1853 the Vestry Minutes record that a petition to Viscount Palmerston, Prime Minister at the time, for an extension of time for closing burial grounds and vaults of this church was turned down: burials (including those in the vaults) to be discontinued at the end of this year and the vaults sealed. The sealing of the vaults was usually carried out by infilling with dumps of soil, domestic refuse and building rubble.

The parishes of St Luke's and St Giles' Cripplegate

The London watchmaking trade had located its construction sector within the parish of St Luke's and the adjoining Clerkenwell around the middle of the 18th century. By the end of the 18th century the watchmaking artisans in St Luke's were estimated at 1,000.

In the 18th and 19th centuries many of the poorest in London were Irish. Francis Place, commenting on a description of the 'dissolute manners of the Irish in St Giles in 1816 said:

'*this account is no doubt correct, and is a fair picture of the manners of a much larger proportion of the people half a century ago. Such people...are now only to be found in a few places, such as the back settlement of St Giles, some places in the parish of St Luke and Ratcliffe Highway, and almost wholly among the Irish. The poorest and most dissolute people in Spitalfields are several grades above the mere Irish'.*

The parish was 'laid out in numerous streets and squares, covered with buildings in every direction, and has become one of the most extensive, and populous parishes in the suburbs of the metropolis' according to Lewis, writing in 1840.

In 1798 the Commissioners for Assessed Taxes was established. This divided houses into five categories, depending on the total amount of assessed tax they paid

each year. This cannot be directly related to annual income but as some tax collectors added additional notes it can be equated.

Table 2.1 Category of tax paid equated with annual income

Category	Tax	Annual income
I	under £1	£61
II	£1-under £2	£66
III	£2-under £5	£79
IV	£5-under £10	£128
V	£10 and over	over £200

Old Street parish had only 16.6% of category IV and V houses and could therefore be classed as a poor parish; all the parishes within the city had over 50%.

The parish registers

Burial registers

These are held, with baptismal and marriage records, at the Greater London Record Office, where they are available only on microfilm (Films X27/1A, 1B, 2, 13-15). They are arranged in monthly, or part monthly blocks, interspersed with sections for christenings and marriages. The format is as follows:

- name
- man/woman/child (not age)
- cause of death (eg consumption, ague, dropsy, smallpox, 'age')

There is no indication of place of burial until 1804 when exact ages and addresses of deceased are also introduced although not uniformly. Apart from a 16-month gap between August 1805 and December 1807 this system continued in place until December 1812, after which it was replaced by printed register pages which did not require information of this kind. Places of interment are indicated by codes:

- NBG (presumably north - or back burial ground)
- SBG (south - or front burial ground)

- PHG (Pest House Ground)
- BCY (?Back - or north Church Yard)
- FCY (?Front - or south Church Yard)

In the period 1804-5 and 1807-12 there were 18 vault interments. The commonest causes of death for these were consumption and convulsions, and there were also cases of dropsy, death in 'childbed', and 'shot himself' (presumably unintentionally and not a suicide). The burial registers for some of these people sometimes mention cause of death some of which we recognise today such as age or cancer, others like decline, dropsy and mortification are far less obvious.

Table 2.2 Cause of death as recorded in the burial registers

Coffin Number	Forename	Surname	Cause of Death
991	James	Lumley	Abscess
350	Bowes	Todd	Abscess
913	Thomas	Godman	Age
656	Mary	Williamson	Age
621	Thomas	Cole	Age
990	Elizabeth	Hewlett	Age
1074	Lucretia	Wright	Age
1075	Arabella	Feast	Age
1145	Mary	Lan	Age
394	Willm (William)	H	Age
254	Cath	Wood	Age
1008	George	Scott	Aged
1008	Cathe (Catherine)		Aged
807	Charles	Triggs	Aged
852	Willem	Spier	Asthma
924	Thomas	Hudson	Asthma
1067	Willm (William)	Turner	Asthma
533	Tho (Thomas)	Wilson	Asthma
1008	George	Scott	Burial register illegible
1008	Cathe (Catherine)		Burial register illegible
720	Elizth (Elizabeth)	Godman	Cancer
946	Lydia	Batty	Cancer
609	Susanna	Rogers	Cancer
773	Louisa	Elliot	Childbed
284	Barbara	Holyland	Childbed
262	Sarah	Hathorn	Childbed
364	Sarah	Hathorn	Childbed
1148	Ann	Lerich	Childbed
777	John	Russell	Consumption
772	John	Amburger	Consumption

723	Elizth (Elizabeth)	Treson	Consumption
849	Rebecca	Benson	Consumption
835	Hannah	Nicholls	Consumption
657	Cuthbert	Wilkinson	Consumption
255	Cath	Forbes	Consumption
625	Zara	Turner	Consumption
613	Mary	Newton	Consumption
475	Elizabeth	Ainge	Consumption
600	Catherine	Lowe	Consumption
494	Willm (William)	Wood	Consumption
616	George	Girsewood	Consumption
859	James	Lumley	Consumption
862	Elizth (Elizabeth)	Baillie	Consumption
908	Ann	Lucas	Consumption
911	Thomas	Feast	Consumption
337	Mattew	?	Convulsions
253	Catherine	Forbes	Convulsions
964	Mary	Lumley	Convulsions
894	Elizth (Elizabeth)	Smith	Convulsions
493	Cathr (Catherine)	Forbes	Convulsions
1194	Edmund	Morier	Convulsions
477	Ann	Turner	Decline
1147	Michael	Lan	Decline
1149	Michael	Lan	Decline
707	Andrew	Egner	Decline
982	John	Kelly	Decline
985	Ann	Bateman	Dropsy
450	Sarah	Jeffreys	Dropsy
1162	Ann	Holloway	Dropsy
935	Elizth (Elizabeth)	Richardson	Dropsy
775	William	Feast	Dropsy
194	James	Eltham	Dropsy
614	Elizabeth	Egner	Dropsy
497	John	Lowe	Dropsy
513	Thos (Thomas)	Dennis	Dropsy
706	Diana	Egner	Dropsy
1155	John	Smith	Fever
1195	George	White	Fever
994	Thomas	Ramsbottom	Fever
844	William	Tanner	Fever
612	John	Sowter	Fever
714	Edward	Seward	Fever
698	Martha	Smith	Fever
909	Ann	Lucas	Fever
918	James	?	Fever
1210	Henry	Waring	Fever
491	Elizth (Elizabeth)	Burnhill	Hooping cough
466	Thos (Thomas)	Hathorn	Inflammation
860	Mary	Lockin	Inflammation
921	Thomas	Young	Lunacy, Shot himself
910	William	Rone	Mortification

971	Oliver	Wilson	Mortification
696	John	Hollinshead	Palsy
655	Ann	Davidson	Palsy
951	John	Stubbs	Paralytic
449	George	Jeffreys	Shot himself
1149	Michael	Lan	Sudden death
1147	Michael	Lan	Sudden death
1146	Thomas	Lan	Suddenly

Place of residence

It has been possible to identify the address at the time of death for 252 individuals through examination of the Burial Registers. Where an asterix appears adjacent to an address in the table it indicates that it is located in the parish of St Luke's Church. The total number of individuals who resided in the parish at the time of their death was 140

Table 2.3 Place of residence of named individuals

Coffin number	forename	Surname	Address
303	Rebecca	Sowter	Albert Place, Clapton
1304	Jane Elizabeth	Campion	Albion Place, New North Road
946	Lydia	Batty	Aldgate
723	Elizabeth	Treson	All Hallows, Barkin
476	William	Freson	All Hallows, Barkin, Near the Tower
253	Catharine	Forbes	All Saints, Poplar
716	William	Sutton	Artillery Place*
1120	William	Doherty	Artillery Place*
334	John Murray	Hunter	Artillery Place*
888	Charles	Read	Artillery Place*
717	Hannah	Sutton	Artillery Place*
1152	Janet	Tillford	Artillery Place, Bunhill Road*
1219	Martha	Burton	Ashley (?) Terrace
623	Sarah	Giles	Balderton Street
792	Emerson	Archer	Banner Square*
961	Edward	Keat	Banner Street*
829	Charles James	Blogg	Banner Street*
467	John Cotton	Pugh	Banner Street*
860	Mary	Locking	Banner Street*
534	Joseph	Deer	Banner Street*
603	Mary	Deer	Banner Street*
1155	John	Smith	Banner Street*
336	Ann	Carr	Banner Street*
1212	Eliza	Keat	Banner Street*
335	John	Carr	Banner Street*
776	John	Bringloe	Bath Street*
355	Charles	Cuerton	Bedford Row

352	Clara Matilda	Cuerton	Bedford Row, Holborn
788	George	Wright	Bell Alley*
831	Mary Ann	Monk	Bell Alley*
869	Ann	Webb	Bond Street
1009	Mary	Clark	Brackley Street (?), Islington*
301	Henry	Budd	Bridewell Precinct, London
1184	Sarah	Boorman	Bridgeport, East London
263	Henry	Cheape	Brunswick Square
264	George	Hathorn	Brunswick Square
299	Margaret	Cheape	Brunswick Square
262	Sarah	Hathorn	Brunswick Street
965	William Gray	Mackenzie	Bryanston Street
856	Margaret	Lovell	Bryanston Street
855	Trefusis	Lovell	Bryanstone Street, Portman Square
841	Mary	Dore	Buck Lane
843	William	Dore	Buck Lane
771	Thomas	Dalton	Bunhill Row*
478	Mary	Tilford	Bunhill Row*
697	Elizabeth	Sewell	Bunhill Row*
923	Thomas	Roberts	Bunhill Row*
344	David Stokes	Hughes	Bunhill Row*
777	John	Russell	Bunhill Row*
1193	Jonathan	Bateman	Bunhill Row*
985	Ann	Bateman	Bunhill Row*
1068	Elizabeth	Simpson	Camberwell
472	unknown	Cassell	Camden Town
1072	Edward Higgins	Coleman	Charles Street*
712	Ann	Higgins	Charles Street*
708	John	Horlot	Chiswell Street*
481	Albert	Bailey	Chiswell Street*
1083	John	Davies	Chiswell Street*
780	Isabel	Bailey	Chiswell Street*
543	Elizabeth Sarah	Bailey	Chiswell Street*
480	Douglas	Bailey	Chiswell Street*
793	Septenius	Bailey	Chiswell Street*
1208	Sarah	Willcox	Chiswell Street*
791	Alfred	Bailey	Chiswell Street*
1146	Thomas	Law	Chiswell Street*
782	Catherine	Bailey	Chiswell Street*
702	Thomas	Minton	Chiswell Street*
709	John	Horlor	Chiswell Street*
921	Thomas	Young	Christopher Street
726	John Evans	Lane	City Road*
1080	James	Dalby	City Road*
1170	Molly	Porter	City Road*
531	Sarah	Willson	City Road*
1065	William Penn	Burnidge	City Road*
764	John	Garder	City Road*
928	James	Fuller	City Road*
964	Mary	Lumley	City Road*
862	Elizabeth	Baillie	City Road*

628	Thomas	Moor	City Road*
859	James	Lumley	City Road*
1169	Emily	Porter	City Terrace*
725	Henry	Lane	Clapton
762	Ester	Gardner	Clapton
1143	Mary	Ellis	Clapton
112	Edwin	Hills	Claremont Place
914	Mary	Davis	Clerkenwell
854	Amelia	Allen	Croyden, Surrey
770	Elizabeth	Harrison	Dermont Villa, Holloway
779	Joseph	Seward	Enfield
1177	Celia	Boyle	Farringdon Street
991	George Wyatt	Patch	Finsbury Street*
353	Thomas	Cuerton	Finsbury Place*
1204	Phoebe	Lester	Finsbury Place*
699	Thomas	Willett	Finsbury Square*
705	Thomas	Willett	Finsbury Square*
1060	Jane	Mattieuson	Finsbury Square*
307	Thomas	Hughes	Finsbury Square*
1084	Douglas	Aylwin	Finsbury Square*
1066	James	Dick	Finsbury Square*
492	John	Capion	Finsbury Square*
916	Susanna	Stanley	Finsbury Street*
339	Sophia	Patch	Finsbury Street*
1141	William	Patch	Finsbury Street*
340	Elizabeth	Patch	Finsbury Street*
626	Sophia	Louch	Finsbury Terrace*
1202	Esther Henrietta	Tomkies	Fountain Place, City Road*
468	Susanna	Joslin	Gee Street*
1076	Caroline	Joseline	Gee Street*
1131	Esther	Taylor	George Yard, Old Street*
302	unknown	Sowter	Golden Lane*
304	Sarah	Stockhall	Golden Lane*
475	Elizabeth	Bunn	Golden Lane*
1261	Alfred	Clarke	Goswell Street*
1258	William Henry	Clarke	Goswell Street*
713	William	Prosser	Goswell Street*
291	Francis	Horn	Goswell Street*
161	Edmund	Roberts	Goswell Street*
617	Lydia	Prosser	Goswell Street*
994	Thomas	Ramsbottom	Goswell Street*
970	Matilda	Gibson	Goswell Street*
1225	Anthony	Falder	Goswell Street*
1259	Edward	Clarke	Goswell Street*
618	Ann	Seward	Goswell Street*
986	George	Walford	Grafton Street
905	Frederick	Gibson	Grafton Street
765	Mary	Love	Hackney
727	John Gardner	Lane	Hackney
1022	William	Lindsey	Haggerstone
1156	Elizabeth	Farmer	Hampstead Road

724	Ann	Hooker	Hartshorn Court*
1157	Peter	Clarke	High Street, Clapham
479	Mary Elizabeth	Hooker	Highgate
972	Ellen Munro	Robinson	Hill Street*
973	Mary Ann	Robinson	Hill Street*
536	Eliza	Smith	Hornsey
812	Mary	Combers	Huxton Town
778	Elizabeth	Seward	Islington*
619	Charles	Cole	Kennington
719	Elizabeth	Jones	King Square
1071	Andrew	Duff	King Street
256	Esther	Stevens	Kingsland Road
258	Nicholas	Stevens	Kingsland Road
356	Anthony	Barber	Laytonstone, Essex
540	Elizabeth	Giles	Lizard Street
541	John	Giles	Lizard Street
1196	Robinson	Turner	Love Lane, Aldermanbury, London
851	Elizabeth	Maxwell	Lunatic Hospital
784	Ann	Seward	Macclesfield Street
281	Noah	Nicholls	Norwood
338	Henry	Stevens	Old Street*
194	James	Eltham	Old Street*
951	John	Stubbs	Old Street*
1079	Judith	Pigott	Old Street*
629	Thomas	Coventry	Old Street*
839	Sarah	Coventry	Old Street*
471	Elizabeth	Cassell	Old Street*
1087	Joan	Wilson	Old Street*
1057	William	Graham	Old Street*
117	Samuel	Roberts	Old Street*
563	William Johnson	Craghill	Old Street*
722	Samuel	Corney	Old Street*
362	Ann	Brown	Paddington
968	Jane	Colechett	Paragon Place, Blackheath
1128	William	Moor	Peckham
361	Thomas	Sowter	Potters Bar
1062	Richard	Sumption	President Street
1135	Susannah	Wright	Rayley Street
966	Andrew John	Mackenzie	Saint Mary-le bone
896	Richard	Tomkies	South London, Shoreditch
337	Matthew	Little	South Street
466	Thomas	Hathorn	South Street
971	Oliver	Wilson	South Street
364	Sarah	Hathorn	South Street
342	Martha	Hughes	St Clements
980	George	Lowe	St George, Hanover Square
981	Foy	Walford	St George, Hanover Square
715	William	Dawson	St Georges, Southwark (?)
116	Ann	Hills	St James, Clerkenwell
721	Sarah	Phillips	St James, Clerkenwell
1082	Anne	Lycett	St James, Clerkenwell

1176	Thomas	Boyle	St James, Clerkenwell
1153	William	Moir	St James, Clerkenwell
907	James	Phillips	St James, Clerkenwell
912	Richard Charles	Davis	St James, Clerkenwell
962	Lucy	Farmer	St James, Westminster
967	John	Farmer	St James, Westminster
1069	Ann	Nightingale	St John
1074	Lucretia Ann	Wright	St John, Clarksb (?)
898	Henry Samuel	Bryant	St John, Hoxton
1127	Matilda	Bonelly	St Leonard, Shoreditch
990	Elizabeth	Hewlett	St Leonard, Shoreditch
908	Ann	Lucas	St Leonard, Shoreditch
927	Isabella	Fuller	St Leonard, Shoreditch
837	Lewis	Willett	St Mary Abbots, Kensington
597	Henry	Giles	St Mary, Whitechapel
773	Louisa	Elliot	St Mary, Aldermanbury, London
1045	Elizabeth	Lindsey	St Mary, Islington*
833	Francis John	Lycett	St Mary, Islington*
162	Thomas	Brown	St Mary, Islington*
118	Sarah	Brown	St Mary, Islington*
920	Sarah	Fuller	St Mary, Islington*
934	Catharine	Allen	St Mary, Lambeth
936	James	Allan	St Mary, Lambeth
939	Rebecca Lydia	Allan	St Mary, Lambeth
730	Francis	Wilsdon	St Mary, Lambeth
704	Elizabeth	Willet	St Mary, Lambeth
1133	Letitia	Clarke	St Mary, Le Strand
938	Charlotte	Allan	St Mary, Newington
620	Sophia	Cole	St Mary, Newington
1132	John	Clarke	St Olave, Silver Street
488	Elizabeth	Rider	St Pancras
1257	Joseph	Clarke	St Pancras
113	Mary	Bailey	St Pancras
114	John	Bailey	St Pancras
363	Keith	Stewart	St Pancras, Middlesex
1073	Elizabeth	Duff	St Stephen, Coleman Street
1218	Susanna Hyde	Clarke	St Stephen, Coleman Street
963	Frances	Jay	Stoke
763	Emma Sophie	Lane	Upper Clapton
701	Thomas	Moore	Uxbridge
122	Ann	Webb	West Square, St George's, ??
1088	Ann	Fisher	White Cross Street*
611	Charles Henry	Yoxall	White Cross Street*
1215	Alfred Gillett	Matthews	White Cross Street*
602	Lousia Victoria	Yoxall	White Cross Street*
1126	Eliza	Dudley	White Cross Street*
1125	James Edward	Dudley	White Cross Street*
610	Cordelia	Scott	White Cross Street*
601	Matilda	Yoxall	White Cross Street*
1077	Rowland	Owens	White Cross Street*
1217	Thomas	Gillett	White Cross Street*

1086	Thomas	Fisher	White Cross Street*
1205	Frances	Woodin	White Cross Street*
1090	Margaret	Martin	White Cross Street*
846	Elizabeth	Lorimer	White Cross Street*
845	John	Wright	White Cross Street*
1154	Leonard Clarke	Matthews	White Cross Street*
1140	Elizabeth	Dudley	White Cross Street*
922	Sarah	Palmer	White Cross Street*
360	Emma	Gardner	White Cross Street*
532	John	Markham	White Cross Street*
917	Thomas	Fox	White Yard*
711	James	Aston	White Yard*
1162	Ann	Holloway	Wilson Street*
1206	William	Hobson	Windsor Place*
794	Ellen	Lycett	Windsor Place*
613	Mary	Newton	Windsor Terrace*
857	Hannah	Jones	Windsor Terrace*
1172	Amelia	Porter	Windsor Terrace*
772	John	Amburger	Windsor Terrace*
895	Hannah Marie	Hickin	Windsor Terrace*
1142	Charles	Wellsted	Wolsey Street
1203	William	Farmer	York Place, Marylebone

Occupation

The Burial Registers record the occupation of only two of the individuals identified during fieldwork. They are the Reverend Trefusis Lovell '31 years rector of this parish' and Henry Lovell whose occupation is listed merely as 'church'.

Other evidence

No Searchers Reports or Burial Fee Books, which could have provided comparable information for the years before 1804 and after 1812, appear to have survived at the GLRO, Finsbury Library of Guildhall Library.

The GLRO does however hold a *Register of Headstones in back churchyard c 1753-1855* which records inscriptions on stones, name, person or family and plot number (Film X27/16) and *Monumental inscriptions in St Luke's churchyard*, with index (1877), described as similar to that for the back churchyard, and therefore presumably relating to the front churchyard (Film X27/18).

The Vestry Minutes

12 June 1734

A well to be made on the Back Burial Ground to drain the water out of the same.

27 August 1734

Burying dues in back burial ground south side 13s 6d; middle ground 7s; pensioners at the lower end 2s 8d. Two corpses are not to be buried in any one grave, and the same not to be less that 4 ft deep (no mention of vaults)

9 May 1735

Ordered that the Pesthouse burial ground be shut up (unhealthful and noysance)

30 March 1736

References to burial in any of the parish burial grounds (no mention of vaults).

7 June 1739

References to burial out of the churchyards or burial grounds belonging to the parish (no mention of vaults)

5 December 1740

Burial fees.

Payable to churchwardens for:

- burial in the vaults under the church £2
- ground on the southern part of the churchyard £1 (would have been more expensive because entrance to the church was on that side and therefore burial there would have been more 'visible')
- ground on the northern part of the churchyard 14 s
- in the southern part of the burial ground 8s
- in the northern part of the burial ground 6s
- Pesthouse (pensioners excepted) 3s 6d
- Ditto If under 10) 2s 6d
- For every vault to be enclosed under the church to be purchased of the parish at per foot square 3s
- For every vault to be purchased of the parish in the churchyard or burial ground at per foots square 4s

Payable to the Clerk for:

- burial under the church, 2s 6d
- in the churchyard, 9d

- in the other grounds, 6d
- burial in the vaults, 2s
- in the ground on the south part of the churchyard 2s
- ditto on the north part 1s 6d
- south part of the burial ground 1s 6d
- ditto north 1s
- Pesthouse 1s (located to north-east of St Luke's church)

Payable to the bearers for:

- burial in vault to each bearer 2s
- in each burial ground ditto 1s

Burials were certainly being made in the vaults by December 1740, but apparently not before (the new scale of charges of the same date could have arisen from the introduction of burials there as an alternative option).

3 March 1741

Pesthouse behind the garden of Allen's (?Alleyn's) Almshouses.

17 October 1743

Vault made in south churchyard by friends of Mr Wells

ordered that in future no person shall be buried nor any ground broken in the church or churchyards or any of the burying grounds belonging to this parish nor any vault shall be suffered to be made nor any gravestone or monument shall be laid down or set up until the friends and relations of the deceased shall have first paid the church dues to the Churchwarden etc.

20 June 1751

Pesthouse burial ground be shut up till orders to the contrary. Burials in the Back churchyard `as usual'.

1 June 1758

Ordered that the back burial ground be shut up till further order and that the Pest House ground be opened for burials and the ground levelled.

30 November 1758

Agreed that a reward of £5 be given to any person or persons who shall at any time detect and apprehend any person stealing Corps out of any of the Burial Grounds belonging to the church, to be paid upon conviction thereof by the churchwardens.

12 October 1810

Report of a committee appointed on 30 May 1809 re the state of the churchyards and burial grounds belonging to the parish, and fees required for interment.

That the vaults beneath the church (are) large and commodious but dark, damp, neglected and highly offensive. Sufficient ventilation not having been secured and wooden coffins having been admitted.

That the whole of ground surrounding the church is denominated the north and south churchyards, which are also neglected; that there are upwards of 40 tombstones much out of repair, being decayed, broken and their owners unknown.

That the burial ground on the north side of the churchyard is also divided into two parts by a row of trees and also called north and south Burial Grounds, and of which the north part is higher than the south, and for interments wherein lower fees are required. Similar neglect displayed, and immediate improvements required.

That the ground commonly called the Pest House Ground is situated in Pest House Row (and) is a large plot of ground principally appropriated for the interment of paupers - but which by a change of name and a trifling expenditure may be rendered convenient and productive.

The north burial ground is nearly filled. May need to purchase additional churchyard at considerable and burdensome expense.

The Committee recommends that funerals of opulent inhabitants should be promoted in the vaults and churchyards; that the burial grounds be made convenient for persons in middling circumstances, and that the Pest House Ground should be also so improved as to be acceptable for the interment of the poor inhabitants.

That for these purposes the committee think that the fees for interment in burial grounds should be more equalised rather than increased, and that very moderate fees should be charged for interment in the Pest House Ground.

That for these purposes the Committee recommend that apertures should be made in the walls at the east and west ends of the church of 3 feet in diameter that they (sic) may be ventilated; that the grave diggers be employed to collect all the remains of the dead and inter them in one hole; and that hereafter no corpse be permitted to be placed in the vaults except in leaden or metal coffins.

Burial fees

- burial in vaults and churchyards £2 10s

- south burial ground 12s
- north burial ground 9s
- Pest House 4s
- For every vault to be purchased under the church to be enclosed at per square foot 5s

That corpses of all persons whose families have vaults or graves with flat or head or footstones, although they were non residents at the time of their death, shall be regarded as resident parishioners and pay only a single fee.

Estimated costs

- digging holes and for removing remains from the vaults 5s 5d
- apertures to the vaults in the church £100

24 July 1849

Parochial interments: re north burial ground, including poor burial ground in Bath Street.

25 June 1850

Metropolitan interments bill noted, re mortuary fees payable, now before the lords.

10 September 1851

Repairs (unspecified).

27 April 1852

Repair needs itemised. Include limewhiting the walls leading to the vault, 10s 6d.

27 October 1853

Burial Grounds Interments. Petition to Viscount Palmerston for an extension of time for closing burial grounds and vaults of this church turned down: burials (including those in the vaults) to be discontinued at the end of this year. Vestry inclined to remonstrate on grounds that Privy Council were violating the intention of the Legislature. Signatures transcribed into the Minutes, but nothing came of it.

Table 2.4 Burial fees, extract from Joseph Turner, Burial fees of the principal churches, chapels and new burial grounds in London and its environs...and…all information for undertakers c 1838

	parishioner	**non-parishioner**
North Ground	0 12 6	0 14 3
Church Service	0 10 0	0 10 0
Under 10 years	0 9 6	0 11 3
South Ground	0 17 0	1 0 9
Under 10 years	0 13 0	0 16 9
Service	0 10 0	0 10 0
Front Ground	3 10 0	3 13 9
Vault, Bell, &c	4 0 0	4 5 0

Burial times: week days from Lady-day to Michelmas, half past 4, Michelmas to Lady-day, 4; Sundays 4 - if in Church, half past 2 0'clock. Early Dues - Fitting.

Faculties

The index of the diocesan Vicar General's Act Books at Guildhall Library MS 9532/4-10 (1725-1826) were checked as part of the desk based assessment (MoLAS 1996); neither St Luke's nor St Giles was mentioned, so it was concluded that the church must have been subject to the St Paul's Dean and Chapter in this respect. This was confirmed by checking the St Paul's' faculties (also at Guildhall Library) up to 1796 (MS 25, 664/3-5). However, they related only to appointment of clergy etc, and from 1840s St Paul's Faculties were absorbed by the diocesan system.

At Guildhall Library only the faculty papers from 1870 have been sorted and indexed (before that date only the faculties themselves are given in the Act Books, as above, without supporting petitions and papers).

1877

Underpin south and east walls and major repairs, MS 18, 319/86

14 March 1877

Faculty to alter and improve the parish church: underpin S and E walls and pier supporting the E column on the E side...the resealing of the whole of the ground floor of the church according to the plan annexed. At the same date a petition of the laying out of the churchyard as ornamental gardens: removal and setting back carefully of such memorial stones as may be necessary for the construction of pathways...that none of the bodies or remains will be removed from the churchyard.

1937

List of tombstones in disused burial ground /101

This item was called back from GL by the Diocesan Register who have retained it.

1946-9

LCC to maintain and develop churchyard /113

1949

Layout of churchyard as gardens

Petition granted for laying out the southern part of the burial grounds in the manner shown on the plan. Earlier works of the kind previously carried out by the LCC. To lower tombstones and cover the area with soil to level up; in the place of brick vaults to reduce the brickwork and replace the top slab and cover with soil. Also references to work on the 'rear portion' beyond Mitchell Street. Only tombstones in 'bad' condition to be moved.

1960

Re dangerous structures, notice /162

Faculty granted 1 June 1960 for demolishing the church except the tower to ground level as a dangerous structure, and removing scheduled items to St Giles. Removal of tablets to the tower. Nothing said about the vaults. Schedule of memorial tablets (of which only a few).

1964-5

Re-interment and bricking up of vaults (GL MS 29441/376/1)

A petition from the rector dated 27 November 1964 concerning the unlawful entry of thieves and tramps into the roofless precinct on many occasions since the partial demolition of the nave. While blocking windows and building up openings in the brickwork etc it had been found that coffins had been disturbed and in one instance the lead interior had been taken apart from the case and the top forced off to reveal the human remains in an advanced state of decay. These were immediately sealed in a zinc coffin. The name plate removed from the damaged coffin was inscribed: 'Mrs Esther Tomkies, died 2 December 1953??? in her 53rd year.' [This inscription is clearly incorrect. During the archaeological works this zinc coffin was located in bay 3 immediately inside a bricked up entrance. The contents of the coffin were identified as an ageing adult female, stature 153.39 cm, who had slight degenerative joint disease and gum disease: she had lost half of her teeth in life. The intact lead coffin of a child (1202) was found at the eastern end of bay 3; it bore the inscription 'Esther

Henrietta Tomkies died 17th July 1828 aged 3 years and 9 months.' Her address in the burial register was recorded as Fountain Place, City Road. The two may well have been related.] A builder has placed an estimate of £77 as the cost of bricking up the remaining openings into the crypt to prevent further vandalism. This would deter attempts to gain entry into the crypt from basement level, and work already done in July 1964 (no faculty appears to be available for this) should in turn deter attempted entries from ground level.

A plan of the crypt showing the position and bricking up of the remaining openings exists. Permission requested to confirm placing of the remains in a new coffin to remain in the same position as the old one, and to authorize bricking up.

A memorandum by H Norman Haines, Diocesan Architect at Fulham Palace, dated 10 November 1964 helpfully makes clear that Mrs Tomkies died in 1853 not 1953, and notes that the first break in at the church was reported in November 1960 and again in August 1961. Doors were broken down and there had been interference with the contents of the crypt. The only access to the latter was via the south-west porch and staircase, but entry had also been forced through holes made in the nave floor. Similar activities were reported in April 1964 when a thorough search of the crypt was made with the aid of temporary lighting. A further inspection in July, while contractors were bricking up walls and sealing the holes in the floor with concrete slabs, revealed that coffins had been disturbed (as reported by the incumbent).

In August instructions were received from London Diocese to remedy the damage and secure the coffins from further disturbance by placing them at the east end of the crypt and sealing the openings with brickwork. The London Necroplis Company was to be employed in resealing and casing the human remains and moving the coffins out of harms way.

From a preliminary shallow excavation it became clear that the task was going to be much bigger than expected, in that once the coffins in the disturbed area were removed to side vaults another layer of coffins would be revealed beneath them. The Necropolis Company estimated that the earth floor of the crypt might cover three layers of coffins spread evenly over the whole area. It was agreed that the disturbed coffin should be returned to their original positions, while the others were to be left and the areas where the coffins were found was to be completely sealed off.

On 13 November 1964 the Registrar reported to Haines at Fulham Palace that the bricking up of the four openings into the crypt had now commenced (the plan only

colours two blockings though the position of the other two seems pretty obvious: at the foot of the northern staircase and between the second and third chambers).

1965

Transfer of burial ground and pest house (GL MS 29441/376/1)

A Faculty to enable the GLC to exercise powers of management under the provisions of the Open Spaces Act 1906 in respect of St Luke's pest house burial ground. Involved 'conveyance' of the burial grounds from the incumbent to the GLC subject to the preservation of existing monuments, if any, for the sum of £7500. The Council agreed to lay out the burial ground as an open space within the meaning of the Act. No indication is given of the site of the pest house and burial ground.

1975

Redevelopment of churchyard (GL MS 21544/376)

Letter of 17 July 1975 from the Islington borough solicitor to the Diocesan Registry noting that the Council was considering the inclusion of the former church and churchyard of St Luke in a plan for the proposed Finsbury Leisure Centre, and that he has been advised that a Faculty is required before the intended work can be carried out to the north of the footpath between Mitchell Street and Ironmonger Row, which is consecrated ground. Possible uses included a blind garden or a bowling green, it being understood that no building was permissible. Could the Registrar please say whether or not the Chancellor would be likely to object in principle.

The Registrar replied on 29 July 1975 that the Chancellor has no objection subject to the Diocesan (?Disused) Burial Grounds Act and the advice of the Diocesan Advisory Committee.

1989-91

Removal of human remains (GL MS 29441/376/2)

On 8 March 1989 an application was made for a dispensation order for leaving undisturbed human remains under part of St Luke's churchyard which was to be used as a car park, and for their removal under part of the churchyard, edged orange on plan A, where an extension of the church was proposed, and also for their removal from the crypt. All removed remains were to be reinterred in the part of the churchyard marked blue.

The plan shows that the orange area, the site of the offices, lay directly north of the south east end of the church between Helmet Row and Ironmonger Row. The whole of the church site itself is coloured green. The intention seems to have been to

sell the church site to the Patten makers as the location for their proposed livery hall: the office extension in the churchyard to the north was part of this scheme.

On 28 April 1989 chartered surveyors informed the Diocesan Registrar that 'within the crypt the coffins and remains are covered by an earth fill and therefore, as yet, are inaccessible.'

On 20th July 1989 the Home office informed the Diocesan Registrar notes that the Secretary of State had issued directives for the removal and reinterment of human remains from the church (area coloured green) and the part of the churchyard marked orange.

Argument between the Home Office and the Registrar early in 1990 about whether the church, and which part of the churchyard, was to be included in the dispensation, or whether they should be covered by other provisions.

On 26th march 1990 the Registrar asked the Home office to omit any reference in the dispensation order with regard to the crypt, feeling that it would come under the provision of earlier directives given by the HO.

On 17th August 1990 HO Registrar a new draft dispensation order covering the entire area except the two areas where remains will be disturbed; the churchyard area in orange (for the office extension) and the church itself.

On 27th September the Registrar notified the Home Office that the order was correct as drafter, and asked for the order to be issued.

On 9th May 1991 the Home Office wrote to the Registrar enclosing the dispensation order (dated 8th May), excluding the areas bounded by thick orange and green lines.

Other Sources

A bound book entitled *Metropolitan borough of Finsbury: St Luke's burial ground* contains an alphabetical index of persons buried at the south burial ground: some 1180 entries relating to 161 tombs, details of whose inscriptions (where still legible) are given, pursuant to the Open Spaces Act 1906. Gummed onto the front endpaper is a notice by the borough of Finsbury, dated 17th June 1937, of its intention to apply for a faculty for permission to remove and change position of tombstones or monuments in the burial ground adjoining St Luke's being at the front or south of the church abutting Old Street. Persons with families interred there are invited to communicate.

A bound book entitled *Minute book of the St Luke's church and burial grounds improvement committee, 1875-8* contains the following information:

Schemes of November 1875

For repairing fabric of the church, reseating the interior and laying out burial grounds attached.

14th March 1878

Visit of Dr Tristram, Vicar-General of the bishop of London, to inspect the burial ground at the back of the church, including the alterations made (gravestones set back from the centre of the burial ground to the side at the northern end). His view was that all inscriptions on the stones should be preserved and not buried in soil, and that additional powers would be necessary for removing 'such stones as were not actually in the way of such paths as were shown in the plan'.

19th March 1878

Agreed that flagstones be laid down in the front churchyard and opposite the west entrance to complete the whole area between the church and the wall of the graveyard.

23rd February 1877

Tristram's response to a petition from St Luke's to underpin south and east walls etc, including reseating, removal of upper gallery and resealing of the ground floor.

Letters from rector to Tristram in 1895

12th November, concerning a scheme to transfer the back burial ground to (?borough of Finsbury) for them to use and keep in order and retain the front burial ground. Is a faculty necessary for this. The Vestry thinks that the rector can do it only on his own authority, but he is concerned about an annual payment to him from the churchwardens of £200 as fees (as per Act of 6 George II, cap 21) for all burials and for making vaults and interments in the crypt of the church. This has not been paid for some years (though after burials ceased at the church it had first been paid from other sources). But he doesn't want to risk prejudicing his successors' rights to the payment by transferring the freehold. Tristram's reply not recorded.

CHAPTER 3 THE ARCHAEOLOGY OF THE CRYPT AND BURIAL GROUND

by Angela Boyle and Ceridwen Boston

Introduction

Structures existing within the churchyard and the crypt of St Luke's church were recorded prior to and during excavation. This chapter describes the upstanding chest tombs, ledger stones and recumbent tomb stones found within the churchyard, and the private vaults subdividing the interior of the church crypt (Figs 3.1-3.6). Cursory descriptions of the structure of the crypt itself is included but these are not intended to be comprehensive.

The Churchyard

At the time of the archaeological recording action the churchyard surrounding St Luke's church was enclosed by Grade II listed railings and gates of 19th-century date, with a further enclosed area to the north of Mitchell Street. The churchyard immediately surrounding the church was split into two areas - a northern and a southern churchyard. Most of the chest tombs were located in the northern churchyard. The Grade II Carlson tomb was located in the centre of the southern churchyard. Plane trees[2] were planted along the perimeter and in the central area of the churchyard. A horse chestnut tree was situated on the north side opposite gate G1(N). A survey of upstanding extra-mural tombs was undertaken by architects Levitt Bernstein Associates. Numbers prefixed by GRN and GRS refer to this survey. Chest tombs that fell within the excavation area were also recorded by archaeologists. These describe both the above and below-ground structure of the tombs and brick shaft graves. The architect and archaeologist's surveys have been combined where appropriate.

[2] Any of several trees with broad leaves and bark that comes off in patches

Boundary walls and railings

Churchyard railings of painted cast iron welded to a cast iron coping set onto a low brick wall of yellow stock bricks are laid Flemish bond externally and English bond internally, and pointed in lime/sand/cement/mortar. The height of this wall is stepped as Helmut Row and Ironmonger Row fall away north/south. The ground level within the churchyard, however, remains level until the southern boundary becomes a low retaining wall. This section of wall on Old Street is faced with panels of cast iron. On the Old Street front, railings have palmette finials with fluted standards, and a mid rail with half height railings and scrolled brackets and backstay of cast iron. The gate piers to the east and west on this front (G2S, G3S) are of four clustered standards each side with lamp standards. The west gates (G3S) each have a cast iron shield lettered 'St Luke. Middlesex. AD 1852'. On Helmet Row, Ironmonger Row and Mitchell Street, railings are of a plainer design with arrowhead finials and no mid rail. Gate piers are formed of clustered standards in Helmet Row and Mitchell Street. Scrolled brackets on brick piers are present at each bay and lamp column. These have a plainer design on north, east and west sides. Generally, railings are stained with some graffiti.

Pathways

The pathways which existed at the time of the archaeological watching brief appear to be those which are represented in Richard Horwood's map of Regency London produced between 1792-9 (Laxton 1985). The gaps which appear in the plan of exposed graves seem also to conform with this (Figure 3.3).

The churchyard vaults and brick-lined shaft graves

In addition to simple earth-cut graves, St Luke's churchyard contained a number of extramural vaults and brick-lined shaft graves for the interment of multiple individuals. There were fewer vaults in the churchyards than within the crypt. The northern churchyard contained four vaults and five brick-lined shaft graves, whilst the southern churchyard had six vaults and eight brick-lined shaft graves. In the northern churchyard, a total of 23 burials were recovered from within these structures, 13 of whom could be named. In the southern churchyard, 60 burials were identified, 23 being named individuals. A catalogue of the coffins and fittings may be found in Appendix 1.

The preservation of the shaft graves and vaults varied, but many were in a poor state of repair. Due to concerns over the health and safety of the excavators, many burials could not be hand-excavated *in situ*, but were recorded from above, prior to machine excavation. After being excavated mechanically, the spoil was checked for human remains, coffin fittings and grave goods. As a result of this imperfect system, there was some mixing of the skeletal elements of different individuals; as well as of coffin fittings. Destruction of less well preserved materials, such as textiles and wood, was inevitable in the circumstances.

From coffin plate inscriptions, it would appear that the vaults and shaft graves were in use between 1760 and 1850 - broadly the same time as the crypt vaults (Figures 3.1 and 3.2). Burial dates from 1778-1848 in the northern churchyard, and from 1755-1844 in the southern churchyard, with a lone outlier, a Mr Cole (shaft grave 126) being buried much later in 1880. Burial in the northern churchyard peaked between 1811 and 1820. In the southern churchyard, burial showed a bimodal distribution, peaking around 1790-1820, tailing off and peaking again between 1831-40. Overall, burial within vaults and shaft graves in the two churchyards was most intense between 1831-40 - a decade before the peak of the crypt vault burials. However, with the possible exception of the decade 1821-30, there is no indication that families abandoned burial within established churchyard vaults and shaft graves in favour of crypt burial. This is evident from the continued use of the churchyard vaults and shaft graves and the lack of duplication of surnames of those buried within the churchyard.

The brick vaults in the churchyard were characterized by arched roofs, with access to the vault interior via steps leading down to a doorway in one of the side-walls of the structure. In contrast, brick-lined shaft graves had access from above only. These graves were subterranean rectangular or coffin-shaped brick structures with their openings covered by a ledger or flat slab of stone. In some cases, the ledger of the grave was surmounted by a monument visible above ground, which bore inscriptions commemorating the deceased within the grave. Many such monuments have been moved or destroyed over time. Those chest tombs that survived were surveyed by the architects Levitt Bernstein Associates, and are described in the following pages. During a burial, the ledger would be lifted, and the coffin lowered into the grave from above, either being piled on top of earlier coffins, or being suspended by horizontal iron bars at different depths within the shaft grave.

Each vault or shaft grave belonged to a specific family group, who had paid considerable sums for the privilege of exclusive burial rights within this space. In late Georgian/ early Victorian urban churchyards, severe overcrowding of burials often occurred (although this was not so manifest at St Luke's church). Concerns about disturbance of the remains of recently buried relatives to make way for further burial led to a fashion amongst the middle and upper classes of lining graves with brick and surmounting them with monuments that were less easily disturbed than simple earth-cut graves. Vaults were a more expensive alternative. These monuments offered another avenue of social display through death ritual. The most desirable plots were the most visible to churchgoers, lining the paths leading up to the church in the southern churchyard.

Families in the 18th and 19th century set great store on burying family members close together. Thus, in most cases individuals within a grave or vault were usually related by birth or by marriage. More specific familial relationships may be established where coffin breastplates or inscriptions on the exterior of the graves identify the specific individuals interred within. Cross-referencing with parish and census records further elucidate these relationships.

The northern churchyard

Seven vaults or brick-lined shaft graves discovered in the northern churchyard lacked upstanding monuments or above ground markers. It is assumed that these had fallen into decay and had been removed during maintenance of the churchyard. A catalogue of these structures is found below.

Vault 104

Brick arched vault under vestry. Constructed of red brick and mortar. Well constructed arch orientated north-south, facing church wall of southern crypt butts wall but was not tied in. No flooring material. No burials were present.

Vault 109

Rectangular east-west orientated brick vault constructed of pink-orange-yellow bricks and yellow-grey mortar. Vaulted roof. Entrance to the west blocked by upright limestone slabs. One brick step comprising a row of 10 bricks leading to entrance. Possible stairwell (559) butts vault on its western side. Arched roof 33 courses of brick high. Walls 20 courses high. Contained coffins 117; 118; 161 and 162.

Vault 110

Rectangular east-west orientated vault, with three steps leading down to arched entrance on eastern side. Constructed of yellowish-orange brick and hard yellow-grey cement mortar. Walls 24 courses. Arch 32 courses. Arch orientated north-south. Contained coffins 112; 113; 114; 115; 116; 212 and 213.

Vault 174

Rectangular, east-west orientated brick shaft grave under monument (5). Inscriptions on monument illegible. Composed of orange-pink brick and whitish-grey sandy mortar. Arched roof. Limestone slab sealing entrance approximately 1 m wide. Dimensions: length unknown; 2.4 m wide. Backfilled by yellow-brown sandy-silt (173). Contained a coffin (number unknown).

Vault 208

Rectangular east-west orientated arched vault, composed of 26 courses of mid-orange to yellow brick in wall, and 29 courses in arch. Four steps, composed of 2 courses of brick capped with limestone/sandstone slabs, lead down to the upper half of the vault on the eastern side. Dimensions: 2.15 m wide; 1.12 m high; doorway 0.9 m wide. Contained coffins 192; 193 and 194.

Vault 456

Rectangular east-west orientated vault close to church wall. Composed of red brick and soft grey, lime mortar. Thinner, redder bricks at the bottom of vault appeared to have been on a different alignment- possibly the foundation of the vault. Dimensions: 1.5 m x 2.3 m x 2 m (internal) Contained coffins 453 and 454.

Vault 1303

Rectangular east-west orientated brick shaft grave. Dimensions: 2.5 m x 0.87 m x 3 m (internal). 1.1 m wide (external width). Contained coffins 1304 and 1305.

The southern churchyard

Vault 111

Rectangular east-west orientated vault constructed of alternative header and stretcher course of pinkish-red brick. North-south arch. Internal dimensions: 1.42 m x 2.65 m x 2.65 m (floor to ceiling). Brick floor. Contained coffins 604; 605; 606; 607 and 608.

Vault 124

Rectangular east-west orientated vault with arched roof aligned north-south. Broken arch patched with ledger. Dimensions: 2.7 m x 2 m. Walls 0.23 m thick. Ledger (1.75

m x 0.9 m x 0.1 m) covers grave shaft. Single course brick floor. Contained coffins 868; 869 and 870.

Vault 126

Rectangular east-west orientated brick shaft grave capped with stone slabs and ledger for monument. Constructed of red bricks and yellow-white mortar. Dimensions: Under stone slabs - 1.18 m x 2.85 m x 0.9 m (external), Under stone slabs - 0.73 m x 2.36 m x >2 m (internal). Three rows of three horizontal iron bars extended cross-ways across the breadth of the grave, 0.5 m apart. Their function was to hold three rows of coffins. Contained coffins 619; 620; 621 and 622.

Vault 144

East-west orientated brick shaft grave, with slightly bowed walls, making the interior concave, and the exterior convex. Covered by three stone slabs (0.85 m x 1.6 m each). No evidence for roofing. Floor was natural brick earth. Dimension of grave: 2.8 m x 1.75 m x 1.6 m (external) Contained coffins 1166; 1167; 1168; 1169; 1170; 1171 and 1172.

Vault 149

Rectangular east-west orientated arched brick-lined shaft grave, composed of light-to-mid pink-yellow-red bricks. Capped with stone ledger, 0.1 m thick, with beveled edges; well finished (appears similar to table tomb). Walls 25 courses; arch 13 courses. Dimensions: 2.2 m x 0.66 m x 2.25 m (internal). Contained coffins 158; 187; 188; 190; 191 and 191.

Vault 239

Rectangular east-west orientated brick shaft grave. Wall thickness was 0.3 m. Covered with stone ledger with smooth finish and beveled edge, which overlay another stone slab (1.8 m x 0.95 m x 0.08 m). Dimensions of grave interior: 2.3 m x 0.8 m x 2.8 m. Contained coffins 807; 808 and 809.

Vault 483

Rectangular east-west orientated brick vault, composed of regular header and stretcher courses of brick and hard cement mortar on wall and arch. North-south orientated arch. Western entrance to vault via four steps, with brick side-walls and sloping two-piece stone cover. Walls at entrance way were bevelled (not seen in other vault structures). Floor covering: mortared stone slabs. Contained coffins 484; 485; 486; 487; 489; 490; 491 and 1312.

Vault 496

Rectangular east-west orientated vault, composed of 16 courses of red brick and grey concrete-rich mortar. Alternative header and footer courses. Entrance to the west through slab-blocked opening (1.83 m wide). Re-used inscribed slab used as lintel over entrance- way (1.02 m wide). To the east, were two more unmarked stone slabs (each > 0.6 m x > 1.3 m) Dimensions of vault: 2.05 m x 1.3 m x 1.15 m (internal) Wall thickness: 0.22 m Contained coffins 497; 535; 599; 600; 803; 804; 805 and 806.

Vault 799

Coffin-shaped east-west orientated brick shaft grave. Capped with stone slab. Bricks were two courses wide at base. Interior of grave horizontally divided into three compartments by limestone slabs. The lowest compartment was 0.6 m deep and 0.9 m wide, and contained coffin 800. Capped with limestone slab. The middle compartment was 0.6 m deep, and contained burial 798, coffin wooden completely decayed. Capped with another slab. Uppermost compartment filled with backfill.

Dimensions: width of 0.9 m; depth below ground level of 3.5 m; length unknown (extended beyond edge of excavation area). Contained coffins 798 and 800.

Vault 828

Probable vault against south-eastern corner of church. Constructed of red brick walls bonded with off-white lime-rich mortar. Had north-south orientated arched roof of yellow brick bonded with hard buff coloured mortar. This clearly belonged to different construction phase. Back -filled with rubble (possibly from collapsed vault arch). Dimensions of arch: 0.23 m x 0.11 m x 0.07 m. Top of arch 0.5 m below present ground surface. Dimensions of brick vault: 1.75 m x 4.5 m x 1 m. Contained no burials.

Vault 1160

Rectangular east-west orientated vault, constructed of red brick in alternative header and stretcher courses. Vaulted ceiling, and entrance hatch on eastern side. Brick flooring. Breached on the western side and re-pointed from outside with original bricks. Dimensions: 1.68 m x 2.3 m x 2.13 m (internal). 2.8 m x 2.1 m (external) Contained 1143; 1144; 1145; 1146; 1147; 1149 and 1201.

Vault 1178

Rectangular brick shaft grave orientated east-west. Not associated with any stone slabs or monument. Structure visible 1.2 m below modern ground surface. Dimensions: 2.6 m x 1.65 m x 1.8 m (external) Base of grave covered with re-used

tombstone of child (6 years) died 1711 (inscription incomplete). If the inscription is correct, the gravestone predates the foundation of the church by 22 years. This raises interesting questions as to its origins. No brick flooring. Charnel pit containing infant remains found beneath base of grave. Was not excavated further. Contained coffins 1176 and 1177.

Vault 1179

Rectangular east-west orientated shaft grave, constructed of brick courses. No associated slabs or monuments found. Structure was visible 1.9 m below modern ground surface. Dimensions: 2.3 m x 1.15 m x 1.9 m (external). Floor of flat-laid bricks. Back-filled - contained a considerable quantity of disarticulated human bone. Contained coffins 1180; 1181 and 1307.

Upstanding monuments within the churchyard

Ten upstanding chest tombs were still *in situ* in St Luke's churchyard and were recorded by the architects Levitt Bernstein Associates. They also recorded three horizontally laid tombstones and several tombstone fragments, which formed an edge to the grassed area north of the churchyard. These structures are prefixed with 'GR' in the text below. GR1-10N and GR14-17N were located in the northern churchyard, whilst GR11-13 were within the southern churchyard. These structures were all 18th- and 19th-century in date. During excavation, archaeologists also recorded the position of tombs and tombstones GR2N-GR10N and GR15, and described the subterranean structures beneath chest tombs that fell within the area of excavation. Six could be matched with the upstanding monuments and are grouped together below.

GR1N

Tombstone laid horizontally on raised plain brick plinth. Inscription on front (east) edge reads '*Family Vault of Mr J David Apples of Seward Street* '.

GR2N or chest tomb 1

Stone chest tomb with south side constructed of plain 19th century machine-made red and yellow brick (22 x 7 cm) bonded with hard, cement-based grainy mortar (stretcher bond). Remaining three sides of stone. All fairly plain and very worn. Inscriptions worn and illegible. East side had simple vertical roll moulding 7.5-9.5 cm in from the north and south edges. West side has traces of similar moulding. Four sides covered with overhanging stone coping (1.81m x 0.92 m). Monument set on plinth of three slabs of limestone. Set in gravel bed.

GR3N

Chest tomb of the Wright family dating to the 19th century. Delaminated on south-west and north-east corners. Side panels of plain yellow brick with stone plaque set into north side. Capped with stone slab.

GR4N

Stone chest tomb of the Bishop family with pilasters at corners. Stone plaque on south face partly worn but reads *'...John Bishop...1820'*.

GR5N

Stone chest tomb set on a stone plinth enclosed by 19th-century cast iron railings with steeple and urn finials. Fluted pilasters at corners of tomb. Stone oval plaques with fan decoration on each side. Inscriptions partly worn but south face *reads 'Elizabeth Allen d. 1836'*; east side reads '*Thomas Allen d. 1818'* .

GR6N or chest tomb 2

Stone chest tomb with granite set surround. Fluted columnettes at corners. Inscription on stone plaque worn on all sides, more so on south side and illegible. Relatively elaborate ornamental, classical design including a shield motif on each face. Overhanging stone coping (0.95 x 1.95 x 0.85 m) of relatively uncorroded stone. Beneath this structure lay vault 110.

Vault 110

Rectangular east-west orientated vault, with three steps leading down to arched entrance on eastern side. Constructed of yellowish-orange brick and hard yellow-grey cement mortar. Walls 24 courses. Arch 32 courses. Arch orientated north-south. Contained coffins 112; 113; 114; 115; 116; 212 and 213.

GR7N (or tombstone 3)

Tombstone with rounded corners (1.86 x 0.91 m). Laid horizontal, flush with the ground directly south of GR6N. Inscription partly worn. The only legible part reads *'….and Rachel…'*.

Vault 555

Beneath this structure lay vault 555, a rectangular, east-west orientated brick shaft grave. Capped by three stone slabs, in turn overlain by single stone ledger (3). Brick floor. Vault dimensions: 2.5 m x 1.5 m x 3 m. Contained severely decayed wooden coffins 460 and 461.

GR8N (or chest tomb 4)

Stone chest tomb set on York stone paving in gravel bed. Relatively simple design with roll moulding at each corner of sides. Overlain by coping stone (1.91 x 0.93 m). Inscriptions worn on all sides. Only legible script was '.... *in her 6th year...*' on south face. Stone on west face very soft and corroded, inscription illegible. Stone on west face partly replaced. Vertical crack at centre of long side panels.

GR9N

Stone chest tomb set in gravel bed, date *c* 1754, fluted columnettes to same design as GR6N, inscriptions worn, top tomb slab has diagonal scoring and cracking running north-west-south-east with one mortar repair, concrete repair to north-west corner.

GR10N (or chest tomb 5)

Stone chest tomb on stone base, set in gravel bed and bounded by 19th-century cast iron railings with arrowhead and baluster finials. Fluted columns at corners. Stone plaques with Greek key fret decoration on all sides. Inscriptions on west and south sides worn and illegible. Overlaid by coping stone (1.95 x 0.91 x 0.11 m). Chest tomb 0.97 m tall.

GR11S

Located in the southern churchyard, south of the area of excavation. Tombstone laid horizontally on concrete base, inscription worn.

GR12S

Located in the southern churchyard, south of the area of excavation. Tombstone laid horizontally on stone and on concrete bases located directly south of GR11S, inscription worn.

GR13S or chest tomb 6

Located in the southern churchyard, south of the area of excavation. Chest tomb Grade II listed, 18th century, stone on stone plinth bounded by 19th century cast iron railings. Fluted columnettes at corners with slate plaques set in stone moulding on north, south and east sides.

Inscription on north face: *Mary Anne Carlson, wife of Henry Carlson son of Henry and Elizabeth Carlson born August 21st 1785 died March 31st 1816. Sacred to the memory of Henry Carlson esq. of Higham Hill, Walthamstow, Essex, only surviving child of Henry and Elizabeth, eldest daughter of William Rowl esq. of Higham Hill. Born Gower Street London May 15th 1786 died Boulogne sur..mer May 28th 1850'*.

Inscription on top of monument: '*William Carlson esq died Jan 23rd 1766 aged 74 years. Also William Carlson esq son of the above died Aug 17th 1778 aged 58 years. Also Miss Elizabeth Mary Carlson daughter of William and Elizabeth Carlson and grand-daughter of the above William esq who died Oct 30th 1780 aged 7 months and 18 days. Also Mr Thomas Carlson son of the above William Carlson died March 29th 1783 (?) Aged 56 years Also Miss Harriet Carlson daughter of Henry and Elizabeth Carlson and grand-daughter of the above William Carlson who died May ? 1785 aged 2 months and 9 days. Also Edmund Carlson son of the above Henry and Elizabeth Carlson died Oct 20th 1787 aged 12 weeks and 3 days. Here lyeth the body of Elizabeth Carlson widow of William Carlson esq the son of William Carlson senior esq who died Oct 24th 1795 aged 65 years'*.

Inscription on the south face: ' *Thomas Hanby esq late of Hackney died Dec 1786 Aged 74 years. Here lyeth the body of Mary widow of the above named Thomas Hanby esq who died 14th day of January 1797 and also ....of Godfrey Shewell late of this parish and likewise daughter of William Carlson senior esq formerly of this parish'*. West side is blank.

GR14N-GR17N (or group 101)

Three complete tombstones and several fragments, all with moss growth, forming coping or revetment to the raised grassed area north of church. These formed a line parallel with the northern wall of the church edging the path. They appear to be tombstones and ledger stones relocated from different parts of the site during maintenance or landscaping of the churchyard in the past. Faint inscriptions were discernible on some of the stones but none were legible.

Ledgers and recumbent headstones in the southern churchyard

Following de-turfing and stripping of the topsoil of the southern churchyard, 41 recumbent stone slabs were revealed. These were found to be a mixture of ledger stones capping brick-lined shaft graves (n = 5), slabs forming components of the roof of extramural vaults (n = 2), recumbent gravestones (n = 5), and ledger stones not apparently covering vaults or shaft graves (n = 29). It is assumed that the last category were stone slabs that had either originally covered brick-lined shaft graves but had been disturbed and re-deposited, or were markers of earth-cut graves. Many of these ledger stones would originally have formed the base of memorials, such as crosses or inscription plaques, which have been lost since.

In most cases, it is unclear how far these stone slabs had been moved from their original position. In the majority of burials, *departum* plates inscriptions were absent or illegible, and most of the ledgers were very worn, rendering inscriptions thereon completely or partly illegible. Of the five ledgers that had traces of inscriptions on their upper surfaces, only three were even partly legible. None of the above inscriptions were found on the slabs capping shaft graves or vaults. Where inscriptions on ledger stones and headstones were legible and could be matched to *departum* plate inscriptions, it is clear that the stone slabs in the southern churchyard had moved at most only a few feet from their original positions. The names on two inscriptions of ledger stones correlated with inscriptions of *departum* plates found in nearby earth-cut burials, and matching inscriptions on three recumbent headstones suggest that these stones remained close to the family plots they originally marked. A catalogue of the ledgers and recumbent gravestones are recorded below.

Ledgers associated with Vaults and Brick-lined Shaft Graves

Seven ledgers were found associated with extramural vaults and brick-lined shaft graves. These are 111; 124; 125; 126; 144; 149; and 239. These ledgers are characterized in the catalogue of these structures elsewhere in the text.

Ledger stones not associated with vaults or brick-lined shaft graves

Ledger 121

Ledger 121 was found overlaying part of the earth cut graves of 1009, 1014 and 1015. This 1.8 m x 0.83 m slab was inscribed with the following: *In memory of Mr William Clark of Islington who died 13th March 18.... Aged 70 Years. Also Mrs Mary Clark wife of the above Died 29th May 18..... Aged 72 Years.* Grave 1009 was found to contain the breastplate of Mary Clark (died 29/5/1844 aged 78 years). Despite the minor discrepancy in the age at death, the ledger stone was clearly commemorating the same individual. Osteologically, the skeletons 1014 and 1015 were analysed as being a prime to mature adult male and an ageing individual, possibly female. Although neither conclusively can be identified as Mr William Clark, it seems safe to assume that ledger 121 originally did mark this grave group, and that it had only shifted slightly from its original position over the burials. Dimensions of ledger: 1.8 x 0.83 m.

Ledger 123

Ledger 123 squarely overlay two unnamed burials (871 and 872), and probably was originally associated with them. The ledger bore no inscription. The slab had a beveled edge, suggesting its use as the base for a memorial or table tomb.

Dimensions: 1.8 m x 0.9 m x 0.08 m.

Ledger 127

Ledger 127 did not overlie any burials, but lay close to burial cluster 827, 861 and 862. The latter two were graves of Capt. Alex Francis Bailey (year of death unknown), and Mrs Elizabeth Baillie, died 1810, respectively. There was no inscription on the ledger. Dimensions: length = 1.75 m; depth = 0.12 m.

Ledger 128

Ledger 128 partly overlaid a cluster of burials of the Richardson and Allan families, dated between 1111 and 1824 (933-937). A very faint inscription was detected on the ledger but was too worn to be legible. It is thus impossible to establish whether the ledger did originally mark these burials, but this is highly probable given its location.

Dimension of ledger: 1.9 m x 0.95 m x 0.12 m.

Ledger 129

Ledger 129 partly overlaid two burial groups, one of the Fuller family (burials 890; 891; 927; 928), and a cluster of four unnamed burials (burials 929-932). No inscription was detected on the ledger so it cannot be established to which of the groups the ledger was associated. Cement on the top of the slab suggests that it had been surmounted by a memorial. Dimension: 1.8 m x 0.95 m x 0.1 m.

Ledger 131

Although ledger 131 did not overlie any burials, it lay very close to a cluster of three unnamed graves (995, 997 and 998). The slab bore no inscription. Dimensions: 1.8 m x 0.9 m x 0.09 m.

Ledger 132

Ledger 132 did not overlie, or even lie in close proximity to any earth cut graves or structures. Thus, its association with specific graves or structures within the churchyard is unclear. The ledger bore no inscription. Dimensions: 1.9 m x 0.9 m x 0.11 m.

Ledger 133

Ledger 133 did not overlie any burials, but did lie in close proximity to a cluster of six burials (1007, 1008, 1011-1013). Burial 1008 was of a George Scott, who died in

1766. The other burials are unnamed. Ledger 133 bore no inscription. Dimensions: 1.75 m x 0.8 m.

Ledger 134

Ledger 134 partly overlay two unnamed burials 1306 and 877, and probably was originally associated with them. No inscription was observed on the ledger. Dimensions: 1.8.m x 0.8 m x 0.12 m.

Ledger 136

Ledger 136 did not overlie or indeed lie close to any burials. Its association with other contexts in the churchyard is therefore unclear. The slab bore no inscription. Dimensions: 2 m x 1.5 m x 0.13 m.

Ledger 137

Ledger 137 did not overlie, or lie in close proximity to any earth-cut graves or structures. Its original provenance is thus unclear. The slab bore no inscription.

Dimensions: 1.8 m x 0.85 m x 0.11 m.

Ledger 138

Ledger 137 did not overlie, or lie in close proximity to any earth-cut graves or structures. Its original provenance is thus unclear. The slab bore no inscription.

Dimensions: 1.8 m x 0.9 m x 0.1 m.

Ledger 139

Ledger 139 squarely overlay the grave of a Mr William Linsley, who died in 1838 (1022). It probably marked his grave. The ledger bore no inscription. Dimensions: 1.95 m x 0.95 m x 0.1 m.

Ledger 140

Ledger 140 directly overlay a cluster of unnamed graves 1016-1021 and 1297, and probably did originally marked this grave originally. The slab bore no inscription.

Dimensions: 1.8 m x 0.9 m x 0.08 m.

Ledger 141

Ledger 141 did not overlie any earth cut graves, but lay very close to the cluster of unnamed graves 1108, 1110 and 1114, with which it may have originally been associated. The slab bore no inscription. Dimension: length unknown; breadth = 0.85 m; depth = 0.08 m.

Ledger 142

Ledger 142 did not overlie any graves or structures. It was found located between two clusters of burials (graves 1027 and 1028; and graves 1118-1120 and 1298). Burial

1120 contained a breastplate bearing the name of Doherty (died 1818). It is unclear to which group the ledger originally belonged. The slab bore no inscription. Dimensions: 2.0 m x 1.05 m x 0.1 m.

Ledger 143

Ledger 143 was not found overlaying any graves but was located close to a group of three unnamed burials (1038-1840). It is impossible to establish if the ledger and the graves are associated, but their spatial proximity makes this probable. The slab bore no inscription. Dimension of ledger: 1.95 m x 0.8 m x 0.1 m.

Ledger 145

Stone ledger 145 bore no inscription. The slab was not found overlying an earth cut burials, but did lie close to two burial clusters: 1184 and 1185 (the grave of Sarah Boorman, dated 1847), and the unnamed cluster of 1183, 1186-1187. It is impossible to determine to which group the slab belonged as the slab bore no inscription. Dimensions: 1.85 m x 0.75 m x 0.15 m.

Ledger 146

Ledger 146 did not overlie any earth cut graves or structures, nor lay in close proximity to any burials. Its original association is therefore unknown. The slab bore no inscription. Dimensions: 1.88 m x 0.97 m x 0.1 m.

Ledger 147

Ledger 147 was located at the edge of the excavation. The full width of the slab could not be ascertained, as it underlay the bulk edge. The ledger did not appear to overlie any burials, but was located close to two unnamed burials, 1286 and 1287. No inscription could be discerned. Dimension: length = 1.97 m; depth = 0.11 m.

Ledger 148

Ledger 148 did not directly overlie any burials, but was located close to two unnamed burials 1286 and 1287. No inscription could be discerned. Dimension: 1.85 m x 0.9 m x 0.07 m.

Ledger 150

Ledger 150 was found in position with brick supports. However, it did not overlie any graves, but lay close to a cluster of unnamed burials 1279-1281, 1284 and 1285. No inscription was discerned. Dimensions: length = 1.85 m; breadth = 0.8 m.

Ledger 151

This western part of this ledger extended beyond the edge of the excavation. A faint inscription was present but was too worn to be legible. Ledger 151 overlay a cluster of

five graves (1266-1270). Although there were no inscriptions from either the ledger or the burials to match the two, it is probable that the ledger did originally mark these burials. Dimension of ledger: 1.8 m x 1.03 m x 0.08 m.

Ledger 152

Ledger 152 partly overlay unnamed burials 1250-1254, and may well have been originally associated with them. No inscription on the ledger could be discerned. Dimensions: 1.81 m x 0.9 m x 0.1 m.

Ledger 153

Ledger 153 squarely overlay unnamed burial 1249, and it is highly probable that it was associated with it. The ledger bore no inscription. Dimensions: 1.87 m x 0.94 m x 0.1 m.

Ledger 154

Ledger 154 lay between two clusters of burials 1230- 1233 (1233 is the burial of Mr Thomas Goodwin, died 1762) and 1234-1239. Lacking any inscription, it is impossible to determine to which burial group this ledger originally was associated. Dimensions: 1.86 m x 0.85 m, x 0.09 m.

Ledger 164

This ledger was not found overlaying any graves, but was located close to a cluster of burials (1122-1124; 1155; 1162). Grave 1162 contained the only *departum* plate of the group. The breastplate inscription read: *Mrs Ann Holloway died 27 December 1811 aged 45 years.* The inscription on ledger 164 was very worn and only partially illegible. The following lettering could be discerned: *John Hol.... .....pt r 1817 Aged.....Ann Co..... Daughter of the ..... August 1832 Aged ..... Sarah Elizth.... daughter of the ..... Jany 1837 Aged ....ne Sarah .....Feby 184.....*

Although the inscriptions did not match in terms of date of death, the Christian name Ann recurs. Although the surname on the ledger stone is incomplete it is likely to be Holloway, given the proximity to grave 1162. Ann Holloway (1162) appears to have been an early burial within the Holloway family plot, preceding the burial of the individuals commemorated on the ledger. Dimensions of ledger: 1.8 m x 0.88 m x 0.1 m.

Ledger 165

Ledger 165 overlay the feet of the skeleton 1117, and probably originally overlay the grave more squarely than it did latterly. A small amount of inscription on the ledger

read as follows: *P 1810.* Unfortunately, there were no *departum* plate inscriptions to link the burials to this inscription. Dimensions: 1.65 m x 0.75 m x 0.09 m.

Ledger 167

Ledger 167 squarely overlay the burial of 1115. It probably marked this grave originally, but there is no inscription either on the *departum* plate or ledger to establish this unequivocally. Dimensions: 2.0 m x 1.02 m x 0.09 m.

Recumbent headstones

Five of the stone slabs in the southern churchyard were found to be recumbent headstones. All bore inscriptions, which are reproduced in the text below. These slabs seem not to have been moved deliberately, but were left where they had fallen. Those that had fallen forwards overlay the graves they had originally marked, whilst those falling backwards where found adjacent to the graves with which they were originally associated.

Recumbent headstone 130

This recumbent headstone was found overlying the lower legs and feet of skeletons in grave 888 and 889. Grave 888 contained a partially legible breastplate, which read: *Charles .....late of .....in the County of D.....born 24 August 1784 obit 25 February 1830.* The other burial was an unnamed prime adult female. The breastplate inscription matches the inscription on the headstone, which read: *Sacred to the memory of Charles Read Esq ....e of Downe Hall in the County of Dorset died the 25th May 1830 Aged 46 Years.* Thus, it is evident from these matching inscriptions that headstone 130 had originally marked grave 888, and that after falling over, this headstone had not moved far from its original position.

Recumbent headstone 135

Similarly, recumbent headstone 135 overlay two burials (950 and 954). The inscription on the headstone (which reads: *Sacred to the memory of Mrs Ann Richardo wife of Mr Benjamin Richardo of Winfor Terrace City Road died 27th December 1814 in the 28th Year of her life*) matched the breastplate of Ann Richards (died 27/12/1814, aged 28 years). She was buried alongside a newborn infant (954), whose existence was not mentioned on the headstone.

Recumbent headstone 156

Recumbent headstone 156 was found overlying the graves of 874 and 875, both unnamed individuals, a child of 3-7 years and a mature female. These could not be

matched confidently to the names inscribed on the inscription on the headstone, which read as follows:

Sacred to the memory of Mr Deskford Grant 15 years an inhabitant of this parish eldest son of the Revd Robert Grant minister in Cullen, North Britain who died on the 3rd July 1820 Aged 65. He was a man of the strictest integrity and a sincere friend. Also Mrs Elizabeth Mahat.....e sister of the above who departed this life on the 12th day of September 1840 aged 69.

Recumbent headstone 155

A recumbent headstone was found close to two burials 1165 and 1166. The inscription read as follows: *To the memory of Mrs Ann Tadwell wife of Mr Henry Tadwell of this parish who died June 8th 1780 Aged 42 Years. Also the above Mr Henry Tadwell who died Jany 5th 1806 Aged 59 Years.* Because neither of the burials were named, it was impossible to find a relationship between these burials and the headstone. The skeletons were of a young and an older male. This also makes an association doubtful.

Recumbent headstone 238

The inscription on headstone 238 read as follows:

In memory of Mrs Johannah Watts, who died 6 Jan 1810 Aged 73 Years. Roseanna Chislett daughter of the above and wife of Isaac Chislett....died April 4th 1825 Aged 20 Years. Eleanor Chislett died April 4th 1832 Aged 57 Years. Isaac Chislett died Feb 12th 1851 Aged 76 Years.

Headstone 238 was found overlying a grave group of six individuals (817; 820-824). None could be named conclusively from *departum* plate inscriptions, but two breastplates suggest that this burial group may be the Chislett family, albeit not those individuals mentioned on the headstone. The breastplate of an adult female (820) reads: *Mr.....horean Ch..... died 26 November 1812.* The breastplate from burial 821 reads: ..... *Sarah Chis-l.... died 11 November 1818 aged 72 years.* It is possible that burial 820 and 821 were earlier Chisletts buried in this family plot before the above-mentioned family was put to rest here.

The Church

The church was built 1722-23 to designs by two of the Fifty New Churches Act surveyors, John James and Nicholas Hawksmoor. The church was redundant by 1960, unroofed by the Church Commissioners, leaving only the spire and the walls, and left derelict after no buyers emerged. Nothing came of successive plans for conversion and the shell of the building was eventually consolidated as a ruin in 1994 (Cherry and Pevsner 1998, 604). The organ case went to St Giles Cripplegate, reredos and alter rails to the north-west chapel at St Andrew, Holborn. The body of the church is of stone with a Venetian window in the east wall. The western tower has a spire as its fluted obelisk. The west tower rises from the ground and the aisle roofs form a fragmentary pediment a little behind its front. The west entrance in the tower is flanked by staircase wings with north and south doorways, an oculus over each entrance, domed vestibule beneath the tower, and flanked lobbies each with an elegantly cantilevered stone stair in a curved end. The interior had tall unfluted Ionic columns, a shallow vault to the nave and transverse vaults to the aisles with galleries on three sides.

George Dance the Elder was a member of the vestry and the church has often been erroneously attributed to him (Weinreb and Hibbert 1983, 752). He was buried here in 1768, and in 1788 his children provided a black marble slab which has since been removed or destroyed. The type founders, William Caslon, father and son, were buried in the southern churchyard in 1766 and 1778 respectively.

Crypt development

The crypt comprises four west-east aligned barrel vaulted bays built in red brick. There are three spine walls each one with three vaulted openings in line with other openings. Two outer spine walls (between Bays 1 and 2, and Bays 3 and 4) are buttressed by primary buttresses (0.36 m deep). Some of these appear to have been removed and those at the south-east corner of the building were replaced/enveloped by larger modern brick buttresses. The primary mortar is soft and white. Scars visible in bays 2-4 (repaired in moderate hard, grey cement mortar) suggest that the crypt was constructed in three sections east-west. The crypt walls comprise alternate courses of headers and stretchers. Above the level of springing, the brickwork of the crypt abuts

the brickwork of the piers supporting the ground level arcades. There are access arches between the bays.

Bays 2-4 were all used for burial and consequently the floor level was significantly higher (*c* 1 m). These bays contain many individual 'family' vaults apparently all early-mid 19th (as suggested by name plates and memorials).

Bay 1 appears never to have been used for burial. A test pit excavated at the western end to a depth of 0.56 m below the (presumably inserted) concrete slab found no evidence for burial. Bay 1 is decorated with painted plaster with a red coloured dad section. This extended over secondary inserted blocking brickwork between bays indicating a later date. Electric lighting etc may have been inserted at this time. A vent (27) in the south wall of thc church allows air into bay 1. It appears to be part of the primary structure and measures 0.75 x 0.62 x 0.50 m. Presumably, originally there would have been a grille over the top.

The crypt covers an area of approximately 430 m^2, the floor level being at 17.58 m OD. It was sealed for safety reasons some time before 1996. Observations carried out by Dr Susan Young and Simon Coe within the crypt before it was sealed suggested that an amount of vandalism had taken place and that some of the burials had been disturbed. This was confirmed by archaeological investigation.

The floor of the crypt would have been earth, and burials did take place below floor level. In August 1964, instructions were received from the London Diocese to remedy damage and secure coffins after disturbance caused by people entering the crypt. It was intended to place them at the east end of the crypt and seal the openings with brickwork. The London Necropolis Company was to be employed in resealing and casing the human remains and handling the coffins to be moved.

Much of the crypt had been backfilled with earth, all the coffins being covered. It was suggested by Simon Coe that much of the spoil in the crypt derived from the clearance of the churchyard area north of Mitchell Street in 1937, and that human remains from that site were therefore included among it.

Vaults within the crypt

There were 21 vaults within the crypt of St. Luke's, containing a total of 72 burials, 56 of which were named individuals. Within the bays of the crypt beneath the church, much of the internal space of the crypt was divided off by brick walls or iron railings

to create small rectangular private family vaults. There were six of these structures in Bay 1, four in Bay 2, ten in Bay 3 and one large vault in Bay 4.

The vaults were first used in 1756, with the interment of William Wood (vault 251). The last to be buried was Charles Stoke (vault 15) in 1853. From evidence of named individuals it would appear that very few individuals were interred before 1800 or after 1850, the peak period of burial being between 1831 to 1840 (Figures 3.1 and 3.2). There is considerable variation in the length of time that each vault was used. Vault 251, the Wood family vault, was utilized for 64 years, whilst others, such as Vaults 11, 13 and 24 contained only single coffins. The number of coffins per vault ranged from single interments to as many as 11. From inscriptions it is apparent that these represented up to three generations of a family.

Bay 1

Vault 240

Rectangular vault in the eastern half of Bay 1, abutting the northern bay wall. The vault is defined by iron railings, with 'spear' tops, set into stone kerbs (which project 0.03 m above floor level of vault). Corner rails are set into the roof of the crypt, and railing is shaped to follow the curvature of the crypt roof. During modern refurbishment, this structure was encased within a later modern breeze block wall.

The front railings hold a door with two locks. An iron inscription plate on the door reads; *The Family Vault of John Gardner, City Road.* Dimensions of vault: 2.2 m x 1.6 m. Contained coffins 725; 726; 727; 728; 762; 763 and 764.

Vault 251

Vault at the eastern end of Bay 1 against the eastern and southern walls of crypt. Constructed of brick and hard grey mortar with lime inclusions. Original arched entrance in west facing wall blocked by later brickwork. Brick floor raised above level of the crypt floor. Small stone plaque on northern wall of vault reads *W. Woods, Gent 1756*. Contained coffins 253; 254; 255; 493; 494 and 495.

Vault 470

Vault located at the eastern end of Bay 1, abutting the eastern and northern walls of the crypt. Originally the vault appeared to have been defined by an iron railing structure. During modern refurbishment, the vault was enclosed within a breeze block wall and a raised cement slab. Steps led up to a raised window or vent. Below the slab, four lead coffins were visible. These rested on the brick floor, and were covered

by spoil. The brick floor was raised by 0.4 m above the level of the crypt floor. Dimensions of vault: 2.5 m x 2.3 m. Contained coffins 471; 472; 473 and 474.

Bay 2

Vault 14

Rectangular vault located at the western end of Bay 2, adjacent to Vault 15. Composed of brick bonded with medium hard white mortar. Doorway (1.84 m x 0.91 m) set into eastern wall. Door has since been removed, but the latch in its iron frame remains *in situ*. The door frame is decorated with vertical twirls in head.

Stone lintel inscribed with *Charles Overton*. Vault was empty.

Vault 15

Rectangular vault located at the western end of Bay 2. Large opening (1.06 m wide) created in eastern wall. Walls rise to barrel vault. Small decorative 'vent' found above opening, and above stone memorial plaque. Plaque inscription reads: *The family vault of Thomas Hughes 1818.* Contained coffins 305; 306; 307; 308; 342; 343 and 344.

Vault 24

Small vault located at the eastern end of Bay 2. Constructed of brick, bonded with medium-soft grey mortar. A wooden door was found lying on the floor, and appeared to have collapsed directly from the existing vault opening. Condition poor with little of the structure surviving. Contained coffin 1196.

Vault 25

Vault in the eastern half of Bay 2, abutting the northern wall of the bay. Constructed of yellow brick bonded with fairly hard, white mortar. An iron barred gate in situ in the eastern wall is composed of eight vertical bars, six innermost circular section bars and three horizontals. A stone lintel over the gate is inscribed: *The family vault of Thomas Dalton esq.* On the south-facing wall is a stone memorial (0.68 m x 1.06 m) inscribed with *Thomas Dalton esq. died December 3rd 1846 in his 85th year. Elizabeth Harrison grand-niece of the above died November 17th 1852 in her 42nd year.* Contained coffins 770 and 771.

Vault 26

Vault located against eastern wall of crypt, adjacent to Vault 24. Constructed of brick bonded with medium-hard white mortar. Timber lintel forms western opening to vault. Lintel supports many bricks, straining somewhat under the load. Vent on south side, just below the main barrel vault, is composed of four rectangular openings. There is a large space for a stone plaque above the openings. An inscribed stone

plaque, found on the floor, matches the dimensions (0.76 m x 0.59 m) of the empty space, and belongs to this vault. Inscription reads: *Within this vault lies the body of William Dore Obit Oct 21 1816 aged 32. Mary Dore Obit May 6 1817 aged 4 years. Mary Dore Obit Jan 8 1821 aged 40 years.* Contained coffins 840; 841; 842 and 843.

Bay 3

Vault 11

Small vault of simple rectangular plan located towards the western end of Bay 3, abutting northern wall of bay. Constructed of brick bonded with hard, grey, grainy mortar. Inner faces rendered. Iron straps tie the wall to the primary buttress. The structure has almost totally come away from the primary wall of the crypt. The vault has been broken open at the western end, above the memorial stone.

Memorial stone is inscribed with *Matthew Little, died 3rd March 1808 aged 6 months.* Contained coffin 337.

Vault 12

Vault of simple rectangular plan, located at the western end of Bay 3, adjacent to Vault 13. Constructed of brick bonded with medium-hard white mortar. Large opening in eastern face appears once to have held a memorial stone, which is no longer *in situ*. A stone lintel is positioned above former memorial, and a timber lintel is immediately behind it. Contained coffins 301; 302; 303; 304 and 361.

Vault 13

Sealed vault located at the western end of Bay 3, adjacent to Vault 12. Constructed of red brick bonded with medium-soft white mortar. Large memorial stone (1.7 m x 0.9 m) set in wall, reads *M. Bowes Todd, late of ? Firshurn Place who departed this life Aug 8 1800 aged 32 years.* Address is not very clear. Single coffin rests on two brick row runners with a timber at each end. An oval glass viewing window with a black metal and gilt border is present. Contained coffin 350.

Vault 16

Vault located towards the western end of Bay 3 on the southern side. Constructed of white painted brick, inside and out, bonded with medium-hard white mortar. The vault has not been built or tied into the crypt wall or ceiling, but butts the main structure. Door opening (1.6 m x 0.95 m) in western wall with iron grille door *in situ.* Door is composed of a frame in-filled by five vertical bars topped with ‘spear’ tops. Stone lintel positioned above the doorway. Copper plate on door is inscribed: *Family*

vault of George Hathorn Esq, Brunswick South. Two timber runners have been placed on brick floor. Contained coffins 362; 363; 364; 465 and 466.

Vault 17

Former vault located in the western half of Bay 3 abutting the northern wall of the bay. Adjacent to Vault 18. Now demolished to ground level. Appeared to have been composed of a single skin of brick, bonded with hard white mortar. Brickwork painted on the outward face only, suggesting that painting took place after vault construction. Contained coffins 339; 340 and 341.

Vault 18

Rectangular vault located in centre of Bay 3 abutting the northern wall. Constructed of brick and medium-hard white mortar. The vault is composed of three free-standing walls, attached to the original bay structure by one square iron section bar at the western end of vault. Part of the original support pillar of the crypt and the eastern entrance to Bay 4 was cut away during the vault construction. Eastern and western walls are one brick thick, whilst the southern wall is two. Eastern doorway (0.91 m x 1.36 m) is surmounted by stone lintel, and sealed by an iron door, which remains *in situ*, but is off its hinges. Stone lintel inscription reads: *Mr W. Sutton's vault 1831.*
Contained coffins 716 and 717.

Vault 19

Private vault located in the centre of Bay 3, and abutting its northern wall. Constructed of white-painted brick bonded with white medium-soft mortar. Building of vault involved the removal of crypt support to four courses high. Vault remains sealed, although a number of bricks have come away at the eastern end, and subsidence has caused large cracks. Stone lintel in western face is located immediately above memorial, and straight joints are located either side of this (ie. a second body was added after initial construction). Inscription on lintel reads: *The private vault of Rev. Trefusis Lovell, rector of this parish, in which are deposited the mortal remains of Margaret, his beloved, virtuous, lamented wife, who died on Sunday June 25th 1837 aged 64 years. Also to the memory of the Re. Trefussis Lovell M.A. for upwards of 30 years rector of this parish; and formerly arch-deacon of Derry, Ireland, who departed this life October 10th 1841 in the 78th year of his age.*
Contained coffins 855 and 856.

Vault 20

Rectangular private vault located in the eastern half of Bay 3, abutting the northern wall of the bay. Constructed of yellow brick, unpainted externally. Internally, the two secondary walls appear to contain faint traces of paint, but this may just be discolouration or staining. Primary arched wall is plastered, possibly to conceal the removal of some of the original crypt pillar support in the dividing wall between Bays 3 and 4. Inscription on the stone plaque (1.05 x 0.63 m) on the southern wall reads*: Mrs Mary Ann Robinson wife of Mr E Robinson died the 5th of May 1838 in her 40th year*. The lower two-thirds of the slab is blank. Contained coffins 972 and 973.

Vault 22

Rectangular vault located at the eastern end of Bay 3, adjacent to Vault 21. Constructed of brick bonded with medium hard white mortar. Timber door-frame (0.95 m wide) in the western wall, but no door or memorial in situ. A timber bearer is set into the northern wall of vault, 1.1 m above the current floor level. Contained coffins 980; 981; 982; 983; 987 and 988.

Vault 23

Rectangular vault located in the eastern half of Bay 3, abutting the southern wall of the crypt. Constructed of whitewashed brick bonded with fairly hard white mortar. Access to the vault would have been at the eastern end, where there is a stone lintel, 1.26 m above the level of the present floor, straight joists on either side, and bricks similar on either side of the joint. Stone memorial plaque in the northern face reads: *John Capron of Finsbury Square died 18th May 1833 aged 78 years.* Lower half of plaque is blank. Contained coffin 492.

Bay 4

Vault 8

Large vault was located at the eastern end of Bay 4. Constructed of white-painted brick bonded with medium soft white mortar. It clearly abutted the barrel vault of the crypt, and was slightly coming away from the wall in places. Southern western wall was angled outwards so as to avoid blockage of the eastern entrance to Bay 3 (now blocked). Northern western wall was aligned at right angles to the spine of the crypt. This abutted a possibly blocked entranceway in the northern wall. In the eastern wall, within the crypt, a circular opening (very similar to one found at the eastern end of Bay 1) had been blocked with modern brick and mortar. Iron lining encircling inner face of the opening was still *in situ*. No memorial or inscription survived, but

stylistically this feature may have dated to the early 19th century. Two projecting entrance piers in western wall contained a wrought iron grill consisting of vertical circular section bars and four horizontals. Five horizontals were removed in the past. Contained coffins 1218; 1219; 1220; 1221; 1222; 1223; 1257; 1258; 1259; 1260 and 1261.

Discussion

The greater popularity of burial within the crypt of St Luke's church does not appear to have developed as a practical solution to burial overcrowding in the churchyards. From the plans of the two churchyards, it is evident that throughout its use as a place of burial, there was always considerable space available for the erection of additional vaults and shaft graves, and for burial within more humble earth-cut graves. Rather, the popularity of crypt burial appears to be ideological, based on the belief that greater worldly and/or spiritual benefit would be derived from interment there.

The period of burial at St Luke's Church coincides with the rapid urban expansion of London in this period (Porter 2000, 248). It also predates the emergence of municipal cemeteries, such as Kensal Green and Highgate, and legislation outlawing interment in the overcrowded churchyards of cities in the 1850s (*ibid*, 331; Curl 2002, 135). Originally established to address the urgent problem of severe over-utilisation of churchyards for the burial in this period, urban cemeteries rapidly became a fashionable new venue for the display of status through burial ritual (Curl 2002, 206-244). It is thus unsurprising that burial at St Luke's became less popular from this time onwards. Officially, it stopped altogether in 1853. The Vestry minutes record that a petition for an extension of time for closure of the churchyard and crypt to further burial had been turned down by the then prime minister, Lord Palmerston. At the end of that year, burial was discontinued, and the vaults sealed (MoLAS 1996).

Like the crypt vault burials, the churchyard vaults and shaft graves contained small family groups. Vault 1 was found empty, and vault 174 contained only a single coffin. However, all other shaft graves and vaults contained between two and nine individuals. On average, these churchyard structures held 3.6 burials. This is broadly similar to the mean of 3.43 interments per vault found within the crypt. However, there were considerably more named individuals identified within the crypt vaults (mean of 2.67) than in the churchyard vaults and shaft graves (mean of 1.57). This

probably reflects the better preservation and retrieval of coffin plates within the crypt vaults.

CHAPTER 4 BURIAL PRACTICE AND MATERIAL CULTURE

by Ceridwen Boston and Angela Boyle

Coffins and coffin fittings

Historical background

By 1700-20 the funeral furnishing trade was a firmly established business, providing fittings for all classes of people and at various costs, depending on the status and wealth of the deceased (Litten 1991). The financial investment in funerary panoply grew over the course of the 18th century and into the 19th century, reaching its zenith in the 1840s. Even amongst the poor the importance of providing a decent burial was keenly felt. However, for those that could afford it, the coffin itself was just one aspect of the elaborate mourning and funerary practices surrounding the death of a loved one in this period. Funerals of the wealthy frequently involved processions of black draped hearses, black plumed horses, mutes and chief mourners, a complex symbolism surrounding appropriate mourning dress, grand memorials, and of course the heavily decorated coffin itself. Rigid mores surrounded the conduct of the surviving members of a family, and prescriptions on the correct social behaviour and dress of mourners was assiduously adhered to, often for years following the death of a loved one.

However, after the 1840s, public sentiment changed yet again. Increasingly, such effusive displays of mourning were seen to be excessive and undesirable. In particular, elaborate, expensive funerals began to be regarded as vulgar, ostentatious displays of wealth and status, and increasingly, were considered to be in poor taste. In this period many caricatures stigmatise undertakers as avaricious, preying on the vulnerability of families in grief, exploiting other peoples' misfortune and their desire to be seen to 'do the right thing' by the dead. Over the middle and later Victorian period a taste for simpler funerals became the norm, and this persists today. Interestingly, in the further reaches of the old British Empire elements of the earlier burial traditions persist. Coffin fittings very much in the elaborate early Victorian mode were being manufactured in Birmingham and shipped out to the Caribbean (particularly to Jamaica) as recently as the 1960s. The coffins from St Luke's Church

date mainly to the heyday of the late Georgian/ early Victorian[2] funerary tradition at its most extravagant.

Early 19th-century perceptions of death

Social historians have often accused the Victorians of a morbid and unhealthy obsession with death. What is clear is that this rite of passage was celebrated more by the Victorians than in any preceding periods, in terms of preparation for death, funeral ritual, and the long period of mourning that followed. Victorian deathbed scenes, as depicted in the literature and art of the day, may seem to modern eyes morbid or mawkishly sentimental, but they represent a genuine attempt to confront the awful reality of death, such that when one's time came death could be met with serenity and calm resignation. In a society where the infant mortality rate varied between 20-50% (Rugg 1999), where epidemic infections could sweep through cities with terrifying ease and where medical interventions were still rudimentary and powerless to halt the advance of many diseases (such as tuberculosis), death was a familiar part of life. Rather than deny the very real presence of death in everyday life, the Victorians chose to accept and celebrate it, to give it centre stage. Instead of a morbid fixation, this response may be seen as a very human, understandable, and often very therapeutic confrontation of humanity's deepest fear.

Rugg (1999) writes that this Victorian concept of a 'good death', a death faced with equanimity, came about through a number of ideological and medical developments in the early years of the 19th century. Advances in medical knowledge and a more widespread trust placed in the medical profession lead to a transformation of the deathbed experience, the doctor's presence playing as central a role in the proceedings as the cleric. A heavy reliance on opiates to ease the pain of the dying served to disarm death of much of its terror. Instead of the emphasis on the physical torments of death and the spiritual torments of hell that had so dominated the thinking of earlier generations, the later Georgians and early Victorians were now more able to perceive death as a gentle slipping away, a falling asleep. Christian teaching also changed emphasis in this period. God became much more a God of Love than a God of Vengeance, and instead of hellfire and eternal damnation a gentler concept of the afterlife as heavenly and eternal rest developed. Considerable emphasis was placed on

[2] The Georgian period (1714-1837); the Victorian period (1837-1901)

heavenly reunion with loved ones in the afterlife, and was a great source of comfort to the bereaved. The effects of the Romantic movement also had a profound effect on attitudes to death and grieving. The movement's emphasis on individualism and the expression of sentiment made the outward displays of grief more socially acceptable, even desirable, both in an emotional and in a material sense.

The material culture surrounding death and mourning was particularly rich in the 19th century. Memorials to the dead abounded in many forms. For example, it was common practice to draw or paint the dead or dying, and later in the period, to photograph the corpse. Death masks were sometimes taken of the face or hands of the dead. Two examples of such effigies were found in a child's coffin at St George's Church, Bloomsbury (Boyle *et al.* in prep.). Locks of hair were often collected as keepsakes, or converted into jewellery.

Correct mourning dress was rigidly prescribed, and individuals failing to adhere to social conventions risked social ostracism. The period of mourning varied with the closeness of the relationship. Widows were expected to be in deep mourning for a year and a day following the death of their husband, wearing only dull lack-lustre fabrics such as crepe or bombazine. After this they might wear more lustrous fabrics, such as black silk. After two years the widow might go into half-mourning when she was permitted to wear purple or mauve. In addition to prescriptions on dress, the social behaviour of the bereaved was rigidly laid out. For example, a widow might not attend public functions, and was prohibited from re-marriage for a year following the death of her husband. By contrast a widower could remarry as soon as he pleased, but his new wife was expected to go into mourning for her predecessor (May 2000).

Social display of mourning manifested strongly in funerary ritual, and proved an admirable medium through which the social prominence of the deceased and family could be displayed. The necessity of giving a good 'send-off' to a loved one was felt by all classes of society. Failure to do this reflected on an individual's very respectability, and many poorer individuals beggared themselves in the attempt to put on a decent funerary spectacle (May 2000). The coffins from the churchyard graves and crypt interments at St Luke's Church show great variation in the richness of their fittings, reflecting the deeply entrenched social stratification that characterised this society. Whilst some could only afford simple wooden coffins, the opportunity for social display was not missed by the middle and professional classes interred in the

extramural vaults and crypt of St Luke's Church. May (2000) estimates that the average amount spent on a funeral of this social class was in the region of £100, notwithstanding the cost of interment in the vaults or crypt (see Chapter 2 above for details of burial fees). The richness of the coffins found within the crypt is eloquent testimony of the social ambitions of this class.

Coffin construction and materials

Coffins used in the later post-medieval period were of the flat lidded single-break type (Reeve and Adams 1993, fig. 51 shows an exploded view of a single-break coffin), and the coffins found at St Luke's Church were no exception. Coffins varied in construction and material, from the most simple unadorned wooden coffins found in pauper funerals to triple layered affairs of wood-lead-wood, heavily adorned with velvet and elaborate metal fittings. The most simple coffins were constructed of a single layer of wood nailed together with iron nails at the corners and along the coffin length. More elaborate wooden coffin constructions were double layered, or possessed a double lid. Some lids were especially designed to foil attempts by 'resurrectionists' or body snatchers to open the coffin and steal the corpse for later sale to anatomy schools for dissection (Litten 1991). On the 30th November 1758 the Vestry Minutes recorded that 'a reward of £5 be given to any person or persons who shall at any time detect and apprehend any person stealing a Corps out of any of the Burial Grounds belonging to the church, to be paid upon conviction thereof by the churchwardens.' The wooden coffin may or may not have been upholstered and decorated with metal coffin fittings, depending on the wealth and inclination of the mourners.

More expensive coffins possessed a lead shell in which the body was encased. Lead lined coffins are most commonly used for interments in the crypts of churches and within intra- and extra-mural vaults and brick-lined shaft graves. The lead of these coffins or shells served to slow, and sometimes arrest the decay of the corpse. The Georgian/Victorian religious belief in the importance of the integrity of the physical body on the Day of Judgement underlay some of the motivations to halt the natural corruption of the corpse. It also fed into the gentle, romantic metaphor of death as eternal rest, underplaying the processes of physical decay that had so pre-occupied people of the later medieval and earlier post-medieval periods (Rugg 1999). On a practical level, the containment of body liquor within a water and air-proof container was of particular importance when interring individuals within the church

vaults or beneath the floor of the church itself. In many churches, such as St George's, Bloomsbury (Boyle *et al.* in prep.), encasement within a lead shell was a basic requirement of interment within the church crypt. The legal imposition of lead coffins for intramural burial occurred in 1815. Previously on the 12th October 1810 the Vestry Minutes recorded 'that hereafter no corpse be permitted to be placed in the vaults except in leaden or metal coffins.'

Lead-lined coffins were either double or triple layered. Double-layered coffins were composed of a lead shell either enclosed by, or enclosing a wooden coffin. Triple-shelled coffins had a wooden inner coffin within a lead shell, the lead itself being enclosed within an ornately decorated and upholstered wooden outer case.

Triple-shelled coffins represent a great investment in time, materials and money, and as such, indicate the wealth of the individual interred and/or the surviving family. The inner wooden coffin was usually of elm, particularly favoured for being more impermeable to water than many other available woods. Planed elm planks were glued and screwed together, and the seams caulked with Swedish pitch. The interior of the coffin was usually lined with fabric, most commonly cambric, a fine white linen made in Cambray, Flanders (Litten 1991). The inner wooden coffin was then encased within a lead shell. The fashioning of the lead shell was beyond the capabilities of most coffin makers, and usually undertaken by a local plumber (ibid). Unlike the inner or outer coffins, the lead shell had to be bespoke. Lead sheets were cut and shaped around the inner wooden coffin. The pieces of lead were then soldered together to create a water and airtight container. Then, either an inscription was engraved directly onto the lead shell, or a fairly plain lead inner coffin breastplate was soldered or riveted thereon. The outer wooden case was prepared and covered with upholstery and decorated with iron or brass studs in advance of the placement of the lead shell within it. Lowering the lead coffin into the outer wooden coffin or case was a difficult and delicate business, usually requiring six men to lift the shell by means of lengths of webbing. This webbing was then cut and removed from beneath the lead shell, and the lid of the outer wooden coffin was screwed or bolted into place (ibid).

Lining of the inner wooden coffin

Cambric was widely used to line the interior of the inner wooden coffin. Often a decorative frill of punched 'lace' covered the coffin sides. This was aesthetically most important where the corpse was to be viewed prior to burial. Fragments of this coffin lining were found adhering to the internal wood of many of the coffins at St Luke's.

Fragments of cambric with a punched lace frill were found within inner wooden coffin 213 (vault 109), coffins 981 and 982 (vault 22); 990; 1039; coffin 1149 (vault 1160), 1151 and 1207. Coffin 307 (vault 15) was more exotic, being lined with a very fine black silk.

Traditionally, the base of the inner coffin was covered with a shallow calico-covered layer of sawdust or bran, which helped to absorb some of the body fluids released during putrefaction. It was observed at St Luke's Church, St George's Church, Bloomsbury (Boyle *et al.* in prep) and St Nicholas' Church, Sevenoaks (Boyle pers. comm.), that plentiful sawdust or bran within the coffin correlated closely with poorer preservation of the skeleton. This is probably the result of leaching of the inorganic bone minerals due to the more acidic environment created by the decaying bran or sawdust (Janaway 1996).

As an alternative to this sawdust or bran layer, the corpse was sometimes laid out on a mattress, with a pillow beneath the head (Litten 1991). This practice reflects the strong symbolic association between death and sleep that developed in the later Georgian/Victorian mind during this period (Rugg 1999). At St Luke's, six such mattresses were found. Coffins 364 (vault 16) and 923 each contained a horsehair mattress, and coffins 926 and 990 (vault 21) a kapok-stuffed mattress and pillow. Kapok is a fine short-stapled cotton wool, also known as silk alton. The material of the mattress within coffin 1270 was not identified. The mattress within coffin 307 (vault 15) was most elaborate, the kapok-stuffed mattress being covered with silk and decorated with tassels. The skull was found resting on a horsehair pillow. Another pillow was found beneath the bonneted head of a Mrs Elizabeth Burnill (coffin 491; vault 483).

One curious and highly unusual find within one coffin (1258) at St Luke's Church was a large quantity of liquid mercury on the coffin base. The reason for its presence in the coffin is not well understood. Mercury was used as a treatment for syphilis and it has been suggested that this treatment may in some way explains its presence within the coffin. No evidence for the disease was found on the skeleton of this young man of 19 years. However, tertiary syphilis is only detected on the skeleton in 10% of cases (Roberts and Manchester 1995). Thus, it is quite possible that he did have the disease although it had not manifested osteologically. His age certainly, suggests someone too old to have been suffering from congenital syphilis, but not too young for the sexually transmitted equivalent to have developed sufficiently for the

disease to be clinically recognised. It is thought by some that the poet and forger Thomas Chatterton who died at the age of 17 years in 1770 from arsenic poisoning may have been trying to cure himself of venereal disease. An alternative hypothesis is that the mercury was placed within the coffin as a means of preserving the corpse. Mercury, like lead, is toxic to many bacteria, and consequently slows the process of natural decay of the body.

Coffin fittings

From the early 18th century, it became the norm to decorate the upholstery of the outer wooden case with a suite of metal coffin fittings or furnishings. The number and materials used for the fittings reflected the wealth and hence, status, of the deceased and family. Considerable variation may be observed across the classes of Victorian society. However, it is important to bear in mind that even the more humble went to considerable pains to bury their loved one with as many accoutrements as they could afford.

A full suite of coffin fittings was composed of one to four *departum* plates (an inner and outer breastplate, a headplate and a footplate), lid motifs, escutcheons, grips and grip plates. In addition, brass or iron studs, originally used to secure the upholstery to the wooden case, became a decorative device, being arranged to create complex patterns on the lid and side panels of the coffin.

Grips were produced by casting. All other coffin fittings were stamped using dies (Litten 1991). Between 1720-30 these were produced by hand-operated die stamping machines, but after this such machines became power-assisted (ibid). Coffin fittings could then be produced *en masse* and were financially accessible to a wider audience by the mid- to late Georgian period. Excavations of the 18th- and 19th-century churchyard and crypt of Christ Church, Spitalfields, London, undertaken in the 1980s, revealed a large number of coffin fittings. The taxonomy compiled from these fittings (Reeves and Adams 1993) forms the basis for identification of the styles in vogue throughout this period.

In comparing the dates for the fittings from St Luke's Church with those from other sites, it is hoped that more refined dating of coffin fittings styles will be possible. In addition to comparisons with Christ Church, Spitalfields, fittings from St Luke's were compared with fittings from St George's, Bloomsbury (Boyle *et al* in prep), and St Bartholomew, Penn, Wolverhampton (Boyle 2004), two broadly

contemporary burial sites recently excavated by Oxford Archaeology. Table 4.1 summarises the results of this comparison. Styles from Christ Church, Spitalfields, are prefixed in the text by the abbreviation CCS; new styles identified from St Luke's Church, Islington are prefixed by OLR; those from St George's church, Bloomsbury, are prefixed by BBM.

New coffin fitting styles from these new sites have been added to types known from Christ Church, Spitalfields, to create a more accurate and comprehensive 'master catalogue' that may be used in future burial recording of this period. Archaeological research into Georgian/Victorian funerary regalia is in its infancy. Data from sites such as St Luke's Church are therefore vital in enriching our understanding of the material culture of the Victorian funeral, and through this, to provide insights into perceptions of death and resurrection in the 18th and 19th centuries.

Table 4.1 New types of coffin fittings from the churches of St. George's, Bloomsbury, and St. Luke's, Islington, that could be matched stylistically, but did not match the Christ Church, Spitalfields taxonomy. OLR refers to new styles from St Luke's church, whilst BBM refers to new styles from St George's.

Matching Coffin Fittings from St Luke's church, Islington, and St George's church, Bloomsbury							
St George's	**Date**	**N**	**St Luke's**	**Date**	**N**	**Overall date**	**N**
Breastplates							
BBM 5	1820-1834	2 (2)	OLR 17	1830	1 (1)	1820-1834	3 (3)
BBM 23	undated	1 (0)	OLR 4	1797-1824	5 (5)	1797-1824	2 (1)
BBM 8	1813-1818	4 (4)	OLR 16	1822-1836	2 (2)	1813-1818	6 (4)
BBM 9	1823- 1825	2 (2)	OLR 9	undated	1 (0)	1823-1825	3 (2)
BBM 16	1852	1 (1)	OLR 8	1812	1 (1)	1812-1852	2 (2)
BBM 26	1835	1 (1)	OLR 32	1840-1848	2 (2)	1835-1848	3 (2)
BBM 1	1834	1 (1)	OLR 21	1823	1 (1)	1823-1834	2 (2)
Grips							
BBM 2	1813-1842	1 (1)	OLR 7	undated	1 (0)	1813-1842	3 (2)
Lid motifs							
BBM 9	1830	1 (1)	OLR 5	1847	1 (1)	1830-1847	2 (2)

A large number of matches were found between coffin fittings from St Luke's church and Christ Church, Spitalfields (Table 4.7). In addition, 67 hitherto unknown styles

were identified. These were drawn on site and the illustrations are included in the report (Figures 4.1-4.73).

Symbolism of motifs used on coffin fittings

This section is largely based on information from www.vintageviews.org/vv-tl/pages/Cem-Symbolism.htm. The motifs displayed on coffin fittings were not merely decorative, but were deeply imbibed with symbolism. Many represented Christian symbols of death, eternal life and resurrection, whilst others owe more to secular symbolism. Classical symbolism abounded, the urn (an Ancient Greek symbol of mourning) was a very popular motif well into the 1850s. Some motifs refer to the age or unexpectedness of the death of a particular individual. For example, the broken column (as seen in the *resurgam* lid motif OLR 4) denotes untimely or unexpected death, a life cut short prematurely. Cherubim were particularly favoured for the coffins of infants and children. Composite symbolism was often used. For example, lid motifs OLR 1-3 of flaming urns cloaked in drapery and laurel wreathes combine the symbolism of drapery and the urn as symbols of mourning, the flame as the flame of eternal life, and the laurel wreath as victory over death (Figures 4.70-72).

Angels and cherubim are very popular motifs on all types of coffin fittings at St Luke's Church. Angels obviously denote heaven and the afterlife, but a cherub's head without a body symbolises the soul. Angels blowing trumpets represent God's glory and victory over death, or alternatively the Day of Judgement. A few of the most common motifs and their symbolism in a Victorian burial context are listed below:

- Shells - fertility, resurrection and pilgrimage (particularly the scallop shell)
- Sunbursts- renewed life after death
- Crown- the crown of Jesus, immortality, righteousness, glory of eternal life
- Flame- eternal life
- Scroll- life and the passing of time
- Skull- death and mortality
- Winged face- the departing soul

Flowers have long played a symbolic role in funerals, the colour and species conveying complex ideas about life, death and rebirth. In the early Victorian period, the placement of wreaths of flowers on the coffin was largely confined to the funerals of girls and young maidens. Evergreens and white flowers, such as roses or lilies,

were acceptable. Bright colours were frowned upon, and even the stamens of white lilies were cut off lest the golden pollen affect the effect of purity (May 2000). Over the course of the 19th century, the laying of wreathes on the coffin and on the grave became more widespread across society (Cox 1998c, 116; Mays 2000). At St Luke's Church, an arrangement of flowers had survived on top of a coffin of an unnamed young female (coffin 188). Examples were also recorded at St Nicholas, Sevenoaks (Boyle 1998).

Breastplates and grip plates are particularly rich in foliage and floral motifs. Whilst the majority are stylised or generic plants, occasionally it is possible to recognise the species. Lilies and chrysanthemums have long been associated with death. Lilies are particularly associated with the Virgin Mary and were most commonly associated with the burial of women. The lily was often seen to represent purity, resurrection and the restoration of innocence of the soul at death. Roses are frequently depicted on breastplates. Roses represent beauty, hope and unfailing love. Depending on the stage of their opening, the rose may represent the age of the person at the time of their death, a bud denoting a child, a partial bloom a teenager, and a rose in full bloom, an adult. Other plant motifs depicted on the fittings from St Luke's Church are listed below:

- Acanthus leaves- heavenly garden
- Daisy- childhood innocence, youth, Jesus the Infant
- Fleur-de-lis- flame, passion, love of a mother
- Laurel- distinction in life, victory over death
- Oak- stability, strength, honour, eternity, the cross of Jesus, liberty
- Palm- spiritual victory over evil, success, eternal peace, Jesus' victory over death
- Poppy- peace, sleep (and hence, death), consolation
- Thistle- earthly sorrow, Christ's crown of thorns, Scotland as country of origin

Upholstery and stud-work

In the later post-medieval period, the outer wooden coffin was usually upholstered in either velvet or baize, the former being the more expensive alternative (Litten 1991). At St Luke's Church, the preservation of upholstery fabric was very poor, with only 33 coffins retaining vestiges of recognisable textile on the outer wooden coffin. Of these, 28 were of baize, and 2 of velvet. On three coffins a loosely woven, coarse

fabric was identified. This was probably shoddy, rough cloth made of woollen yarn, obtained by tearing to shreds refuse woollen rags, and by the addition of some new wool. Shoddy was often used as a backing for velvet upholstery, which, presumably, had since decayed. Traditionally, the colour of coffin upholstery was black, but coloured cloth did begin to be used in the early 19th century (Litten 1991). At St Luke's Church, two coffins displayed coloured upholstery: coffin 158 was covered with yellow fabric, and coffin 188 with green.

Upholstery studs were composed exclusively of brass or of iron. Of the 123 coffins with extant studs 82 were composed of iron, and 41 of brass (Table 4.2). In a number of cases these were painted black, and in one case the brass studs had been gilded. Due to the poor preservation of the outer wooden coffins little of the decorative arrangement of the studs could be identified. Indeed, in the vast majority of cases only single loose studs or short rows of 3-10 studs were recovered from the grave backfill. Only two coffins' upholstery stud designs could be matched to those from Christ Church, Spitalfields: CCS 3 (coffin 479) and CCS 36b (coffin 1089).

Table 4.2 *Types of metals used for coffin fittings at St Luke's, Islington (n = 750)*

Fitting type	**N**	**Iron**	**Lead**	**Silvered tin**	**Brass**	**Tin pewter**
Departum plates	204	19 (9.36%)	153 (75.37%)	16 (7.88%)	15 (7.39%)	1 (0.49%)
Coffin grips	243	241 (99.18%)	0	0	2 (0.823%)	0
Grip plates	142	122 (85.92%)	6 (4.23%)	2 (1.41%)	0	12 (8.45%)
Lid motifs	23	17 (73.91%)	2 (8.70%)	0	0	4 (17.39%)
Escutcheons	15	8 (53.33%)	0	1 (6.67%)	2 (13.33%)	4 (26.67%)
Upholstery studs	123	82 (66.67%)	0	0	41 33.33%)	0

Departum plates

Departum plates were riveted onto the upholstered coffin in the positions that their individual names suggest (inner, outer, head, foot). All breastplates at St Luke's had inscriptions giving the title, name, age and date of death of the deceased. Occasionally, additional information was included, such as their place of birth or residence, their profession (in the case of a man) or the profession of their father or

husband (in the case of a woman) and relationships to other family members. Inner breastplates usually contained the same information as the outer breastplate, but sometimes contained less detail. The information from the head and footplate inscriptions was usually restricted to the name, title and year of death of the deceased. Such information is a rich source of biographical and palaeodemographic data for the population interred there.

Two hundred and three *departum* plates were recorded from St Luke's (Table 4.2). The majority (n = 204) was made of lead (75.37%). Plates of iron constituted 9.36%; silvered tin, 7.88%; brass, 7.38% and tin pewter 0.49% of the assemblage. Lead breastplates were heavily decorated with stamped motifs and borders. The symbolism underlying these motifs has been discussed above. Many breastplates were too corroded for their styles to be identified. Sufficiently well preserved breastplates were compared to the Christ Church, Spitalfields taxonomy (Reeves and Adams 1993). Matches were found in 100 cases (49.26%). These comparisons are of significance in refining the date ranges during which specific styles were in use in the late Georgian/early Victorian period. In addition to known styles, 46 new breastplate styles (OLR 1- 46) were identified at St Luke's church on 87 individual breastplates. These were sketched on site and comprise Figures 4.1-4.56. The number of breastplates in each new style is listed below in Table 4.3. Date ranges are also given. Of the new styles, OLR 29 was the most popular (eg Fig. 4.40), Date ranges are also given. On comparing these new breastplate styles with those identified at St George's, Bloomsbury, seven matches were found (Table 4.1).

Table 4.3 Summary of the new breastplate styles at St Luke's church, Islington (n = 87). N = total number identified in the assemblage. The numbers quoted in brackets are the number of examples of known date. Date ranges for the new types are given.

OLR Number	N	Date range
1	2 (2)	1824-1850s
2	1 (1)	1832
3	1 (1)	1766
4	5 (5)	1797-1824
5	1 (1)	1807
6	1 (1)	1764
7	1 (0)	undated
8	1 (1)	1812

9	1 (0)	undated
10	1 (1)	1756
11	1 (1)	1808
12	1 (0)	undated
13	1 (1)	1771
14	1 (1)	1822
15	1 (1)	1778
16	2 (2)	1822-1836
17	1 (1)	1830
18	1 (1)	1827
19	2 (2)	1817-1823
20	1 (1)	1836
21	1 (1)	1823
22	4 (3)	1844-1853
23	2 (2)	1823-1845
24	2 (2)	1844-1848
25	1 (1)	1837
26	8 (7)	1820-1844
27	3 (3)	1846-1850
28	4 (4)	1841-1849
29	14 (13)	1835-1844
30	2 (2)	1843-1844
31	1 (1)	1838
32	2 (2)	1840-1848
33	1 (1)	1818
34	2 (2)	1831-1840
35	1 (1)	1851
36	1 (1)	1834
37	1 (1)	1831
38	1 (1)	1838
39	1 (1)	1853
40	2 (2)	1830-1848
41	1 (1)	1813
42	1 (1)	1835
43	1 (1)	1761
44	1 (1)	1755
45	1 (1)	1791
46	1 (1)	1815

Grips and grip plates

Once solely functional, the grips with which mourners carried the coffin became stylistically elaborate during this period, as did the grip plates through which the grips attached to the coffin. Depending on the coffin size, most coffins originally had between four and ten grips. Pairs of grips and grip plates were attached along the long axis of the coffin. Frequently another pair was attached to the head and the foot of the

coffin. In most cases the grips and grip plates on a coffin matched one another in style and the type of metal used.

Grip plates from 142 coffins were recovered at St Luke's. Many were very poorly preserved, and often consisted of no more than small fragments corroded onto the reverse of the more robust grips. Of those sufficiently well preserved to identify, grip plates from 59 coffins were found to match the Christ Church, Spitalfields taxonomy. The most ubiquitous was CCS 3, found on 30 coffins (50.85%). The popularity of this style is echoed in the assemblages from Christ Church, Spitalfields, (Reeve and Adams 1993); St George's, Bloomsbury (Boyle *et al* in prep), and St Bartholomew's, Penn (Boyle 2004). Frequently, but certainly not in all cases, grip plate CCS 3 and grip CCS 4 were found together as a set. Of the total numbers of grips and grip plates from the four sites, grip plate CCS 3 accounts for 50.44% of the total number of coffins with recognised grip plates; and grip CCS 4 for 35.6% of the grips. In addition to the styles that could be matched to the Christ Church, Spitalfields taxonomy, six new styles of grip plate (OLR 1- 6) were identified (Figures 4.64-4.67). No matches with the new grip plate types were made with the St George's, Bloomsbury assemblage.

Coffin grips were recovered from 243 coffins at St Luke's church. Being predominantly of iron, many had suffered considerable corrosion, and the style of decoration could not be identified. One hundred and thirty five were matched to the Christ Church, Spitalfields taxonomy. In addition, nine new styles (OLR 1-9) were identified (Figures 4.57-4.63), of which one (OLR 7, Figure 4.63) could be matched to a grip from St George's, Bloomsbury (BBM 2).

Needing to be robust, the metals used for grips were restricted to iron and brass, whereas a greater variation in materials could be used for the grip plates. At St Luke's, iron was overwhelmingly the most favoured metal for grips, constituting 99.18% of the total assemblage. The remaining grips were of brass. Iron was also the most popular metal for grip plates (85.92 %), followed by tin pewter (8.45 %), lead (4.23 %) and silvered tin (1.41 %).

Table 4.4 Summary of new types of coffin fittings, other than breastplates, identified at St Luke's church, Islington (n = 57). N = total number of examples of each style found, with datable examples in brackets. The known date ranges are also given.

Grip plates	**N *(N = 14)***	**Date range**
OLR 1	8 (1)	1819
OLR 2	1 (1)	1853
OLR 3	1 (1)	1810
OLR 4	2 (2)	1836-1847
OLR 5	1 (1)	1799
OLR 6	1 (0)	undated
Grips	N *(N = 36)*	Date range
OLR 1	1 (0)	undated
OLR 2	1 (0)	undated
OLR 3	1 (1)	1811
OLR 4	28 (3)	1819-1852
OLR 5	1 (1)	1853
OLR 6	1 (0)	undated
OLR 7	1 (0)	undated
OLR 8	1 (1)	1847
OLR 9	1 (1)	1799
Lid motifs	N *(N = 6)*	Date range
OLR 1	1 (1)	1807
OLR 2	1 (1)	1813
OLR 3	2 (2)	1787-1790
OLR 4	1 (1)	1847
OLR 5	1 (1)	1847
Escutcheons	N *(N = 1)*	Date range
OLR 1	1 (0)	undated

Lid motifs

Lid motifs and escutcheons are decorative stamped pieces of metal attached to the upholstery of the outer wooden case. Lid motifs are larger than escutcheons and tend to be located above the head and in the knee area of the coffin lid. Escutcheons are most commonly found in the corners and along the margin of the upholstery stud-work panels of the coffin lid and side panels.

Relatively few lid motifs were recovered from St Luke's Church. This is probably more a factor of poor preservation rather than a genuine absence from the

original assemblage. The vast majority of lid motifs were composed of very thin sheets of stamped iron. Only 23 lid motifs were recovered from the site. It is probable that many more had rusted away altogether. The lid motifs at St Luke's church were made of iron (73.91%); tin pewter (17.39%) and of lead (8.7%). Thirteen motifs were matched to the Christ Church, Spitalfields taxonomy. Using the St Luke's material, it is now possible to date three lid motif types. In addition, four new types were identified (OLR 1- 4), three being flaming urns (Figs 4.69-4.71), and one a *resurgam* motif (Figure 4.72).

Escutcheons

Escutcheons were recovered from 15 coffins at St Luke's Church. In common with lid motifs these metal fittings are made of very thin stamped metal, and hence, are more prone to corrosion than more robust fittings, such as breastplates and grips. It is thus probable that the original prevalence of escutcheons was very much higher than was recovered during the excavation. There was much greater variation in the materials used for this form of coffin decoration. Escutcheons from eight coffins were composed of iron (53.33%), four of tin pewter (26.67%), two of brass (13.33%) and one of silvered tin (6.67%). Stylistically, escutcheons from 20 coffins were matched to the Christ Church, Spitalfields taxonomy. One new style was identified (OLR 1; Figure 4.73).

The distribution of coffin types at St Luke's Church

The general condition of the coffins at St Luke's church varied greatly, the coffins within the earth-cut graves of the churchyard being worst preserved, and the interments in the crypt best preserved. At St Luke's Church, remnants of coffins survived in association with 712 of the total of 1048 burials (67.94%)[3]. It is assumed that all burials were originally contained within a coffin, as was the common burial practice, in all but the most extreme cases of poverty, in this period. However, natural decay of wooden coffins, particularly in earth-cut graves, has removed all traces of the original coffins. Table 4.5 below summarises the coffin materials and coffin types found in the churchyards and the crypt of St Luke's Church.

[3] A further five skeletons were identified during osteological analysis bringing the total to 1053.

Table 4.5 Summary of coffin types and materials (n=712)

Material	Single	Double	Triple	Total
Wood	254	0	0	254
Lead-lined	0	14	439	453
Iron	3	0	0	3
Zinc	1	0	1	2
Total	258	14	440	712

There is a marked patterning to the distribution of coffins of different type and materials as demonstrated in Table 4.6. Wooden coffins were found predominantly in the earth-cut graves of the churchyards (92.19 %). Only one was present within the crypt, whilst a more mixed picture emerged in the brick-lined shaft graves and extramural vaults. Of the 62 burials within these structures, 35.48 % (n = 22) were of wood. Extramural vaults had a lower proportion of wooden to lead coffins (34.21 %) than brick-lined shaft graves (55.88 %). The remaining coffins were lead-shelled coffins, with the exception of three iron coffins and two zinc coffins. Non-lead metallic coffins began to be used in the mid-19th century, being cheaper than wooden coffins, and lighter than a lead equivalent, but like lead they provided a water and airtight container for the corpse. However, they never achieved much popularity with the public, and even less so with incumbents of the Church, taking a long time to decay. Additional charges by the Church for burial within such coffins also contributed to their unpopularity (Litten 1991).

Table 4.6 Location of coffins of different materials within the churchyards and crypt of St Luke's church, Islington (n = 1048)

Location	Coffin not extant	Wood	Lead-shelled	Zinc	Iron
Northern churchyard earth-cut graves	274	86	17	0	0
Southern churchyard earth-cut graves	56	150	45	1	3
Total extra-mural earth-cut graves	330	236	63	1	3
Northern churchyard vaults and shaft graves	1	2	17	0	0
Southern churchyard vaults and shaft graves	4	15	23	0	0
Total vaults and shaft graves	5	17	40	0	0
Church crypt	0	1	351	1	0
Location unknown	1	0	0	0	0
Totals	336	254	453	2	3

The distribution of the different coffin types within the churchyard and the crypt of St Luke's suggests a strongly hierarchical approach to the most socially desirable place of burial across the site. Overall, earth-cut graves were the most humble and least desirable, followed by brick-lined shaft graves, then extra-mural vaults, and the most desirable of all, interment beneath the living body of the church itself. The southern churchyard would have been a more desirable place of burial than the northern churchyard because the church entrance was on the south side and consequently burials would have been more visible there. Burial fees were greater and this is further reflected in the higher numbers of lead-shelled coffins there when compared to the northern churchyard (see Table 4.6).

Grave clothes and grave goods

Janaway (1998) comments on the great variation in dressing corpses in the 18th and 19th centuries. A loose sheet or winding cloth was often placed under the corpse and used to line the open coffin, and later was folded over to cover the corpse, often being pinned in place. Shroud pins were found in five coffins (428; 468; 947; 985; 1270). A punched lace or ruched ruffle (trimming consisting of frills) often adorned the coffin sides. This has been discussed more fully above.

The corpse itself was often clothed in a crudely made shroud. Nightdress-like shrouds, often with a ruffle round the neck and down the front, began to replace the earlier practice of dressing the dead in everyday personal clothing in this period

(Janaway 1998). One male skeleton (coffin 778) at St Luke's was discovered with a trouser button overlying his pelvis, suggesting that he was wearing trousers at the time of burial. The lack of other such fastenings suggests that most individuals buried at St Luke's were dressed in shrouds. In a number of lead coffins, shroud fragments were found adhering to the bone. Seventeen coffins contained shroud material. In most cases the fabric was not identified. In coffins 354 and 966, woollen shrouds were identified, whilst a shroud of linen was discovered within coffin 1022.

Three female skeletons had a textile frill around the skull (468; 491; 526). In coffin 524 this fabric was very well preserved and was clearly a bonnet. One male (coffin 162) wore a length of green and cream silk pleated and folded around his neck. The excavator interpreted this as a cravat.

In keeping with Christian beliefs of the period, very few coffins contained grave goods or even personal affects. Exceptions were coffin 871, which contained a single gold earring; coffin 959, a copper alloy coin; 1013, a bone handle from a piece of cutlery.

Conclusion

The coffin fittings from St Luke's church constitute an important new corpus that makes a valuable contribution to the growing body of knowledge about the material culture of funerals in the late Georgian/early Victorian era. Although much is known historically about Victorian burial traditions, examination of the physical remains of the coffins and other funerary accoutrements is a relatively new and exciting field. Comparisons with Christ Church, Spitalfields, St George's Church, Bloomsbury (Boyle *et al* in prep.) and St Bartholomew's Church, Penn, Wolverhampton (Boyle 2004), have refined the dating of many known fitting styles. Many date ranges of coffin fitting styles from Christ Church, Spitalfields, have now been greatly expanded, suggesting that numerous styles remained in vogue for up to 150 years. Others appear to have enjoyed much more transient popularity. However, such research is still in progress, and as the coffin fitting corpus expands with the addition of data from more sites in the future, a more comprehensive picture should emerge.

In addition, to furthering our knowledge of existing fittings, 67 new types have been identified at St Luke's church, and will be added to the 'master catalogue' in progress. It is hoped that this information will be available to excavators of future

post-medieval burial sites, and that this valuable research will be carried forwards in the future.

Table 4.7 Summary of styles of coffin fittings from 18th- and 19th-century churches based on typologies from Christ Church Spitalfields (CCS)

Types	Christ Church, Spitalfields		St Luke's, Islington		St. Bartholomew's, Penn, Wolverhampton		St. George's, Bloomsbury		Overall date range from the four sites	
Outer Breastplates	**(N = 325)**	**N**	**(N = 100)**	**N**	**(N= 47)**	**N**	**(N= 182)**	**N**	**(N = 655)**	**N**
CCS 1	1729-1807	15	1775	1	1811-1855	40	1848	1	1729-1855	57
CCS 2	1839-1845	2	1814	1	undated	1	1830	1	1814-1845	5
CCS 3	1810-1821	11							1810-1821	11
CCS 4	1783-1822	5	undated	1			1819	1	1783-1822	7
CCS 5	1827-1847	3							1827-1847	3
CCS 6	1783-1852	25	1802-22	10			1805-1824	16	1783-1852	51
CCS 7	1779-1794	2			undated	2	1827	1	1779-1827	5
CCS 8	1767-1825	34	1785-1880	9			1805-1832	18	1767-1880	61
CCS 9	1773-1797	12	1773-1814	7			1825-1834	4	1773-1834	23
CCS 10	undated	1							undated	1
CCS 11	undated	1							undated	1
CCS 12	undated	2							undated	2
CCS 13	1799	1							1799	1
CCS 14	1743-1818	4					1818	1	1743-1818	5
CCS 15	1824	2							1824	2
CCS 16	1835	1							1835	1
CCS 17	1828	1							1828	1
CCS 18	1765	10							1765	10
CCS 19	1761	1							1761	1
CCS 20	1813-1847	3	1790-1853	18			1814- 1852	19	1790-1853	40
CCS 21	1824-1847	21	1828-1850	27			1812- 1846	29	1812-1850	77
CCS 22	1821	1					1818-1819	2	1818-1821	3
CCS 23	1831	1					1830-1843	2	1830-1843	3
CCS 24	1782-1819	4					1809-1826	3	1782-1826	7
CCS 25	1832	1					1845	1	1832-1845	2
CCS 26	1832-1849	3					1835	1	1832-1849	4
CCS 27	1788-1839	3			undated	2	1814	1	1788-1839	6
CCS 28	1829-1842	4	1844	1			1822-1823	2	1822-1844	7
CCS 29	undated	2							undated	2
CCS 30	1809-1832	3					1819-1826	3	1809-1832	6
CCS 31	1759-1821	3							1759-1821	3
CCS 32	1830	1					1833	1	1830-1833	2
CCS 33	1802	1							1802	1
CCS 34	1820	1							1820	1
CCS 35	1806-1825	6							1806-1825	6

CCS 36	1821	1							1821	1
CCS 37	1796	1	1795	1					1795-1796	2
CCS 38	1779-1825	6							1779-1825	6
CCS 39	1794	2							1794	2
CCS 40	1788	1							1788	1
CCS 41	1764-1767	3							1764-1767	3
CCS 42	1777	1							1777	1
CCS 43	1793-1797	2							1793-1797	2
CCS 44	1828-1829	2							1828-1829	2
CCS 45	undated	1							undated	1
CCS 46	1771-1821	6					1806-1846	7	1771-1846	13
CCS 47	undated	1					1810-1840	2	1810-1840	3
CCS 48	1835	1							1835	1
CCS 49	undated	1			undated	2			undated	3
CCS 50	1780-1821	6							1780-1821	6
CCS 51	1795	1							1795	1
CCS 52	1778-1794	4					1825-1833	2	1778-1794	4
CCS 53	1834	1							1825-1833	3
CCS 54	1827	1							1827	1
CCS 55	1820-1826	3							1820-1826	1
CCS 56	1825	2							1825	3
CCS 57	1812-1824	2							1812-1824	2
CCS 58	1823	1							1823	2
CCS 59	1793	1							1793	1
CCS 60	undated	1							undated	1
CCS 61	1765-1786	3	1808	1			1811	1	1765-1811	5
CCS 62	1811	1							1811	1
CCS 63	1775	1							1775	1
CCS 64	1777-1794	4	1783	1					1777-1794	5
CCS 65	1778	1							1778	1
CCS 66	1761-1770	6							1761-1770	6
CCS 67	1769-1777	3	1802	1			1807-1826	8	1769-1826	12
CCS 68	1768	1							1768	1
CCS 69	1765-1803	3							1765-1803	3
CCS 70	1777-1778	2							1777-1778	2
CCS 71	1765	1							1765	1
CCS 72	1765	1							1765	1
CCS 73	1776	1							1776	1
CCS 74	1777	1							1777	1
CCS 75	1782	2							1782	2
CCS 76	1785-1793	2							1785-1793	2
CCS 77	1823	1							1823	1
CCS 78	1827	1							1827	1

CCS 79	1790	1							1790	1
CCS 80	1777-1786	2							1777-1786	2
CCS 81	1836	1							1836	1
CCS 82	1820-1829	5	1800- 1830	17			1806- 1848	47	1800-1848	69
CCS 83	1747	1							1747	1
CCS 84	1833-1836	2	1828-1835	4			1810-1842	15	1828-1842	21
CCS 85	1835	1					1810	1	1810-1835	2
CCS 86	1795-1811	2					1805	1	1795-1811	3
CCS 87	1827	1							1827	1
CCS 88	1770	1							1770	1
CCS 89	1758	2							1758	2
CCS 90	1827	1							1827	1
CCS 91	1824	1							1824	1
CCS 92	1832	1	1848	1					1832	2
CCS 93	1852	1							1852	1
CCS 94	1829	1							1829	1
CCS 95	1737-1746	2							1737-1746	2
CCS 96	1732	1							1732	1
CCS 97	1793	1					1823	1	1793-1823	2
CCS 98	1776	1							1776	1
CCS 99	1772	1							1772	1
CCS 100	1775	1							1775	1
CCS 101	1768	1							1768	1
CCS 102	1739	1							1739	1
CCS 103	1806-1809	2							1806-1809	2
CCS 104	1784-1789	2							1784-1789	2
CCS 105	1753	1							1753	1
CCS 106	undated	1							undated	1
CCS 107	1794	1							1794	1
CCS 108	1806	1							1806	1
CCS 109	undated	1							undated	1
CCS 110	1827	1							1827	1
CCS 111	1788	1							1788	1
CCS 112	1757	2							1757	2
CCS 113	1811	1							1811	1
CCS 114	undated	1							undated	1
Grip plates	**(N = 216)**	**N**	**(N = 59)**	**N**	**(N = 10)**	**N**	**(N = 54)**	**N**	**(N = 339)**	**N**
CCS 1	1812-1825	9	1816-1840	2					1812-1840	11
CCS 2	undated	1					1821	1	1821	2
CCS 3	1768-1842	100	1787-1880	30	1837	8	1807-1841	33	1768-1880	171
CCS 4	undated	2	1807-1850	5			1827-1843	3	1807-1850	10
CCS 5	1729-1815	15	1807	6			1829	1	1729-1829	22

CCS 6	undated	1	1820- 1848	7					1820-1848	8
CCS 7	1791-1813	5							1791-1813	5
CCS 8	undated	2							undated	2
CCS 9	1784-1827	22					1826	1	1784-1827	23
CCS 10	undated	1							undated	1
CCS 11	1795-1849	2					1842	1	1795-1849	3
CCS 12	1761	1							1761	1
CCS 13	1798	1							1798	1
CCS 14	1843-1845	4	1844-1847	2			1824-1843	4	1824-1847	10
CCS 15	undated	1							undated	1
CCS 16	undated	2					1836	1	1836	3
CCS 17	1765-1793	2	1826	1			1817-1828	2	1765-1828	5
CCS 18	undated	1							undated	1
CCS 19	1763	2							1763	2
CCS 20	undated	4							undated	4
CCS 21	undated	1							undated	1
CCS 22	undated	1							undated	1
CCS 23	undated	1							undated	1
CCS 24	1794-1806	4			undated	1			1794-1806	5
CCS 25	1833-1847	10	1841	1	undated	1	1840	1	1833-1847	13
CCS 26	1819	2							1819	2
CCS 27	1779	2	undated	1					1779	3
CCS 28	undated	1							undated	1
CCS 29	1776	1	undated	1					1776	2
CCS 30	1747	1							1747	1
CCS 31	1823	3	1810-1830	3			1810-1846	6	1810-1846	12
CCS 32	undated	1							undated	1
CCS 33	1806-1828	8							1806-1828	8
CCS 34	1799	1							1799	1
CCS 35	undated	1							undated	1
Grips	**(N = 514)**		**(N = 135)**		**(N = 101)**	**N**	**(N = 90)**	**N**	**(N = 840)**	**N**
CCS 1	1747-1847	29	1762-1853	12	1811-1849	13			1747-1853	54
CCS 2	1763-1837	88			2- 1813	5	1828	1	2- 1763-1837	94
			2a - 1811	29	2a- 1830s	33			2a- 1811-1830s	62
			2b-undated	1	2b- undated	5			2b- undated	6
CCS 3	1729-1827	121	3-1820-1850	3	1836-1837	3	1807-1836	3	3-1729-1850	130
			3a-17.9-1830	11					3a- 17..9-1830	11
			3b-1835-1840	49					3b- 1835-1840	49
CCS 4	1743-1847	176	1761-1880	12	1811-1836	40	1805-1847	71	1743-1880	299
CCS 5	1744-1835	72	1796- 1822	8			1809-1830	7	1744-1835	87

CCS 6	1839-1849	19	1777-1844	10	undated	1	1835-1848	5	1777-1849	35
CCS 7	1821-1849	2					1842	1	1821-1849	3
CCS 8	undated	1							undated	1
CCS 9	1770	2					1844	1	1770-1844	3
CCS 10	1837	2			undated	1	1825	1	1825-1837	4
CCS 11	undated	1							undated	1
CCS 12	undated	1							undated	1
Lid motifs	**(N = 124)**	**N**	**(N =13)**		**(N = 2)**	**N**	**(N = 67)**	**N**	**(N = 206)**	**N**
CCS 1	1839	5	1820	1	1829	1	1821-1850	4	1821-1850	11
CCS 2	1795-1847	39	1797-1838	2			1809-1847	15	1795-1847	56
CCS 3	1821-1824	10	1831	1					1821-1831	11
CCS 4	undated	6	1835-1847	3					1835-1847	9
CCS 5	1798	2							1798	2
CCS 6	1779-1847	30	1797-1844	2	undated	1	1810-1852	19	1779-1852	52
CCS 7	1849	1					1842	1	1842-1849	2
CCS 8	1832-1849	3					1816	1	1816-1849	4
CCS 9	1849	1					1842	1	1842-1849	2
CCS 10	1793-1820	3	undated	1					1793-1820	4
CCS 11	1822-1843	5							1822-1843	5
CCS 12	undated	1					1835	2	1835	3
CCS 13	undated	3					1836-1852	4	1836-1852	7
CCS 14	undated	1	1822	2			1813-1841	17	1813-1841	20
CCS 15	undated	1							undated	1
CCS 16	1789	1							1789	1
CCS 17	1821-1824	2							1821-1824	2
CCS 18	undated	1							undated	1
CCS 19	undated	1	1840	1					1840	2
CCS 20	undated	1							undated	1
CCS 21	undated	1							undated	1
CCS 22	1794	1							1794	1
CCS 23	undated	2							undated	2
CCS 24	1798	1							1798	1
CCS 25	undated	1					1825-1833	3	1825-1833	4
CCS 26	undated	1							undated	1
Escutcheons	**(N = 174)**	**N**	**(N = 20)**		**(N = 0)**	**N**	**(N = 72)**	**N**	**(N = 266)**	**N**
CCS 1	1776-1827	45	1797-1836	5			1804-1847	27	1776-1847	77
CCS 2	1839	2	1822	1					1822-1839	3
CCS 3	1815	6	1822	1			1837	1	1815-1837	8
CCS 4	1779-1839	24	1787 -1831	3			1818-1824	2	1779-1839	29
CCS 5	undated	3					1833-1836	2	1833-1836	5

CCS 6	1823-1835	10	1826-1838	3			1806-1846	14	1806-1846	27
CCS 7	undated	1					1817	1	1817	2
CCS 8	undated	1							undated	1
CCS 9	1779	5					undated	1	1779	6
CCS 10	1779-1839	17					1835-1852	3	1779-1852	20
CCS 11	1832-1845	4	1841	1			1835-1852	3	1832-1852	8
CCS 12	1779-1847	30	1799-1807	4			1813-1831	6	1779-1847	40
CCS 13	1833-1835	11	1847	1			1821-1843	11	1821-1847	23
CCS 14	1811-1822	7							1811-1822	7
CCS 15	undated	1							undated	1
CCS 16	1842	2	undated	1			1829	1	1829-1842	4
CCS 17	undated	1							undated	1
CCS 18	undated	1							undated	1
CCS 19	undated	2							undated	2
CCS 20	undated	1							undated	1

Table 4.8 The style of coffin fittings associated with coffins in the crypt, extramural vaults and brick-lined shaft graves

Coffin no.	**Breastplate**	**Grip Plate**	**Grip**	**Escutcheons**	**Lid motif**	**Inscription**
110 (Fig. 4.5)	OLR 5					Wimperis died 1807
112 (Fig. 4.13)	OLR 24	CCS 14 *1843-1845*	CCS 6 *1839-1849*		CCS 6 *1779- 1847*	in Hills died 1844
114			CCS 4 *1743-1847*			John Bailey died 1820
116	CCS 84 *1833-1836*					n Hills died 1835
117		CCS 6 *(no dates known)*				Samuel Roberts died 1820
118	CCS 82 *1820-1829*					Sarah Brown died 1830
161	CCS 82 *1820-1829*		CCS 4 *1743-1847*			Edmund Roberts died 1814
162		CCS 3 *1768-1842*	CCS 4 *1743-1847*			Thomas Brown died 1828
187		CCS 5 *1729-1815*	CCS 3b *1729-1827*			undated
188			CCS 3b *1729-1827*			undated
189		CCS 5 *1729-1815*				undated
190		CCS 5 *1729-1815*	CCS 3b *1729-1827*			undated
191			CCS 3b *1729-1827*			undated
192					CCS 10 *1793-1820*	undated
193	CCS 6 *1783-1852*	CCS 3 *1768-1842*	CCS 4 *1743-1847*			Ann Elliott? died 1805
194 (Fig. 4.59)		CCS 3 1768-1842	OLR 3			John Eltham died 1811
213		CCS 3 *1768-1842*	CCS 4 *1743-1847*			Thomas Brown died 1828
253	CCS 82 *1820-1829* (without outer border)	CCS 4 *(no date known*)	CCS 3 *1729-1827*		CCS 1 *1839* (similar)	Catherine Forbes died 1820
254 (Fig. 4.66)	CCS 9 *1773-1797* (without outer border)	OLR 5	OLR 9	CCS 12 *1779-1847*		Cath Wood died 1799
255			CCS 5 *1744-1835*		CCS 2 *1795-1847*	Cath Forbes died 1796
303 (Fig. 4.61)	New type- too fragmentary to type	OLR 2	OLR 5			Re..cca Sowter died 1853
305		CCS 31 *1823*	CCS 1 *1747-1847*			undated

307	CCS 84 *1833-1836*	CCS 31 *1823* Similar to CCS *6 (no dates known)*	CCS 4 *1743-1847*			Thomas Hughes died 1830
337 (Fig. 4.8)	OLR 11					Matthew…died 1808
339		CCS 3 *1768-1842*	CCS 4 *1743-1847*	CCS 13 *1833-1835*		Sophia Patch died 1831
340	CCS 6 *1783-1852*	CCS 4 *(no dates known)*	CCS 3 *1729-1827*	CCS 6 *1779-1847*		Elizabeth Patch died 1822
	Similar to CCS 82 *1820-1829*			CCS 2 *1795-1847*		
341	CCS 82 *1820-29*		CCS 1 *1747-1847*	CCS 1 *1776-1827*		George Wyatt died 1809
343	CCS 20 *1813-1847*					Charles Stoke died 1853
350	CCS 82 *1820-1829*	CCS 3 *1768-1842*	CCS 5 *1744-1835*	CCS 12 *1779-1847*		Bowes Todd died 1800
352 (Fig. 4.1)	OLR 17					Clara Cuerton died 1830
361 (Fig. 4.12)	OLR 23					Thomas Sowter died 1845
362 (Fig. 4.4)	OLR 4					Ann brown died 1823
363 (Fig. 4.9)	OLR 14				CCS 14 *(no dates known)*	Keith Stewart died 1822
364	CCS 6 *1783-1852* (without border)	CCS 4 *1743-1847*				Sarah Hawthorn died 1807
		CCS 4 *1743-1847*				
453 (Fig. 4.6)	OLR 6		CCS 4 *1743-1847*			Benjamin Smith died 1764
454 (Fig. 4.19)	OLR 44					Elizabeth ? Smith died 1755
466	CCS 4 *1783-1822*					Thomas Hathorn died 1806
471			CCS 4 *1743-1847*			Elizabeth Cassell died 1830
472	CCS 20 *1813-1847*					Mary Ann Cassell died 1839
473			CCS 6 *1839-1849*			undated
486			CCS 2a *1763-1837*			undated
487		CCS 3 *1768-1842*	CCS 4 *1743-1847*			undated
488	CCS 9 *1773-1797*	CCS 3 *1768-1842*		CCS 1 *1776-1827*	CCS 6 *1779-1847*	Elizabeth Rider died ?1819
492		CCS 3 *1768-1842*	CCS 4 *1743-1847*			John Capron died 1833
494 (Fig. 4.7)	OLR 10					William Wood died 1756
495	CCS 9 *1773-1797*		CCS 6 *1839-1849*			William Wood died 1777
497	CCS 9 *1773-1797*	CCS 3 *1768-1842*	CCS 4 *1743-1847*	CCS 1 *1776-1827*	CCS 2 *1795-1847*	John ? Lowe died 1797
					CCS 6 *17779-1847*	
600 (Fig. 4.71)	CCS 9 *1773-1797*	CCS 3 *1768-1842*		CCS 4 *1779-1839*	OLR 3	Catherine Lowe died 1787

604		CCS 5 *1729-1815*	CCS 3b *1729-1827*			undated
605		CCS 32 *1830*				undated
608			CCS 1 *1747-1847*			undated
609 (Fig. 4.18)	OLR 43					Susanna Rogers died 1761
619	CCS 20 *1813-1847*	CCS 1 *1812-1825*			CCS 19 *(no date known)*	Charles Cole died 1840
620	CCS 20 *1813-1847*	CCS 3 *1768-1842*	CCS 4 *1743-1847*			Sophia Cole died 1839
621	CCS 8 *1767-1825*	CCS 3 *1768-1842*				Thomas Cole died 1803
622	CCS 8 *1767-1825*	CCS 3 *1768-1842*	CCS 4 *1743-1847*			Mr. Cole died 1880
727 (Fig. 4.16)	OLR 36					John Gardner died 1834
762 (Fig. 4.15)	OLR 26					Ester Gardner died 1842
763	CCS 21 *1824-1847* (with different borders)		CCS 1 *1747-1847*			Emma Lane died 1840
764	CCS 21 *1824-1847*		CCS 4 *1743-1847*			John Gardner died 1832
770	CCS 20 *1813-1847* (with husk flower band)		OLR 4			Elizabeth Harrison died 1852
771	CCS 20 *1813-1847* (with husk flower band)		OLR 4			Thomas Dalton died 1846
798			CCS 1 *1747-1847*			undated
807 (Fig. 4.10)	OLR 15					Charles Triggs died 1778
808			CCS 3a *1729-1827*			undated
809			CCS 1 *1747-1847*			undated
840			CCS 1 *1747-1847*			undated
841 (Fig. 4.11)	OLR 19		CCS 4 1743-1847			Mary Dore died 1817
842			CCS 4 *1743-1847*			Mary Dore died 1821
843	CCS 8 *1767-1825* (similar)	CCS 1 *1747-1847*				William Dore died 1816
855	OLR 29 (with different border)					Trefusis Lovell died 1844
856 (Fig. 4.14)	OLR 25					Margaret Lovell died 1837
868	CCS 82 (with different borders)				CCS 4 *(no date known)*	Mary Aston died 1835
869	CCS 20 *1813-1847*					Anne Webb died 1835
870		CCS 6 *(no dates known)*				undated
980			CCS 1 *1747-1847*			George Lowe died 1814
981 (Fig. 4.17)	OLR 41					Foy Walford died 1813
989	CCS 6 *1783-1852* (without outer border)					Matthew Hewlett died 1808

990	CCS 8 *1767-1825* (different border)	CCS 31 *1823*				Elizabeth Hewlett died 1810
1143		CCS 3 *1768-1842*	CCS 4 *1743-1847*	CCS 6 *1823-1835*	CCS 6 *1779-1847*	Mary Ellis died 1838
1144 (Fig. 4.70)	CCS 8 *1767-1825* (with new outer border)	CCS 3 *1768-1842*	CCS 4 *1743-1847*		OLR 2	Mary Millward died 1813
1145	CCS 6 *1783-1852* (with OLR 621 outer border)					Mary Law died 1802
1146	CCS 6 *1783-1852* (without outer border)					Thomas Law died 1806
1147	CCS 8 *1767-1825* (with OLR 699 inner border, and CCS 8 inner as the outer border)					Michael Law died 1785
1148			CCS 4 *1743-1847*			Anne ? Lerich died 1798
1149			CCS 1 1747-1847			Michael Law died 1796
1169			CCS 6 *1839-1849*			Emily Porter died 1848
1171	CCS 21 *1824-1847*					…died 1839
1176	CCS 21 *1824-1847* (with OLR 618 outer border)		CCS 1 *1747-1847*			Thomas Boyle died 1840
1177	OLR 29		CCS 4 *1743-1847*			Celia Boyle died 1835
1180			CCS 3b *1729-1827*			undated
1181			CCS 2a *1763-1837*			undated
1196		CCS 3 *1768-1842*	CCS 4 *1743-1847*			Robinson Turner died 1814
1218	CCS 82 *1820-1829*					Sarah Clarke died 1826
1219		CCS 3 *1768-1842*				Martha Burton died 1848
1220		CCS 3 *1768-1842*	CCS 4 *1743-1847*			Susannah Clarke died 18--5
1222			CCS 1 *1747-1847*			undated
1257	CCS 21 *1824-1847* (without outer border)	CCS 3 *1768-1842*	CCS 4 *1743-1847*			Joseph Clarke died 1833
1261 (Fig. 4.20)	OLR 46					Alfred Clarke died 1815
1304			CCS 3b *1729-1827*			Jane Campion died 1844

Coffin fittings from the earth-cut graves of the northern and southern churchyards of St Luke's church, Islington

Coffin	**Breastplate**	**Grip plate**	**Grip**	**Escutcheons**	**Lid motif**	**Inscription**
122			CCS 4 *1729-1827*			Ann Webb died 1850

158 (Figs 4.26 and 4.58)	OLR 12		OLR 2			undated
160			CCS 1 *1747-1847*			undated
186			CCS 1 *1747-1847*			undated
209			CCS 3a *1729-1827*			undated
212 (Fig. 4.73)				OLR 1		undated
214			CCS 3a *1729-1827*			undated
216			CCS 2a *1763-1837*			undated
219			CCS 2a *1763-1837*			undated
222			CCS 3a *1729-1827*			undated
225			CCS 4 *1743-1847*			undated
226			CCS 1 *1747-1847*			undated
228 (Fig. 4.60)		OLR 1	OLR 4			undated
234			CCS 2 *1763-1837*			undated
236			CCS 1 *1747-1847*			undated
245			CCS 3b *1729-1827*			undated
246						undated
247			CCS 3b *1729-1827*			
248			CCS 2b *1763-1837*			undated
252			CCS 2a *1763-1837*			undated
259			CCS 3a *1729-1827*			Ann Tomkies died 1830
262	Similar to CCS 21 *1824-1847* CCS 20 *1813-1847*					Sarah Hathorn died 1843
264	CCS 20 *1813-1847*					George Hathorn died 1848
265				CCS 16 *1842*		undated
267			CCS 1 *1747-1847*			undated

269			CCS 3b *1729-1827*			undated
274			CCS 2a *1763-1837*			undated
277			CCS 1 *1747-1847*			undated
278			CCS 3b *1729-1827*			undated
279			CCS 3b *1729-1827*			undated
281	CCS 21 *1824-1847* (with different outer border)					Noah Nicholls died 1837
282			CCS 1 *1747-1847*			undated
284	CCS 64 *1777-1794* (with very minor differences)		CCS 1 *1747-1847*			Barbara Holyland died 1783
289			CCS 3b *1729-1827*			undated
290	CCS 21 *1824-1847*		CCS 4 *1743-1847*			undated
291	CCS 82 *1820-1829*		CCS 4 *1743-1847*			Mr…died 1826…
297			CCS 4 *1743-1847*			undated
298			CCS 1 *1747-1847*			undated
313			OLR 4			undated
314			CCS 3b *1729-1827*			undated
316			CCS 1 *1747-1847* CCS 4 *1743-1847*			undated
319			CCS 4 *1743-1847*			undated
322			CCS 1 *1747-1847*			undated
327			CCS 1 *1747-1847*			undated
329			CCS 3b *1729-1827*			undated
331			CCS 2a *1763-1837*			undated
333	CCS 20 *1813-1847*					Hester Stevens died 1840
334	CCS 20 *1813-1847*					John Murray died 1842
335	CCS 21 *1824-1847*					John Carr died 1836
336 (Fig. 4.29)	OLR 16					Ann Carr died 1824
365			CCS 2a *1763-1837*			undated
366			CCS 2a *1763-1837*			undated
367			CCS 1 *1747-1847*			undated
368			CCS 1 *1747-1847*			undated
371			CCS 3b *1729-1827*			undated

373			CCS 4 *1743-1847*			undated
376			CCS 3b *1729-1827*			undated
377			CCS 1 *1747-1847*			undated
378			CCS 1 *1747-1847*			undated
379			OLR 4			undated
380			OLR 4			undated
381			CCS 2a *1763-1837*			undated
383			CCS 4 *1743-1847*			undated
389			CCS 1 *1747-1847*			undated
390			CCS 2a *1763-1837*			undated
391			CCS 4 *1743-1847* CCS 1 *1747-1847*			undated
392	CCS 82 *1820-1829*		CCS 4 *1743-1847*			Mary Sheppard..died ? 1808
393	CCS 82 *1820-1829* (without inscription edges)					John Sheppard died 1829?
394			CCS 4 *1743-1847*			Mr H…died 1761
395			CCS 2a *1763-1837*			undated
397			CCS 2a *1763-1837*			undated
398			CCS 1 *1747-1847*			undated
399			OLR 4			undated
400 (Fig. 4.54)	OLR 41		CCS 4 *1743-1847*			Mr..died..... 07
401			CCS 1 *1747-1847*			undated
402			CCS 2a *1763-1837*			undated
406			CCS 1 *1747-1847*			undated
407			OLR 4			undated
414			CCS 2a *1763-1837*			undated
421			CCS 1 *1747-1847*			undated
422			CCS 3a *1729-1827*			undated
423			CCS 1 *1747-1847*			undated
424			CCS 4 *1743-1847*			undated
426			CCS 4 *1743-1847*			undated

436			OLR 4			undated
437			CCS 1 *1747-1847*			undated
440			CCS 4 *1743-1847*			undated
442			CCS 4 *1743-1847*			undated
445			CCS 4 *1743-1847*			undated
446 (Fig. 4.3)	New type -too fragmentary to type					Rebecca ?..died 185?
449	OLR 4 (with CCS 86 border)					George Jeffreys died 1804
450	OLR 4 (with different inner border)					Sarah Jeffreys died 1797
468	OLR 16					Susannah Jocelin died 1816
469	CCS 21 *1824-1847*					Thomas Tribe died 1842
475			CCS 4 *1743-1847*			Elizabeth Ainge died 1811
476	CCS 82 *1820-1829* (without border)					Rev. Balentine Freson died 1822
477			CCS 1 *1747-1847*			Ann Turner died 1799
478			CCS 1 *1747-1847*			Mary Tilford died 1827
479					CCS 3 *1821-1824*	Mary Hooker died 1831
481 (Fig. 4.48)	OLR 34					Albert Bailley died 1838
498			CCS 1 *1747-1847*			undated
501			CCS 4 *1743-1847*			undated
502			CCS 4 *1743-1847*			undated
504			CCS 1 *1747-1847*			undated
506			CCS 4 *1743-1847*			undated
507			OLR 4			undated
508			CCS 3b *1729-1827*			undated
510			CCS 1 *1747-1847*			undated
512			OLR 4			undated
513	CCS 1 *1729-1807*					Thomas Dennis died 1775
521			CCS 3b *1729-1827*			undated
522 (Fig. 4.23)	OLR 7	CCS 29 *1776*				undated

526			CCS 3b *1729-1827*			undated
527			CCS 3b *1729-1827*			undated
531	CCS 2 *1839-1845*	CCS 3 *1768-1842*	CCS 4 *1743-1847*			Sarah Wilson died 1814
532	CCS 21 *1824-1847*					John Markham died 1828
533			CCS 1 *1747-1847*			Thomas Wilson died 1792
534	CCS 21 *1824-1847* (with different outer border)		CCS 4 *1743-1847*			Joseph Deer died 1831
535			CCS 4 *1743-1847*			undated
536 (Fig. 4.28)	OLR 16		CCS 4 *1743-1847*			Eliza Smith died 1822
537	CCS 82 *1820-1829*		CCS 1 *1747-1847*			Susannah Smith died 1827
538	CCS 28 (with different inscription border and shield)					Thomas Giles died 1844
539	CCS 21 *1824-1847* (with different outer border)					James Jones died 1839
563	CCS 21 *1824-1847* (with different border)		CCS 1 *1747-1847*			William Craghill died 1832
567			CCS 3b *1729-1827*			undated
569			CCS 4 *1743-1847*			undated
571			CCS 4 *1743-1847*			undated
573			CCS 3b *1729-1827*			undated
574			CCS 3a *1729-1827*			undated
575			CCS 3b *1729-1827*			undated
578			CCS 3b *1729-1827*			undated
581			OLR 4			undated
584			CCS 1 *1747-1847*			undated
585			CCS 1 *1747-1847*			undated
586			CCS 1 *1747-1847*			undated
587			CCS 1 *1747-1847*			undated
594			CCS 4 *1743-1847*			undated
595			CCS 2a *1763-1837*			undated
596			OLR 4			undated
597			CCS 6 *1839-1849*			Mary Giles died 1838
599 (Fig. 4.62)		CCS 3 *1768-1842*	OLR 6	CCS 4 *1770-1839*		undated

610			CCS 1 *1747-1847*			Cordelia Scotter died 1853
612			CCS 1 *1747-1847*			John Sowter died 1792
614	Possibly CCS 9 *1773-1797*		CCS 1 *1747-1847*			Elizabeth Egner died 1773
616	CCS 20 *1813-1847*					George Girsewood died 1790
617	CCS 20 *1813-1847*					Lydia Prosser died 1838
618	CCS 21 *1824-1847*					Ann Seward died 1839
626	CCS 21 *1824-1847* (with different inner and outer borders)					Sophia Louch died 1847
630		OLR 1	OLR 4			undated
631		OLR 1	OLR 4			undated
634			CCS 3b *1729-1827*			undated
635			CCS 4 *1743-1847*			undated
636			CCS 1 *1747-1847* CCS 3a *1729-1827*			undated
639			OLR 4			undated
641			CCS 3b *1729-1827*			undated
643			CCS 3b *1729-1827*			undated
644			CCS 3b *1729-1827*			undated
646 (Fig. 4.67)		OLR 6	CCS 1 *1747-1847*			undated
650		CCS 27 *1779*	CCS 2a *1763-1837*			undated
651			CCS 4 *1743-1847*			undated
652			CCS 4 *1743-1847*			undated
654			CCS 4 *1743-1847*			undated
655 (Fig. 4.56)	OLR 45		CCS 1 *1747-1847*			Ann Davidson died 1791
656	New type- too fragmentary to categorise		CCS 1 *1747-1847*			Mary Williamson died 1791
657	New type -too fragmentary to categorise					Cuthbert Williamson died 1787
660		CCS 5 *1729-1815*	OLR 4			undated
665			CCS 4 *1743-1847*			undated
666			CCS 1 *1747-1847*			undated
667			CCS 1 *1747-1847*			undated
674			OLR 4			undated

674			CCS 1 *1747-1847*			undated
677			CCS 3b *1729-1827*			undated
679		CCS 3 *1768-1842*	CCS 4 *1743-1847*			undated
682		CCS 3 *1768-1842*	CCS 5 *1744-1835* CCS 1 *1747-1847* CCS 4 *1743-1847*			undated
685		CCS 6 *(no date known)*	CCS 2a *1763-1837*			undated
686			CCS 3b *1729-1827*			undated
688			OLR 4			undated
690		OLR 1	OLR 4			undated
691			CCS 4 *1743-1847*			undated
692			CCS 4 *1743-1847*			undated
694			CCS 2a *1763-1837*			undated
697 (Fig. 4.41)	OLR 29		CCS 1 *1747-1847*			Elizabeth Sewell died 1839
698			CCS 1 *1747-1847*			undated
699	CCS 8 *1767-1825* (with different border)					Thomas Willet died 1815
701	CCS 20 *1813-1847*					Thomas Moor died 1832
702			CCS 4 *1743-1847*			Thomas Mordon died 1827
705			CCS 4 *1743-1847*			Thomas Willet died 1815
706		CCS 3 *1768-1842*	CCS 4 *1743-1847*		OLR 3	Diana Egner died 1790
707		CCS 3 *1768-1842*	CCS 1 *1747-1847*			Andrew Egner died 1790
708	CCS 21 *1824-1847* (with CCS 23 outer border)					John Horton died 1834
709	OLR 29 (with new outer border)		CCS 6 *1839-1849*			John ----lor died 18?3?57
711 (Fig. 4.52)	OLR 39					James Aston died 1853
713 (Fig. 4.33)	OLR 22					William Prosser died 1844
714			CCS 1 *1747-1847*	CCS 12 *1779-1847*		Edward Seward died 1807
715	CCS 84 (with different border)					Wiliam Danson died 1828
717	CCS 21 (with different borders)					Hannah Sutton died 1831

719	OLR 29					Elizabeth Jones died 1836
720			CCS 1 *1747-1847*			Elizabeth Godman died 1791
721	CCS 21 *1824-1847* (without outer border)		CCS 6 *1839-1849*			Sarah Phillips died 1836
722	OLR 29					Samuel Corney died 1836
725	OLR 26 (with different border)					Henry Lane died 1843
730	CCS 8 *1767-1825* (with new border)					..an Wills…died 1820
731			CCS 2b *1763-1837*			undated
732		OLR 1	OLR 4			undated
734			CCS 3b *1729-1827*			undated
735			CCS 2a *1763-1837*			undated
736			CCS 4 *1743-1847*			undated
738			OLR 1			undated
739			CCS 2a *1763-1837*			undated
740			CCS 4 *1743-1847*			undated
742			CCS 3b *1729-1827*			undated
747			CCS 3b *1729-1827*			undated
749			CCS 1 *1747-1847*			undated
753		OLR 1	OLR 1			undated
757		OLR 1	OLR 1			undated
758			CCS 5 *1744-1835*			undated
759			CCS 1 *1747-1847*			undated
776 (Fig. 4.40)	OLR 29					John Bringloe died 1837
778			CCS 1 *1747-1847*			Elizabeth Seward died 1835
780			CCS 1 *1747-1847*			Isabel Bailey died 1834
782			CCS 4 *1743-1847*			Catherine Bailey died 1847
784	OLR 29 (with different outer border)		CCS 3b *1729-1827*			Ann Seward died 1835
788			CCS 4 *1743-1847*			George Wright died 1845
790			CCS 1 *1747-1847*			undated
791			CCS 1 *1747-1847*			Alfred Bailey died 1829
793 (Fig. 4.55)	OLR 42					Septimus Bailey died 1835

794 (Fig. 4.30)	OLR 18					Ellen Lycett died 1827
798			CCS 1 *1747-1847*			undated
802			CCS 4 *1743-1847*			undated
811 (Fig. 4.57)			CCS 4 *1743-1847* OLR 1			undated
812	OLR 26 (with different base detail)		CCS 4 *1743-1847*			Mary Combers died 1848
813	CCS 82 *1820-1829* (with different inner and outer borders)					undated
818			CCS 1 *1747-1847*			undated
819			CCS 4 *1743-1847*			undated
820		CCS 3 *1768-1842*	CCS 4 *1743-1847*			…horean Chr..died 1812
821	CCS 6 *1783-1852* (without borders)					Sarah? Cheswell? Died 1818
827	OLR 28					undated
831		CCS 6 *(no dates known)*				Mary Monk died 1847
833 (Fig. 4.21)	OLR 2		CCS 1 *1747-1847*			John Lycett died 1832
837	CCS 21 *1824-1847* (with different outer border)					Lewis Willet died 1831
839	OLR 762 (with different outer border					Sarah Coventry died 1842
845 (Fig. 4.42)	OLR 30					John Wright died 1843
846 (Fig. 4.37)	OLR 27					Elizabeth Lorimer died 1850
851	New type- too fragmentary					Mrs Maxwell died 1825
853			CCS 4 *1743-1847*			undated
860			CCS 4 *1743-1847*			Mary Lockin died 1809
861	CCS 8 (with different outer border)		CCS 1 *1747-1847*			Capt Alex Bailey died 29/4 (0)
862			CCS 1 *1747-1847*			Elizabeth Baillie died1810
863			CCS 2a *1763-1837*			undated
864	CCS 9 *1773-1797* (without outer border)		CCS 3a *1729-1827*			Elizabeth Cro.. died 17..9
865						undated
871	OLR 22		CCS 4 *1743-1847*			undated

873			CCS 4 *1743-1847*			undated
874			CCS 1 *1747-1847*			undated
875			CCS 5 *1744-1835*			undated
876			CCS 2a *1763-1837*			undated
878			CCS 4 *1743-1847*			undated
879			CCS 5 *1744-1835*			undated
880			CCS 4 *1743-1847*			undated
882			CCS 2a *1763-1837*			undated
888 (Fig. 4.53)	OLR 40		CCS 4 *1743-1847*			Charles…..died 1830
889			CCS 4 *1743-1847*			undated
890 (Fig. 4.38)	OLR 28		CCS 4 *1743-1847*			Samuel Fuller died 1849
891			CCS 4 *1743-1847*			undated
892			CCS 4 *1743-1847*			undated
893			CCS 4 *1743-1847*			undated
898	CCS 21 *1824-1847* (with different outer border)					Henry Bryant died 1830
905	OLR 40		CCS 4 *1743-1847*			Frederick Gibson died 1848
906			CCS 2a *1763-1837*			….mina Henwood died 1811
908			CCS 4 *1743-1847*			Ann Lucas died 1810
909 (Fig. 4.64)		OLR 3	CCS 6 *1839-1849*			Ann Lucas died 1792
912	CCS 8 *1767-1825* (with different border)					Richard Davis died 1817
913			CCS 1 *1747-1847*			Thomas Godman died 1784
916	OLR 4		CCS 4 *1743-1847*			Susanna Stanley died 1813
917	CCS 21 *1824-1847* (with OLR 534 outer border)					Thomas Fox died 1834
920		CCS 25 *1833-1847*	CCS 6 *1839-1849*	CCS 11 *1822-1843*		Sarah Fuller died 1841
924			CCS 1 *1747-1847*			Thomas Hudson died 1787
925			CCS 1 *1747-1847*			Christina Lanton died 1779
927 (Fig.	OLR 21					Isabella Fuller died 1823

4.32)						
928	new type- too fragmentary to catalogue		CCS 4 *1743-1847*			James Fuller 1814
932			CCS 4 *1743-1847*			undated
934	OLR 1					Catherine Allan died 1824
935 (Fig. 4.27)	OLR 13 (with CCS 64 outer border)		CCS 1 *1747-1847*			Elizabeth Richardson died 1771
936	OLR 23 (with different inner border)		CCS 4 *1743-1847*			James Allan died 1819
938	CCS 82 *1820-1829* (with different border)					Charlotte Allan died 18?6
939	CCS 82 (without inscription edges)					Rebecca Allan died 1819
942		OLR 1	OLR 4			undated
944			CCS 4 *1743-1847*			undated
946	CCS 82 *1820-1829* (with different border)		CCS 1 *1747-1847*			Lydis Batty died 1812
947			CCS 2a *1763-1837*			undated
948			CCS 3b *1729-1827*			undated
949			CCS 3b *1729-1827*			undated
950	CCS 9 *1773-1797* (without outer border)		CCS 4 *1743-1847*			Ann Richardo died 1814
951	CCS 6 *1783-1852*		CCS 4 *1743-1847*			John Stubbs died 1811
953			CCS 4 *1743-1847*			undated
958			CCS 3b *1729-1827*			undated
959			CCS 2a *1763-1837*			undated
961	OLR 29 (with different outer border)					Edward Keat died 1839
962	OLR 4					Lucy Farmer died 1824
964	CCS 61 *1765-1786* (with CCS 31 border)					Mary Lumley died 1808
965			CCS 4 *1743-1847*			William MacKenzie died 1836
967			CCS 5 *1744-1835*			John Farmer died 1822
968	OLR 26 (with OLR 618 inner and 534 outer borders)					John Colchett died 1844
970 (Fig. 4.31)	OLR 20		CCS 6 *1839-1849*			Matilda Gibson died 1836
972 (Fig. 4.49)	OLR 35					Ellen Robinson died 1851
973 (Fig.	OLR 32		CCS 4 *1743-1847*			Mary Robinson died 1838

4.45)						
976	Similar to CCS 93 *1852*					George Nightingale died 1848
977 (Fig. 4.44)	OLR 32					George Nightingale died 1840
986	CCS 20 *1813-1847*	CCS 4 *(no dates known)*	CCS 3 *1729-1827*			George Walford died 1850
989	CCS 6 *1783-1852* (without outer border)					Matthew Hewlett died 1803
990	CCS 8 *1767-1825* (with different outer border)					Elizabeth Hewlett died 1810
993			CCS 2a *1763-1837*			undated
994 (Fig. 4.69)			CCS 4 *1743-1847*	CCS 12 1779-*1847*	OLR 1	Thomas Ramsbottom died 1807
995 (Fig. 4.63)			OLR 7			undated
996					CCS 14 *(no dates known)*	undated
997 (Fig. 4.25)	OLR 9					undated
998			CCS 1 *1747-1847*			undated
999			CCS 2a *1763-1837*			undated
1001			CCS 3b *1729-1827*			undated
1003			CCS 3b *1729-1827*			undated
1004			CCS 3b *1729-1827*			undated
1008 (Fig. 4.22)	OLR 3					George Scott died 1766
1009	OLR 30					Mary Clark died 1844
1012			CCS 3b *1729-1827*			undated
1014			CCS 1 *1747-1847*			undated
1015			CCS 4 *1743-1847*			undated
1016			CCS 1 *1747-1847*			undated
1018			CCS 4 *1743-1847*			undated
1019			CCS 1 *1747-1847*			undated
1020			CCS 1 *1747-1847*			undated
1022	OLR 29 (with different outer border)					William Linsley died 1838

1023			CCS 3b *1729-1827*			undated
1025			CCS 3b *1729-1827*			undated
1028	CCS 8 *1767-1825*	CCS 3 *1768-1842*	CCS 4 *1743-1847*			undated
1029			CCS 1 *1747-1847*			undated
1033			CCS 1 *1747-1847*			undated
1034			CCS 3b *1729-1827*			undated
1041			CCS 4 *1743-1847*			undated
1042		OLR 1	OLR 4			undated
1043			CCS 4 *1743-1847*			undated
1044			CCS 4 *1743-1847*			undated
1055	OLR 28		CCS 4 *1743-1847*			Elizabeth Lindsay? died 1841/
1046	OLR 26 (with different outer border)		CCS 4 *1743-1847*			…..67 years…
1047			CCS 3a *1729-1827*			undated
1053			OLR 4			undated
1054			CCS 4 *1743-1847*			undated
1057	CCS 82 (with different border)					William Graham died 1821
1066	CCS 20 *1813-1847*		CCS 4 *1743-1847*	CCS 6 *1823-1835*		James Dick died 1828
1067			CCS 1 *1747-1847*			William Turner died 1791
1068	OLR 29 (with different inner border)		CCS 4 *1743-1847*			Elizabeth Simpson died 1838
1069 (Fig. 4.2)	OLR 28		CCS 4 *1743-1847*			Ann Nightingale died 1842
1071	CCS 84					Andrew Duff died 1828
1073	OLR 29 (with different outer border)	CCS 10 *(no dates known*)	CCS 4 *1743-1847*			Elizabeth Duff died 1840
1074	CCS 6 *1783-1852* (without any borders)					Lucretia Wright died 1812
1076	OLR 19 (with CCS 46 border)					Caroline Joselin died 1823
1077 (Fig. 4.43)	OLR 31		CCS 4 *1743-1847*			Rouland Owen died 1838
1078			CCS 1 *1747-1847*			Thomas Roberts died 182?
1079	CCS 82 *1820-1829* (but tapered; different inner border)		CCS 4 *1743-1847*			Judith Pigott died 1824
1080	CCS 21 *1824-1847* (with different outer border)		CCS 6 *1839-1849*			James Dalby died 1835

1082	CCS 21 *1824-1847* (without outer border)					Anne Lycett died 1833
1083 (Fig. 4.47)	OLR 34	CCS 3 *1768-1842*				John Davies died 1840
1084 (Fig. 4.51)	OLR 38					Douglas Aylwin died 1838
1086			CCS 4 *1743-1847*			Thomas Fisher 1825
1087	CCS 20 *1813-1847*					Joan Wilson died 1852
1088	CCS 21 *1824-1847* (with different outer border)	CCS 6 *(no dates known)*	CCS 4 *1743-1847*	CCS 1 *1776-1827*		Ann Fisher died 1836
1089 (Figs 4.65, 4.68 and 4.72)	CCS 20 *(no dates known)*	OLR 4	OLR 8	CCS 13 *1833-1835*	OLR 4 OLR 5	Ann Ruff died 1847
1090	CCS 21 *1824-1847* (with different outer border)	OLR 4				Margaret Martin died 1836
1091			CCS 3b *1729-1827*			undated
1110			CCS 5 *1744-1835*			undated
1112			CCS 1 *1747-1847*			undated
1113			CCS 4 *1743-1847*			undated
1118			CCS 4 *1743-1847*			undated
1119		CCS 6 or 8 *(no dates known)*	CCS 4 *1743-1847*			undated
1120 (Fig. 4.46)	OLR 33		CCS 4 *1743-1847*			…Doherty died 1818
1121			CCS 1 *1747-1847*			undated
1128	CCS 20 *1813-1847*	CCS 17 *1765-1793*	CCS 4 *1743-1847*	CCS 6 *1823-1835*		William Moore died 1826
1130 (Fig. 4.24)	OLR 8					James Roe died 1812
1132	CCS 82 (with different borders)		CCS 4 *1743-1847*			John Clarke died 1819

1133	CCS 82 *1820-1829* (with new border)					Letitia Clarke died 1818
1135 (Fig. 4.36)	OLR 27					Susanna Wright died 1849
1152 (Fig. 4.34)	OLR 22					Janet Tilford died 1853
1153	OLR 26 (with new outer border)					William Moir died 1830
1156	CCS 20 *1813-1847*					Elizabeth Farmer died 1834
1163	CCS 82		CCS 1 *1747-1847*			Thomas …iderell died 18…6
1168			CCS 1 *1747-1847*			undated
1169	OLR 24	CCS 6 *(no dates known)*	CCS 4 *1743-1847*			Emily Porter died 1848
1170	OLR 29(with new inner border)					Mary Porter died 1836
1171	CCS 21 *1824-1847*					…..died 1839..
1172	OLR 27					Amelia Porter died 1846
1180			CCS 3b *1729-1827*			undated
1181			CCS 2a *1763-1837*			undated
1184 (Fig. 4.39)	OLR 28		CCS 4 *1743-1847*			Sarah Boorman died 1847
1185			CCS 1 *1747-1847*			undated
1188			CCS 1 *1747-1847*			undated
1191 (Fig. 4.50)	OLR 37					Frederick Martin? Died 1831?
1193 (Fig. 4.35)	OLR 23					Jonathon Bateman died 1823
1194	CCS 37 *1796* (with CCS 86 border)					Edmund Morier died 1795
1195	CCS 67 *1769-1777*					George White died 1802
1196		CCS 3 *1768-1842*	CCS 4 *1743-1847*	CCS 1 *1776-1827*	CCS 2 *1795-1847*	Robinson Turner died 1814
1197			CCS 1 *1747-1847*			undated
1203	CCS 21 *1824-1847* (without outer border)					William Farmer died 1828
1204	OLR 26 (with different border)					Phoebe Lester died 1826

1206	CCS 21 *1824-1847* (with different outer border)					William Hobson died 1831
1208	CCS 21 *1824-1847*					Sarah Wilcox died 1837
1216	CCS 21 *1824-1847* (without outer border)					Sarah Matthews died 1835
1217			CCS 4 *1743-1847*			Thomas Gillett died 1831
1223	OLR 29(with different outer border)					Roland Wilkes died 1839
1225	CCS 6					Anthony Falder died 1815
1233			CCS 1 *1747-1847*			Thomas Godwin?...Died 1762
1235			CCS 1 *1747-1847*			undated
1244			CCS 3b *1729-1827*			undated
1249			CCS 1 *1747-1847*			undated
1256			CCS 1 *1747-1847*			undated
1263			CCS 1 *1747-1847*			undated
1268		CCS 5 *1729-1815*	CCS 1 *1747-1847*			undated
1269			CCS 4 *1743-1847*			undated
1270	CCS 21 *1824-1847* (with new outer border)		CCS 1 *1747-1847*			…185.....
1283			CCS 3b *1729-1827*			undated
1284			CCS 4 *1743-1847*			undated
1306			CCS 2a *1763-1837*			undated
1315	CCS 6 *1783-1852* (without outer border)		CCS 4 *1743-1847*			undated

CHAPTER 5 THE HUMAN SKELETAL ASSEMBLAGE

by Ceridwen Boston, Angela Boyle and Annsofie Witkin

Introduction

A total of 1053 skeletons were excavated at St Luke's church. Of these, 896 were recorded osteologically. Two hundred and forty-one individuals were named, whilst 655 were unnamed. The assemblage of unnamed individuals was recorded osteologcally using low resolution methodology, whilst the 241 named individuals underwent full analysis. It would not be meaningful to compare the prevalences of many skeletal pathologies and non-metric traits between the two samples. For this reason, the two groups have been treated as separate assemblages in this chapter.

The presence of a fairly large skeletal assemblage of known age and sex allowed a rare and valuable opportunity to test frequently used osteological ageing and sexing methodologies for accuracy and precision. The value of new ageing methods was also examined against the known chronological age of these skeletons.

One hundred and fifty-seven burials were not osteologically recorded for one of two reasons: either the coffins were sealed or substantially intact, or the remains were fleshed, and therefore deemed unsuitable for osteological analysis.

Osteological analysis of the unnamed sample

The identity of 655 individuals buried at St Luke's church could not be ascertained from *departum* plate inscriptions. Although a number of unnamed individuals were discovered within the crypt (n = 54) and extramural vaults and brick-lined shaft graves (n = 27), the majority of the unnamed population was recovered from earth-cut graves within the northern and southern portion of the churchyard (n = 574 or 87.63 %). This is in part due to the poorer preservation of coffin furniture within these graves, and in part reflecting simpler burial practices of many churchyard burials at St Luke's church. In the Georgian and Victorian periods, the church vault was the most socially desirable location for burial, followed by extramural vaults and brick-lined shaft graves. An earth-cut grave was the cheapest and least favoured place of

interment, and was the lot of the more humble members of society.Thus, palaeodemographic differences between the unnamed and named skeletal populations at St Luke's church may reflect real socio-economic differences between these contemporary, but socially distinct populations. However, comparisons between the two populations are hampered by the differences in methodology used in the recording of many pathologies.

Methodology

Unlike the named sample that underwent full osteological analysis, the unnamed skeletons were examined in less detail. Age, sex and stature were analysed fully, bone preservation and completeness were recorded, and a full skeletal and dental inventory was made. The skeletons were not formally examined for skeletal pathology or non-metric traits, but those pathologies or traits noted incidentally in the course of osteological examination were recorded. Dental pathology was also recorded. As a result of this methodology, the true pathology rates for this sample may be under-reported.

Adults were aged using a combination of methods, including ageing from the degeneration of the pubic symphysis (Suchey and Brooks 1990; Todd 1921), iliac auricular surface (Lovejoy *et al* 1985) and sternal rib ends (Iscan and Loth 1984; Iscan *et al* 1985), and from cranial suture closure (Meindl and Lovejoy 1985). The dental attrition method of Miles' (1962) was not employed, as this tends to grossly under-aged skeletons of post-medieval populations. Instead, the method developed by Roden (1997) on a post-medieval pauper assemblage from Newcastle Infirmary, Newcastle-upon Tyne, was used. Subadults were aged by dental development (Moorrees *et al* 1963) and by epiphyseal fusion (Bass 1987; Schwarz 2000).

Sexing of adults was determined from the skull and pelvic morphology (Buikstra and Ubelaker 1994), and from metrical data (Workshop 1980). No attempt was made to sex subadults, in accordance with accepted practice.

The stature of the adults was estimated from combined long bone length measurements, using the regression formulae developed by Trotter (1970). Wherever possible, combined femoral and tibial measurements were used. In the absence of either bone, stature was calculated using one long bone, preferably from the lower limb, but where this was unfeasible, the upper limb long bones were utilised.

Preservation and completeness

Bone preservation of the unnamed assemblage was rated on a four-point scale, ranging from 1 (poor) to 4 (excellent). A wide variation in preservation was noted, with 401 (61.22 %) being rated as well to excellently preserved, 217 (33.12 %) had fair preservation, and 37 (5.65 %) were poorly preserved.

In many skeletons, small bones (such as carpals and phalanges) were under-represented. This is probably due to a combination of poor retrieval of these elements in the sub-optimal lighting of the vaults and from the backfill of earth-cut graves, and the poorer bone preservation of these small, less robust bones. Completeness of the skeleton was scored on a four-point scale, 4 representing 76-95 % completeness; 3 representing 50-75 %; 2 representing 25-49 % completeness, and 1 representing less than 25 % complete. Preservation and completeness of each skeleton is summarised in Table 1 below.

Table 5.1: Completeness and preservation of the unnamed assemblage (n = 655)

Completeness	**Number of individuals**	**Preservation**	**Number of individuals**
1 (poor)	114 (17.4%)	1 (poor)	37 (5.65%)
2	172 (25.95%)	2	217 (33.13%)
3	157 (23.97%)	3	338 (51.60%)
4 (excellent)	212 (32.37%)	4 (excellent)	63 (9.62%)
Total	655		655

Table 5.3 shows the category of preservation in relation to location within the churchyard or crypt. The best bone preservation was found in skeletons buried in the earth-cut graves of the southern and northern churchyards. Good to excellent bone preservation was found in 60.47% and 64.35% of these burial groups, respectively, compared with 24.09% and 50% of those buried within the extramural vaults in these locations. It is probable that the structural collapse of many arches and side walls of the extramural vaults contributed towards poorer bone preservation and fragmentation in these groups. Of the crypt burials, 59.26% were rated as being well preserved, whilst 40.74% were poorly or fairly poorly preserved.

Table 5.2 Preservation and location of the unnamed population within the church precinct (n = 655)

	1 (Poor)	**2**	**3**	**4 (excellent)**	**Total number of individuals**
South churchyard	11	74	113	17	215
South churchyard, vault	3	14	1	5	23
North churchyard	16	112	196	35	359
North churchyard, Vault	1	1	1	1	4
Crypt	6	16	27	5	54
Total number of individuals	37	217	338	63	655

Table 5.3 shows the category of completeness in relation to location within the churchyards or crypt. Three hundred and sixty-nine individuals (56.34% of the total burial assemblage) were more than 50% complete, whilst 401 (61.22%) were well or excellently preserved. Skeletons excavated within the northern churchyard and the crypt were most complete, 75% and 66.67% being more than 50% complete, respectively. There was little difference in completeness noted between skeletons from the northern and southern churchyards' earth-cut graves (57.67% and 55.15%, respectively). Least complete were skeletons recovered from within the vaults of the southern churchyard. Of these, only 39.13% were more than 50% complete. The structural damage and depth of these structures and the poorer preservation of this burial group may have hindered the recovery of a greater proportion of the bones of these skeletons.

Table 5.3 Completeness and location of the unnamed assemblage within the church precinct (n = 655)

	1 (Poor)	**2**	**3**	**4 (excellent)**	**Total number of individuals**
South churchyard	33	58	46	78	215
South churchyard, vault	9	5	4	5	23
North churchyard	63	98	92	106	359
North churchyard, Vault	1		2	1	4
Crypt	8	10	14	22	54
Total number of individuals	114	171	158	212	655

Assemblage composition

Sex distribution

The proportion of adult males and females within the unnamed population is summarised in Table 4 and Figures 1 and 2 below. A total of 41 adults (6.25%) could not be osteologically sexed, as they lacked the diagnostic elements necessary for sex determination. No attempt was made to sex the 102 subadults (15.56% of the total population) in accordance with accepted practice. However, two older adolescents were identified as female on the basis of pelvic morphology.

On the face of it, there appears a slight predominance of males over females (270 or 52.53% versus 244 or 47.47%). However, this male/female ratio is broadly in keeping deaths with listed in the London Bills of Mortality of 1790-1840 (taken from Molleson and Cox 1993, 208), where males constituted 50.3-52.3%, and females 48.9-49.9% of recorded deaths.

Age distribution

The unnamed individuals ranged in osteological age from foetal to 70+ years. Due to the limitations of current ageing methods, it was not possible to determine the true age of most skeletons beyond the age of 60 years. It is probable that some individuals did survive well into old age (as is suggested from age at death recorded on *departum* plate inscriptions and parish burial records of this time period). Three skeletons could not be aged at all (0.46%), and 56 (8.59%) were identified as adults, but more precise age estimation could not be made. Age estimates were sorted into ten age bands or categories for analysis purposes (see Table 5.4 below).

The assemblage was composed predominantly of adults (84.36%), with only 102 skeletons (15.64%) being aged below 18 years.

Table 5.4: Age and sex composition of the unnamed population (n = 655)

Sex	**Foetus**	**Neonate**	**Infant 1**	**Infant 2**	**Juvenile**	**Young adult**	**Prime adult**	**Mature adult**	**Ageing adult**	**Adult**	**?**	**Total**
		(0-11 months)	(1-5)	(6-11)	(12-17)	(18-25)	(26-40)	(40+)	(50+)			
M						9	67	83	45	9		213
M?						3	20	20	5	9		57

F						17	49	63	45	4		178
F?					2	5	14	20	13	12		66
?	3	25	45	17	10	2	13	1		22	3	141
Total	3	25	45	17	12	36	163	187	108	56	3	655
%	0.40	3.83	6.90	2.61	0.84	5.52	25.0	28.68	16.56	8.59	0.46	

In pre-modern societies, infant mortality rates are considerably higher than modern western societies, and one would expect that this would be reflected in the archaeological record. In 1840, Edwin Chadwick calculated childhood mortality from seven different regions of England from current mortality figures. Although considerable regional variation did exist, he estimated that on average one in five children of the gentry and professional classes would die before reaching adulthood, whereas amongst the children of labourers, servants and artisans the figure was one in two (Rugg 1999, 216-7). Malnutrition, infectious diseases and poor living conditions were the major causative factors for these early deaths.

It is unclear why there is such an under-representation of infants and children at St Luke's church, since the burial ground was fully excavated, and presumably realistically reflects the assemblage composition of the burial population. It is possible that the very young were buried at a different burial site but, given the propensity for burying family members together, this explanation seems unlikely. It is possible that this negative bias may be explained in terms of the poorer preservation of subadult remains, or less successful retrieval during excavation. Over a hundred years of intercutting of graves may also have obliterated smaller infant and child burials. Since the charnel from St Luke's church was not osteologically analysed, the numbers of subadults in this collection is unknown.

Overall, the age distribution of the unnamed sample shows the highest age of mortality in the mature adult age band (aged 40+ years), followed by the prime adult category (26-40 years). Deaths in early adulthood (in females, most commonly from complications of pregnancy and childbirth, and in males, from trauma) were low, involving only 5.52% of the total unnamed population. No marked difference in mortality patterns could be discerned between the sexes.

Race

Cranial and facial dimensions were not systematically measured on the skulls of the unnamed assemblage, and hence, racial identity was not formally assessed. It is

assumed that the vast majority of the assemblage was Caucasian. A notable exception was skeleton 1130, a mature adult whose facial features and proportions (eg. the nasal and orbital indices) were more characteristic of an individual of negroid or mixed race.

The presence of a black individual in the St Luke's burial population should not come as a great surprise, given the number of black people documented as living in London in the late Georgian/early Victorian period. Although historical records do record the presence of small numbers of black people in Britain from Roman times, it was with the expansion of the British Empire and the establishment of the slave trade that the numbers of blacks in Britain grew dramatically. Many were employed as domestic servants to wait on wealthy families, whilst others were sailors, professional boxers or undertook a range of menial jobs. Whilst the majority appeared to have lived in penury, a handful did achieve wealth and social position. For example, Cesar Picton, a former servant, became a moderately wealthy coal merchant and land owner in Kingston-upon-Thames, and Olaudah Equano (1745-1797), a former slave, went on to become a radical reformer and best-selling novelist (Sandhu 2003). The true number of black people living in London in this period is difficult to gauge, but in 1764, the *Gentleman's Magazine* estimated a number as high as 20,000 individuals; like skeleton 1130, the vast majority of these were male (*ibid*).

Stature

It was possible to estimate the stature of 295 males and 238 females (81.37% of the total adult population). The male stature range was 1.49-1.94 cm (mean of 1.71 m or 5 foot 6 inches), whilst the female range was 1.39-1.74 m (mean of 1.58 m or 5 foot 2 inches). This is comparable with the named population from St Luke's church, where the mean statures for men and women were 1.70 and 1.58 m, respectively.

Childhood and adult stature is determined by an interplay of inherited and environmental factors. Whilst we all have a maximum genetic potential to reach a certain adult stature, physical and emotional stressors during childhood and adolescence may prevent us achieving this potential. If such stressors (such as malnutrition, infection or chronic illness) are too severe or prolonged for the growing body to 'catch-up' growth later, the individual will become permanently stunted. Thus, stature has been used as a rough yardstick to indicate the overall health of

Table 5.5 Comparative data on stature estimation in seven later post-medieval urban populations in England

	Male (Mean)	Male (Range)	Female (Mean)	Female (Range)
St.Luke's,Islington (unnamed)	1.70 m	1.49 m-1.94 m	1.58 m	1.39 m-1.74 m
St.Luke's,Islington (named)	1.70 m	1.55 m-1.93 m	1.58 m	1.49 m-1.72 m
Newcastle Infirmary	1.71 m	1.60 m-1.83 m	1.60 m	1.50 m-1.76 m
St Bartholomew's, Penn	1.75 m	1.45 m-1.85 m	1.60 m	1.42 m-1.83 m
St Nicholas, Sevenoaks	1.73 m	1.62 m-1.83 m	1.61 m	1.49 m-1.72 m
St George's, Bloomsbury	1.72 m	1.52 m- 185 m	1.60 m	1.49 m-172 m
Christ Church, Spitalfields	-	1.68 m-1.70 m	-	1.54 m-1.59 m
Cross Bones, Southwark	1.69 m	1.53 m-1.80 m	1.58 m	1.42 m-1.72 m
Kingston-on-Thames, London	1.69 m	1.54 m-1.90 m	1.60 m	1.40 m-1.75 m

individuals and of populations, provided the genetic component of populations do not change (as would happen, for example, with an influx of peoples of different average stature). Because the unnamed individuals of St Luke's church had largely been buried in earth-cut graves, the more simple form of burial at this time, it was probable that they represent the working classes of the Islington area, whilst the named individuals (who predominantly were buried in more elaborate coffins in the church crypt, vaults or brick-lined shaft graves) represent the middle classes. A higher stature was expected of the latter group, given their greater access to better food, medical care, physically less onerous jobs and general living conditions. This was not found to be the case. There is no difference in the average stature of men and women, and only a slight difference in the range of statures.

When comparing the average stature with other contemporary burial sites in England (Table 5 above), it is interesting to note that St Luke's named and unnamed assemblages had average male stature that was lower than the pauper burial ground of the Newcastle Infirmary, Newcastle-upon-Tyne, and only a centimetre greater than the poor buried at the Cross Bones burial ground, Southwark, and the middle classes of Kingston-upon-Thames. Average male stature was noticeably lower than the crypt burials of St Nicholas', Sevenoaks, St George's, Bloomsbury and St Bartholomew's, Penn. These assemblages represented the upper middle classes of the period. Less variation was found in female stature across the six sites, with St Luke's named and

unnamed female stature being the lowest comparable only to that of the Cross Bones burial assemblage in Southwark, and two centimetres less than the other four sites. It is unclear why the St Luke's assemblages have statures lower than expected, given the greater wealth of that part of London, relative to working class Southwark and the working classes of Newcastle Infirmary.

Dental pathology

Dental pathology was recorded in 230 individuals of the unnamed assemblage. Teeth were fully analysed for calculus, peridontal disease, caries, abscesses and ante-mortem tooth loss (AMTL). Gross dental enamel hypoplasia was also recorded. Caries, abscess and AMTL rates were not calculated per tooth or socket but per individual. Unfortunately, this had precluded meaningful comparisons with the named assemblage from St Luke's, Islington, and from other sites of this period. Dental disease prevalences are displayed in Table 5.6 below.

In the post-medieval period, the consumption of cane sugar gradually increased. In the 16th and 17th centuries, sugar was an expensive and high status luxury available only to the most wealthy. However, the development of sugar plantations in the West Indies in the 18th century generated a more ready and affordable supply of the commodity to markets in Europe. Sugar consumption gradually spread down the social classes, until by the latter half of the 19th century it was available to all but the most indigent. By the early 19th century, sugar was widely available to the middle classes, but was not yet cheap enough to be readily accessible to the lower classes. The availability of sugar had a dramatically deleterious effect on the dental health of the nation. Caries rates doubled from the late medieval to the post-medieval period and antemortem tooth loss increased by 4% over the same period (Roberts and Cox 2003, 396).

Dental calculus

Plaque is composed of oral micro-organisms that become imbedded within a matrix of protein, saliva and food residues that accumulate on the teeth after eating. Carbohydrates, particularly simple sugars, accelerate this process (Hillson 1996, 254-55). Plaque may become mineralised, forming calculus, the hard immovable deposit on the teeth colloquially known as tartar. There are two types of calculus: supra-

gingival calculus, which is situated above the gum line, and sub-gingival calculus found beneath the gum line on exposed roots. Deposits are most heavy on teeth nearest to the saliva glands (Roberts and Manchester 1995, 55). Regular brushing of the teeth will remove most plaque deposits, thus preventing calculus formation.

The calculus rate was recorded per tooth present, and size and position on the crown was noted, using guidelines set out by Brothwell (1981). However, such a detailed presentation of this data is beyond the scope of this report. Calculus was recorded on the teeth of 16 individuals in the unnamed assemblage. This was graded as flecks only in one individual, as slight in 11 others and moderate in three. The low prevalence and lack of severity of calculus deposition is surprising in an age where dental hygiene was minimal or entirely lacking, but may relate to a low consumption of refined sugar by this population.

Periodontal disease

Peridontal disease is the inflammation of the soft tissues of the mouth, namely the gums, and/or the peridontal ligament and alveolar bone (Levin 2003, 245). Retraction of the gums exposes the vulnerable root of the tooth to attack by acidic plaques, commonly resulting in caries, abscesses and ante-mortem tooth loss. The main predisposing factor for periodontal disease is calculus build-up in the dental pockets. Peridontal disease is strongly associated with increasing age in both modern and archaeological populations. However, aetiology of this disease is multi-factoral, with genetic predisposition, environment, diet and oral hygiene all playing a role.

The disease may express itself as either horizontal or vertical bone loss. In the former, more than one tooth is affected, often involving the whole dental arcade, with all alveolar walls being lost uniformly. This is by far the more common form of peridontal disease. In vertical bone loss, the lesion is localised around one or two teeth. This bony resorption around the tooth is irregular, and generally occurs without horizontal bone loss (Hillson 1996, 263-65).

Periodontal disease was recorded by subdividing the jaws into four quadrants, which was scored independently. The severity of the disease was scored as slight, medium or considerable, using the universally accepted standards set out by Brothwell (1981). In the unnamed sample, peridontal disease was present in 46 individuals. It ranged in severity from slight (n = 7 or 15.22% of the cases of

peridontal disease present), through medium (n = 15 or 32.61%) to considerable (n = 22 or 47.83%).

Caries

Destruction of the tooth enamel results in the formation of caries, which is irreversible and frequently results in toothache, abscess formation and ultimately, ante-mortem tooth loss. In the unnamed assemblage (n = 230), 188 carious cavities were recorded, giving a prevalence of 0.81 caries per person. Dental caries develop as a result of poor oral hygiene and a diet high in carbohydrates, particularly processed sugar.

***Ante-mortem tooth loss (AMTL*)**

Although teeth were sometimes drawn electively, in anticipation of the agonies of toothache in later life, or lost as a result of trauma, most teeth were lost as a result of periodontal disease and caries. AMTL is diet-related but also age-related, and hence, it is no surprise that the older members of the unnamed population suffered higher rates of tooth loss. In the unnamed population, 1219 teeth were lost ante-mortem. This is an average of 5.3 teeth per individual.

Dental abscesses

Severe dental disease may result in infection tracking down to root canal or around the root to the apex, resulting in a dental abscess. In untreated cases, the pressure of the inflammation and accumulated pus forces a path through the alveolar bone, leaving behind a smooth-sided lesion in the jaw. In the unnamed population, 92 such abscesses were present, a prevalence of 0.4 per individual.

Dental enamel hypoplasia

Dental enamel hypoplasia (DEH) manifests on the buccal surface of the tooth crowns as pits, horizontal lines or lines of pits. These features are the result of a thinning of the enamel caused by an interruption or slowing of the normal deposition of enamel during crown formation (Goodman and Rose 1990). DEH is induced by a number of metabolic insults, such as nutritional deficiency, weaning and bouts of childhood diseases lasting more than three weeks (Aufderheide and Rodriguez-Martin 1998; 405; Hillson 1996, 165-66). Unlike bone, enamel does not remodel during life, and so

remains as a permanent indicator of such a stress episode in the first six or seven years of life.

In the unnamed sample, the dentition was not systematically analysed for DEH, and hence, fainter lines were not recorded. One individual (skeleton 247) showed marked enamel thinning, indicating very severe, prolonged ill health in childhood. The underlying stressor could not be identified in this skeleton, but malformation of the cusps of the mandibular molars of seven adult skeletons (608, 783, 954, 975, 997, 1024 and 1258) were the mulberry molars typically found in congenital syphilis. The disease and its manifestations are discussed in more detail in the section on skeletal pathology below.

Dental interventions

Two individuals (skeletons 290 and 975) had metal fillings in their molars. The latter had suffered malformation of enamel (mulberry molars) due to congenital syphilis, which would have left the teeth more vulnerable to decay. Indeed, this prime adult male had seven unfilled caries at the time of death. Four teeth had been filled: three with gold and one with lead. Skeleton 290 had a single filling of the right upper maxillary molar. The material was described as a grey metal, and is most likely to be tin, lead or mercury amalgam.

During the 18th and 19th centuries, the cheapest material used for fillings was either tin or lead. From the beginning of the 19th century, various forms of amalgams became available. These were based on heavy metals, such as mercury, which was mixed with copper or silver filed from coins (British Dental Association Museum display; Hillam 1990). Pellets of the amalgam were placed in the cavity and tamped down with a hot instrument. Gold was the most suitable material but also the most expensive. A typical dentist's fees of 1781 listed gold fillings at 7/6 whilst lead fillings cost 5 shillings each (Wilson 1985, 38). Gold fillings were made of tiny pieces of gold foil that were compressed into the dental cavity.

Table 5.6: Dental pathology recorded on the unnamed population (n = 230)

Skeleton No	AMTL	Caries	Abscesses	Peridontal disease	Calculus	Dental interventions
114	3	3	0			
115	0	0	0	considerable		
119	0	3	0			
120	0	0	0			

159	0	0	0			
160	9	3	0			
185	0	0	0			
186	0	0	0			
188	0	0	0			
190	4	0	0			
191	8	8	6			
195	17	0	2			
196	16	0	1			
209	0	1	0			
210	0	0	0			
211	0	0	0			
213	7	1	0			
214	21	0	0	considerable		
215	0	0	0			
216	11	3	1			
217	0	0	0			
218	3	0	0			
219	5	3	2			
220	0	0	0			
221	0	0	0			
222	1	4	0			
223	0	0	0			
224	0	0	0			
225	1	0	3			
226	0	0	0			
227	0	0	0			
228	7	0	1	considerable		
229	0	0	0			
231	16	0	0			
232	9	1	1			
234	12	0	0	considerable	slight	
235	0	0	0			
236	6	0	2			
237	0	0	0			
241	0	0	0			
242	0	0	0			
243	0	0	0			
244	0	0	0			
245	0	0	0			
246	0	0	0			
247	5	2	0			
248	1	0	0			
249	3	1	0			
250	11	0	0			
252	14	0	0	medium		
Skeleton No	**AMTL**	**Caries**	**Abscesses**	**Peridontal disease**	**Calculus**	**Dental interventions**
256	0	0	0			
257	0	0	0			
258	0	0	0			
260	15	1	0	considerable		
261	0	0	0			

264	19	2	2			
265	0	0	0			
266	0	0	0			
267	10	0	2			
268	3	6	3			
269	0	0	0			
271	22	2	3	considerable	slight	
272	8	0	0	considerable		
273	0	0	0	slight	slight	
274	13	0	3			
275	28	0	0	considerable		
276	3	3	4	medium	slight	
277	5	2	2	slight		
278	32	0	0	considerable		
279	0	0	0			
280	20	0	1	considerable	slight	
282	13	1	2	slight		
283	0	0	0			
285	4	0	0	slight	slight	
286	0	0	0			
287	0	0	0			
288	0	0	0			
289	4	0	0			
290	8	5	0	medium		metal fillings
291	19	0	1			
292	0	0	0			
293	0	0	0			
294	0	0	0			
295	0	0	0			
296	7	0	2	considerable		
297	0	0	0			
298	1	2	0			
305	0	0	0			
309	0	0	0			
310	1	0	0			
312	9	4	0			
313	1	0	0			
314	4	2	1			
315	0	1	3		flecks	
316	32	0	0	considerable		
317	0	0	0			
318	1	5	0			
319	8	1	3	considerable		
320	24	0	0			
321	14	3	2			
322	2	0	0			
Skeleton No	**AMTL**	**Caries**	**Abscesses**	**Peridontal disease**	**Calculus**	**Dental interventions**
323	0	3	0			
324	13	0	0			
325	7	0	0			
326	12	3	5	considerable		
327	0	2	0			

328	0	0	0			
345	0	0	0			
346	0	0	0			
347	0	0	0			
348	0	0	0			
349	0	0	0			
357	11	0	2			
359	16	0	0	considerable		
365	16	0	0			
366	0	0	0			
367	21	0	0			
371	0	3	0			
374	3	1	0	medium		
375	3	1	1			
376	11	0	4			
377	0	0	0			
378	8	0	1			
383	32	0	0			
385	0	0	0			
392	4	9	0			
398	15	0	0	medium		
407	0	0	0			
409	16	0	0			
410	32	0	0			
411	5	4	0	medium		
414	1	4	0	medium		
419	1	7	3			
423	0	0	0			
426	8	1	1			
428	0	1	0			
429	0	0	0			
431	16	0	0			
433	0	0	0			
434	6	6	0			
435	0	0	0			
440	0	0	0			
441	0	0	0			
443	0	0	0			
444	0	0	0			
445	19	0	0			
447	0	0	0			
450	0	0	0	slight		
454	0	0	0			
455	0	0	0			
457	5	0	0	medium		
458	4	5	4			
Skeleton No	**AMTL**	**Caries**	**Abscesses**	**Peridontal disease**	**Calculus**	**Dental interventions**
459	3	1	0			
460	22	0	0	considerable		
461	0	0	0			
462	0	1	0			
463	4	0	0			

473	0	0	0			
482	0	0	0			
498	10	3	1	considerable		
499	14	2	1			
500	0	0	0			
501	0	0	0			
502	12	1	2			
503	0	0	0			
504	1	0	0			
505	0	0	0			
506	2	4	2			
507	8	0	0	considerable		
508	1	0	0			
509	0	0	0			
515	0	0	0			
516	0	0	0			
517	15	0	0			
518	0	0	0			
519	2	1	3			
520	0	2	0			
591	15	3	0			
615	0	0	0			
637	0	0	0			
639	0	0	0			
731	2	0	0	medium		
865	4	0	1			
866	3	0	0	medium		
871	3	0	0			
872	0	0	0			
892	9	1	1			
893	30	2	0	present		
930	0	0	0			
931	2	8	1			
944	32	0	0			
947	11	3	0			
948	2	3	0	considerable		
950	7	2	0			
957	0	2	0	slight		
974	0	0	0			
975	2	7	0			gold fillings
997	0	0	0			
1000	0	0	0			
1001	0	0	0			
1002	0	2	0	slight	slight	
1004	0	0	0			
1007	0	0	0			
Skeleton No	**AMTL**	**Caries**	**Abscesses**	**Peridontal disease**	**Calculus**	**Dental interventions**
1014	26	1	1	medium		
1023	7	3	1	slight		
1032	30	0	0			
1038	0	0	0			
1039	4	0	0	slight		

1041	0	0	0			
1048	11	0	0			
1049	15	0	0	considerable		
1050	6	3	0	slight		
1051	0	0	0			
1058	16	0	0			
1124	0	0	0			
1158	0	0	0	slight		
1159	0	0	0			
1161	0	0	0			
1165	7	2	0	medium	medium	
1171	14	0	0			
1173	3	0	0	slight		
1174	3	3	0	slight to medium	medium	
1175	2	2	0			
1177	8	0	0	considerable		
1183	3	2	2			
1187	24	0	0			
1188	0	0	0			
1316	1	0	0			
1317	0	0	0			
1318	18	1	2			
Totals	**1219**	**188**	**92**	**46**	**16**	**2**
Prevalence	**5.3**	**0.81**	**0.4**	**20%**	**6.96%**	**0.87%**

Skeletal pathology

Although the unnamed sample was not formally examined for pathology, large number of bones displayed obvious evidence of pathological conditions. Detailed information on the location and character of these bony changes is available in Table 5.6 below.

It is important to reiterate that because the skeletons were not formally examined for pathology, a number of more subtle bone modifications may have been overlooked, and hence, the rates calculated here might be erroneously low. This is especially true for periostitis and well healed and well aligned fractures. Spinal degenerative joint disease (SDJD) was fully recorded and does reflect the true prevalence of these degenerative changes.

Congenital disorders

A number of congenital anomalies were present in the unnamed sample. Many of them would not have affected the health or daily lives of the individuals concerned. However, some would have had deleterious effects and are discussed below.

Spondylolysis

Spondylolysis is the ossification union failure of the *pars interarticularis* of the vertebra, resulting in separation of the vertebra into two parts: a ventral part formed by the body, pedicles and transverse and superior articular processes, and a dorsal part formed by the laminae, spinous process and inferior articular processes. Spondylolysis has long been considered to be a congenital disorder, but more recent work also suggests a traumatic origin. It is frequently associated with another common neural tube defect: *spina bifida occulta* (Aufderheide and Rodriguez-Martin 1998

Health problems may arise from spondylolysis through slippage of the vertbral bodies, due to the lack of the anchoring effect of the inferior articular process. Most commonly, L5 slips on the sacrum, but L3 on L4, and L4 on L5 does occur.The fifth lumbar vertebra of skeleton 682 showed non-union of the *pars interarticularis*,. The sacrum of this individual was normal.

Scoliosis

Severe congenital scoliosis affected the spine of skeleton 723. Scoliosis is the abnormal curvature of the spinal column to the left or right in the coronal plane. It differs from kyphosis, which is the abnormal curvature in the anterio-posterior plane (colloquially known as a hunchback). In skeleton 723, there was marked deviation to the left, with the spinal column between T3 and T9 at an angle of 60° to the midline. The bodies and facets of these vertebrae were fused, and five to six ribs were fused to The internal organs, particularly the lungs, would have been compressed, possibly causing respiratory problems as well as an increased risk of blockages in the intestines. This type of spinal deformity may be caused by trauma (Aufderheide and Rodriguez-Martin 1998, 66-67), but the severity of the deformity in this individual, and the morphological changes to the ribs indicate that the scoliosis was congenital. In skeleton 756, there were developmental abnormalities of the sacral segments S1-3. The anterior half of the sacral bodies has a cleft in the body, causing a right- sided scoliosis of the sacrum. The body of L5 is deformed and wedged thereby correcting the scoliosis of the sacrum superiorly.

Other vertebral congenital anomalies

In a one-year old child (skeleton 881), three consecutive neural arches were fused together. It is unclear if this was congenital or the result of trauma.

Os acromiale

During normal development, the acromial process begins to fuse to the scapula at approximately 10-14 years (Schwartz 2000). In some adults, non-union persists into adulthood, and is known as *os acromiale*. Originally believed to be a developmental anomaly, work on skeletons from the ship the *Mary Rose,* which sank off the coast of England in 1545 AD, suggests an occupational role in the development of this condition (Roberts and Manchester 1995, 113). In the *Mary Rose*, 13.6 % had *os acromiale*, in comparison with modern dissection room frequencies of 8.0 %. The highest frequency was found amongst skeletons located where archery equipment was stored, suggesting that prolonged archery practice from childhood was a factor in the aetiology of this condition.

In the unnamed St Luke's assemblage, *os acromiale* was identified on the right scapula of two skeletons (512 and 808). It is unclear how much genetic variation or repetitive arm movements sustained from childhood into adulthood underlay the development of this condition. In a society where child labour was commonplace, it is not improbable that repetitive arm motions enacted over many years of childhood, adolescence and adulthood (for example, weaving or minding a machine) caused or contributed towards this condition.

Congenital shortening of the femur

Shortening and abnormal medial rotation of the left distal femur was present in a mature female (skeleton 160). The proximal third of the femur was normal, but the distal two thirds of the femoral shaft and the condyles were medially rotated, such that the anterior aspect of the bone faced medially. The left tibia appeared normal, and must have been held in a medially rotated position, since no secondary degenerative changes were present in the knee or ankle joint of the left foot. The maximum length of the left femur was 47 mm shorter than the right. This congenital anomaly would have caused an inward rotation of the foot, and a pronounced limp whilst walking.

In the absence of any pathological evidence, it would appear that this deformity was congenital in origin, and is typical of one of four main forms of congenital femoral shortening, which occur unilaterally in 90% of cases (Aufderheide and Rodriguez-Martin 1998, 71).

Trauma

Fractures

Fifty-five unnamed individuals (8.3%) displayed fractures indicative of trauma. Nineteen fractures were defined as closed, and involved principally the ribs in nine individuals, the upper limbs in eight individuals, and the lower limbs in four. Evidence of healing and good alignment of the bone were present in most of the above bones, but due to callous formation the type of fracture could not be ascertained without radiography.

Fractures may be defined by their nature and their anatomical alignment relative to the long axis of the bone. In the unnamed assemblage, seven oblique fractures, seven transverse fractures, one comminuted fracture and 19 compression fractures of the vertebral bodies were identified. The location of oblique fractures varied from the distal tibial shaft (skeleton 232), to the glenoid fossa (skeleton 244), the left fibula shaft (skeleton 457), and the distal shaft of the left radius (skeleton 1177). All these fractures were largely or completely healed. Most common transverse fracture sites were the ribs (usually occurring as the result of a direct blow to the ribcage), the distal radius and the neck of femur and the distal fibular shaft. Compression fractures of the vertebrae most commonly affected the mid to lower thoracic vertebral bodies.

Misalignment of fractures was relatively rare, suggesting that splinting of broken long bones was successfully undertaken in most cases. There were, however, several exceptions. On the radius of skeleton 232, no overlap occurred, but the apposition of the bone fragments had been less carefully maintained, and the distal portion of the element was angled anteriorly at 20° to the midshaft. This mature female had osteoporosis, which would have rendered her bones more brittle and prone to fracture. A slight fall onto an outstretched hand may well have been sufficient to fracture the bone. Aufderheide and Rodriguez-Martin (1998, 315) report that, together with the femoral neck, the distal radius is by far the most common fracture site in individuals with osteoporosis.

Total failure of the broken bones to knit was observed in the left ulna of skeleton 463. The broken bone had formed a pseudoarthrosis of the olecranon that remained detached at the level of the coronoid process, despite evidence of healing of the proximal and distal ends of the fractured bone. This non-union is due to poor

stabilisation of the broken bone of the elbow joint following the injury, a fracture still problematic to fixate today.

Compression fractures of the bodies of two vertebrae were found in 19 individuals. Crush or compression fractures result when a sudden excessive force is applied to the bone (Ortner and Putchar 1981, 56), and the bone is compressed along the plane of impact (in this instance vertically), either collapsing the body uniformly, or forming a wedge-shaped vertebral body. Crush fractures often occur where there is already an inherent weakness of the bone (most commonly due to underlying osteoporosis, but also present in pathologies such as tuberculosis or metastatic carcinoma). In severe cases, the uneven collapse of the body precipitates a misalignment of the spinal column (scoliosis or kyphosis), which may result in compression of the spinal nerves, causing chronic pain and disturbance of sensation to the peripheries.

Skeleton 838 had suffered a comminuted fracture to the distal shaft of the right tibia and fibula. A comminuted fracture occurs when the bone is shattered by a crush or direct blow, and splinters into a number of fragments at the site of impact. These fractures are notoriously difficult to align correctly, and healing is often slow.

Two fractures were complicated by bone infection. A mid-shaft fracture in skeleton 209 shows new bone growth on the shaft and a large sinus penetrating to the marrow cavity, indicative of secondary osteomyelitis. Skeleton 743 also showed bony changes typical of infection following the fracture of the left distal fibula shaft. Infection following fracture is frequently as a result of the broken bone breaking through the skin (known as a compound fracture) and directly introducing infection into the marrow cavity.

Skeleton 243 had suffered a slipped epiphysis of the left femoral head probably due to a traumatic incidence in childhood or adolescence. The resultant joint surface was elongated and abnormally flattened, and there was a loss of the *fovea capitum*. However, no secondary degenerative changes were noted on the femoral head or left acetabulum, suggesting that the individual walked without difficulty or pain.

Traumatic dislocation of the hip

Skeleton 838 appears to have experienced an extremely traumatic injury, in which the right femoral head was completely dislocated posteriorly from the acetabulum. The loose femoral head of skeleton 838 had moved superiorly and a new false socket had

developed on the right iliac blade, created by an area of profuse osteophytosis, pitting and eburnation. Similar bony changes are found in cases of severe congenital dislocation of the hip. The femoral head showed eburnation and osteophytosis but otherwise appeared normal. The long bones of the right leg were also normal in size and morphology, suggesting that this injury had occurred in adulthood when full skeletal maturity had been obtained. The presence of the false socket indicates that this ageing male had continued walking after the injury, albeit with a marked limp.

Unlike the shoulder, the hip joint is an extremely stable joint, with the femoral head and acetabulum held in position by a number of large muscles, tendons, ligaments and fascia. Considerable force is necessary to dislocate the hip. In modern examples, the posterior dislocation of the femur is exceedingly rare, and is most commonly the result of severe force applied through the knee when the casualty is in a sitting position (for example, hitting the dashboard of a car in a head-on road traffic accident (Hacking 2004, pers. comm.). In late post-medieval London, such an injury may have been sustained from a severe fall onto an outstretched leg.

Metabolic disorders

Cribra orbitalia and porotic hyperostosis

Cribra orbitalia is widely thought to occur in response to a deficiency of iron during childhood, most commonly the result of inadequate dietary intake of iron, and/or as a result of severe intestinal parasite infestation (Stuart-Macadam 1991, 101). Iron is a central component of haemoglobin, the molecule necessary for the transportation of oxygen in the red blood cells of the blood. Red blood cells are produced within the red bone marrow of a number of bones of the body, which include the diplöe of the cranial vault, the sternum and the pelvis. In childhood the diplöe are particularly important, but become a secondary site of red blood cell production later in life. In iron deficiency anaemia, the body attempts to compensate for low serum iron levels by hypertrophy of these bones. In children, this manifests osteologically as an increased porosity and thickening of the diplöe of the cranial vault (known as porotic hyperostosis) and of the orbital sockets (*cribra orbitalia). Cribra orbitalia* is often used as a generic indicator of physical stress in childhood.

Thirteen adult and five subadult skeletons displayed c*ribra orbitalia* (2.60 % of the total population). These lesions were graded in severity, using the standards set out by Stuart-Macadam (1991, 101-113). In most individuals, the lesions were scored

as Type 2 or 3 (slight to moderate severity). The lesions were active in all the subadults. Porotic hyperostosis, manifesting as pitting of the left and right parietal bones, was also present in mature adult skeleton 892 and in prime adult skeleton 957.

Scurvy

Three individuals (skeletons 529, 678 and 1284) presented with lesions of the eye orbits characteristic of scurvy, although in skeleton 1284 a differential diagnosis of scurvy or c*ribra orbitalia* was problematic.

Scurvy is a disease caused by a prolonged deficiency of vitamin C, usually due to a dietary inadequacy of fresh vegetables and fruit. Scurvy develops gradually over several months, lethargy being present from 12 weeks, lumps and haemorrhages of the skin and mucous membranes occurring between 19-23 weeks, and swollen, soft purple gums appearing after 30 weeks (French 2003, 297). Scurvy causes lack of wound healing and haemorrhaging, cardiac haemorrhages occasionally resulting in death. Skeletally, scurvy is noted from hypertrophy of the diplöe in the eye sockets and cranial vault, and diffuse new bone growth on the periostium in response to haemorrhage adjacent to the bone (Aufderheide and Rodrieguez-Martin 1998, 310-312).

Scurvy famously afflicted sailors on long sea voyages, but outbreaks also occurred sporadically in other social groups (such as long-term prisoners), and it was prevalent amongst agricultural labourers during years of poor harvests, the most severe being the potato famine of 1845-46 (French 2003, 296-7). In the 18th and 19th centuries, the supply of fresh vegetables and fruit to the metropolis of London was frequently very erratic, and the cost was often beyond the meagre means of the urban poor. Infantile scurvy also followed the early weaning of infants onto pap or panada, a mixture of flour and water (Roberts and Cox 2003, 307), which was grossly lacking in many nutrients (see also rickets for vitamin D deficiency). This child-rearing practice was often popular amongst the affluent, and hence, scurvy cannot be seen solely as a deficiency disease of the poor.

Rickets

Anterior-posterior bowing of the femoral shafts and/or medio-lateral bowing of the tibiae diagnostic of rickets was observed on seven skeletons (1.07%). Rickets is a deficiency disease caused by a lack of vitamin D, which is central to the absorption of dietary calcium. A deficiency results in soft, thin bones. Weight-bearing during crawling and walking in childhood cause the long bone shafts of the arms and legs to

bow. Although Vitamin D may be obtained in foodstuffs such as oily fish and animal fat, the majority of vitamin D is formed by the exposure of the skin to ultraviolet radiation. The presence of rickets usually indicates an individual who had not received sufficient exposure to sunlight in early childhood.

Rickets was fairly uncommon in pre-industrial and rural agrarian societies (Ortner and Putschar 1981, 274), but became widespread in the industrial cities of the later medieval period. The smog that blanketed the great manufacturing centres (including London) for much of the year served to block out a great deal of sunlight. Long hours of child labour in factories and mines also ensured that many working class children were not exposed to sufficient daylight necessary for the adequate production of vitamin D. In 1773, Fordyce (quoted in Roberts and Cox 2003, 309) estimated that 20,000 poor children in London were afflicted with this disease. The scale of the disease was still vast in the mid-19th century, with a third of all admissions to Great Ormond Street Hospital in London being diagnosed as rachitic.

However, rickets was not necessarily the sole preserve of the poor. The 17th century physician Francis Glisson (the first to describe rickets in precise clinical detail) observed that it was a disease of children of the wealthy classes, where it was common practice not to be suckled one's natural mother, but by a wet nurse (Sloan 1996, 44). This practice usually resulted in early weaning onto gruels high in calories but poor in animal fat, and hence, low in vitamin D (Steinbock 2003, 281-282). This social practice resulted in those from a privileged background developing the disease, and was exacerbated by keeping the young child indoors for long periods.

Osteoporosis

Osteoporosis is a proportional decrease of both the bone mineral and the bone matrix, leading to bone which is light and brittle, and liable to fracture after minimal trauma (Steinbock 2003, 236). There are two types of osteoporosis: type 1 or post-menopausal osteoporosis (affecting women over 50 years of age), and commonly the underlying condition in vertebral crush fractures and fractures of the distal radius; and type 2 or senile osteoporosis, which affects both males and females over the age of 60 years equally, and predisposes individuals to vertebral wedge fractures and fractures of the femoral neck. A drop in oestrogen levels following the menopause accounts for 10-20% loss of total bone mass in modern women (*ibid).* This often serves to aggravate a pre-existing negative calcium balance caused by a poor dietary calcium

intake and/or the net bone calcium lost during the reproductive years through multiple pregnancies and prolonged breastfeeding *(ibid*).

Osteoporosis affected three unnamed individuals (skeletons 252, 267, and 893). The first two were mature and prime adult females, respectively. The age and precise sex of adult skeleton 893 is not known. Given the ages of skeleton 252, it is more probable that she suffered type 1 osteoporosis, whereas skeleton 267 may have suffered either type 1 or 2. Skeleton 252 had suffered spinal complication secondary to osteoporosis with severe compression fractures of T8, L1 and L2. Given the difficulty in macroscopic identification of osteoporosis, it is highly probable that the true prevalence was very much higher in this population.

Joint disease

Ankylosing spondylitis

Possible ankylosing spondylitis was observed on the vertebral column and pelvis of skeleton 498, with fusion of the sacro-iliac joint, and of four pairs of adjacent thoracic and lumbar vertebrae. However, the female sex and presence of osteoarthritis in other parts of the skeleton makes this diagnosis less certain.

Ankylosing spondilitis (AS) is a systemic, non-infectious, progressive inflammatory disorder of connective tissue calcification (Roberts and Manchester 1995, 118-120; Aufderheide and Rodriguez-Martin 1998, 102). The aetiology of the disease is poorly understood, but there appears to be a strong autoimmune causation. It is a rare disease affecting only about 1 in 2000 individuals, 90% of which are male (*ibid*).

The sacro-iliac joint, spine and major peripheral joints are most frequently involved. The disease process usually begins in early adulthood, classically with erosion, new bone growth and ankylosis or fusion of the sacro-iliac joint and calcification of associated ligaments. Typically in ankylosing spondolysis, the lower thoracic/upper lumbar vertebral bodies and small vertebral joints begin to fuse, and the intervertebral disks and longitudinal ligaments ossify. This process progresses up and down the spinal column (but more typically the lumbar vertebrae are first to fuse), creating the classic ‘bamboo spine’ of this disorder.

Table 5.7: Summary of the pathology identified on the skeletons of the unnamed population (n = 262). Abbreviations: R = right; L = left; C = cervical vertebrae; T = thoracic vertebrae; L = lumbar vertebrae; SDJD = spinal degenerative joint disease, OA = osteoarthritis.

Inhumation	Pathology	Comments
Congenital disorders		
682	Spondylolysis	L5: *Pars interarticularis* or spondylolysis
1003	Congenital spondylolysis	C2 and 3: bodies are fused at articular surfaces, as are half of the spinous processes. Intervertebral disc space is not preserved
Spondylolysis	**2**	
512	*Os acromiale*	R scapula: tip of acromium process has remained unfused
808	*Os acromiale*	R scapula: tip of acromium process has remained unfused
Os acromiale	**2**	
756	Deformity of sacrum and L5	Anterior half of sacral bodies S1-3 have cleft in bodies, causing R sided scoliosis of S1-4; Deformity of body of L5 with L body compressed, thereby correcting sacral scoliosis
723	Scoliosis	Severe scoliosis of T3-T9 at a 60° deviation to the L from the long axis to the L, with bodies and facets fused, and 5-6 ribs fused to vertebrae
Scoliosis	**2**	
881	Fusion of vertebral neural arches	Three neural arches fused together (? developmental defect, ? trauma) in a year old child
Fusion of vertebral neural arches	**1**	
160	Congenital shortening of the femur	Congenital deformity of L femur (47 mm shorter than R). Upper third normal. Distal half of femur and condyles medially rotated.
Congenital shortening of the femur	**1**	
Trauma		
209	Closed fracture	Mishaft fracture of R humerus, alignment poor: angled medially at 45° to long axis of bone; Large sinus indicating osteomyelitis,; traumatic arthritis to humeral head (profuse osteophytosis and porosity)
213	Closed fracture	Healed fractures of R radius, 2 x R ribs, R patella, C6
248	Closed fracture	L radial proximal shaft: large callous, medial displacement of shaft; secondary osteomyelitis
277	Closed fracture	L clavicle mid-shaft: large callous formation, slight inferior displacement of lateral fragment; R 2nd metatarsal : callous present, well aligned
376	Closed fracture	5 ribs healed
473	Closed fracture	Distal shaft of L fibula: callous still just visible, well aligned
479	Closed fracture	Distal R radial shaft: largely healed (callous just visible); slight misalignment of fragments
506	Closed fracture	R. clavicle, 2nd metacarpal, 5 ribs (probably right)
569	Closed fracture	Posterior R rib shaft: fracture with overlap of fragments anteriorly, and fusion onto the adjacent inferior rib
575	Closed fracture	Well healed fracture from unsided rib fragment (callous still present)
652	Closed fracture	R clavicle: healed fracture resulting in callous formation and shortening of bone
681	Closed fracture	L 10th rib: healed fracture
743	Closed fracture	L distal fibula: partly healed fracture of shaft, with secondary osteomyelitis
803	Closed fracture	R humerus: healed fracture of medial epicondyle
847	Closed fracture	L mid-thoracic rib: large callous formation, partly healed, well aligned
870	Closed fracture	L rib: anterior part of rib has healed fracture
886	Closed fracture	Unsided ribs x 2: healed fracture of shafts; R patella: healed fracture of lateral side; R 1st metatarsal: healed fracture with secondary osteoarthritis (eburnation and severe osteophytosis).
1015	Closed fracture	1 x L rib: fracture at angle of rib

1242	Closed fracture	R fibular and tibial shafts: distal ends on medial aspect; healed
Closed fracture Count	**19**	
190	Compression fracture	Compression of entire body of T8 and anterior wedging of T9
195	Compression fracture	Anterior wedging of T6 and T7, associated with osteochondritis and osteophytosis
252	Compression fracture	Severe compression fracture of T8, L1 and L2, secondary to osteoporosis
265	Compression fracture	Compression fractures of T6-T9, causing kyphosis (? underlying osteoporosis)
274	Compression fracture	Complete severe compression of C6 ; anterior wedging of C7
280	Compression fracture	T10: anterior wedging of body, associated with severe osteoarthritis
282	Compression fracture	Anterior wedging of body of T10
348	Compression fracture	L5: severe compression of whole body
463	Compression fracture	T11 and T12
506	Compression fracture	T8 and T9
572	Compression fracture	C6: severe compression of body
662	Compression fracture	Severe compression of body of T8 with resultant kyphosis, associated with SDJD
665	Compression fracture	T3-6 are fused at bodies, T5 body wedged resulting in slight scoliosis of spine- ? traumatic in origin
742	Compression fracture	Wedging of body of T9 to R side, causing slight scoliosis, associated SDJD
822	Compression fracture	Anterior wedging of body of T5, with fusion of T5 and T6, associated with SDJD
1051	Compression fracture	L5: wedging of body towards R
1167	Compression fracture	T10 and 11: wedging of bodes resulting in a scoliosis to the left
1280	Compression fracture	T6: severe compression of whole body; T5: slight wedging of anterior body associated with slight SDJD of thoracic vertebrae
1281	Compression fracture	T3-T7 bodies fused, bodies wedged to L causing slight scoliosis
Compression fracture Count	**19**	
838	Comminuted fracture	R distal tibial shaft and fibula: well aligned and well healed fracture, but caused shortening of limb by 2.5 cm
Comminuted fracture	**1**	
242	Transverse fracture	Malformation, misalignment and medio-lateral flattening of femoral head-old fracture of femoral head
519	Transverse fracture	L rib
687	Transverse fracture	R tibia: distal shaft immediately proximal to the distal end: well-aligned and well healed fracture, slight callous and thickening of shaft still present
736	Transverse fracture	L humerus: oblique or transverse fracture of mid-shaft, healed; severe medial angulation of distal humeral shaft (c. 45°)
738	Possible transverse fracture	R acetabulum and R proximal femur: severe porosity, moderate to severe osteophytosis, flattening of the femoral head, secondary to neck of femur fracture
815	Transverse fracture	Rib fragment (possibly L): well healed fracture, no significant callous formation
850	Transverse fracture	Distal shaft of 5th R metatarsal: long standing healed fracture
Transverse fracture Count	**7**	
232	Oblique fracture	Distal shaft of L tibia (well aligned and marked callous formation)-well healed
244	Oblique fracture	Circular defect in scapula fossa from trauma
329	Oblique fracture	Healed fracture of R femoral neck with subluxation of head and neck and profuse callous formation
457	Oblique fracture	L midshaft of R fibula: large callous formation, in good alignment
687	Oblique fracture	Distal end of R fibular shaft: callous is still evident, but healing advanced, slight anterior displacement of distal shaft, immediately superior to the malleolus
870	Oblique fracture	L 3rd metatarsal: oblique mid-shaft fracture well healed, slight overlap of fragments
1177	Oblique fracture	Well-healed but poorly aligned fracture of distal L radius
Oblique fracture Count	**7**	
463	Pseudoarthrosis	Non-union of L ulna olecranon process
Pseudoarthrosis Count	**1**	
243	Dislocation of the epiphyseal plate	Healed slipped proximal epiphysis of L femoral head causing abnormal flattening of head, no secondary DJD

Dislocation of the epiphyseal plate	**1**	
838	Traumatic dislocation of hip	R pelvis: false socket immediately superior to acetabulum (area of profuse osteophytosis, pitting and eburnation) where femoral head articulated with pelvis; caused by posterior dislocation of R hip joint
Traumatic dislocation of the hip	**1**	
453	*Osteochondritis dissecans*	L humeral head: ovoid loss of bone on posterior articular surface
567	*Osteochondritis dissecans*	Medial condyles of R and L femora: small circular areas where dense bone is absent on the joint surface
576	*Osteochondritis dissecans*	Olecranon process of R ulna: ovoid smooth lesion on joint surface with trabecular bone clearly visible
826	*Osteochondritis dissecans*	Circular lesion located medially on L humeral head
1112	*Osteochondritis dissecans*	Lateral condyle of distal L femur
Osteochondritis dissecans	**5**	
Metabolic disorders		
225	*Cribra orbitalia*	Type 3 R orbit
232	*Cribra orbitalia*	Type 2 L orbit, Type 1 R orbit
237	*Cribra orbitalia*	Type 2, left orbit
257	*Cribra orbitalia*	Type 3, left and right orbits
293	*Cribra orbitalia*	Type 2 L and R orbits
348	*Cribra orbitalia*	Type 3 R and L orbit
587	*Cribra orbitalia*	Type 1 healed L and R orbits
606	*Cribra orbitalia*	Type 4-5 R and L orbits, active
608	*Cribra orbitalia*	L and R orbits, active
685	*Cribra orbitalia*	L and R orbits: Type 1 (healed)
703	*Cribra orbitalia*	L and R orbits: Type 1 (healed)
802	*Cribra orbitalia*	L and R orbits: porous bone
814	*Cribra orbitalia*	R orbit: Type 1
816	*Cribra orbitalia*	L and R orbits: Type 2 (active)
892	*Cribra orbitalia*	Porotic hyperoostosis of L and R parietals, *cribra orbitalia* of L and R orbits
905	*Cribra orbitalia and porotic hyperostosis*	L and R orbits: pitted; parietals have thickened porous bone typical of porotic hyperostosis
957	*Cribra orbitalia*	Porotic hyperostosis of cranial vault; bilateral lesions within orbits
1025	*Cribra orbitalia*	L and R orbits: Type 1-2, healed
1124	*Cribra orbitalia*	L and R orbits: active lesions
***Cribia orbitalia* Count**	**19**	
252	Osteoporosis	Of spine
267	Osteoporosis	Underlying SDJD
479	Osteoporosis	Bones very light, assiocaiated with SDJD and fractured R radius
893	Osteoporosis	Bones are light in weight, associated osteoarthritis
Osteoporosis Count	**4**	
529	Scurvy	New bone formation on the roofs of the L and R orbits
678	Possible scurvy	L and R orbits: pitted lamella bone
1284	Possible scurvy or *Cribra orbitalia*	L and R orbits: Type 5 *Cribra*- trabecular bone and new bone outgrowths (active); difficult differential diagnosis
Scurvy	**3**	
119	Rickets	R and L femurs and tibiae
221	Rickets	Anterior bowing of R and L femoral shafts. Slight A-P bowing of both tibiae. Periosteal new bone growth (woven) present anterior aspect of R and L tibiae.
236	Rickets	Slight medio-lateral bowing of tibial and fibular shafts, flaring tibial condyles
432	Rickets	Severe bowing of femora, fibulae and tibia.
444	Rickets	Anterior bowing of R and L femoral shafts
489	Rickets	Lateral bowing of tibiae, healed
508	Possible rickets	R and L femora show anterior bowing mid shaft, R more marked and shorter.

645	Rickets	L and R femora, tibiae and fibulae show bowing of shafts typical of rickets, massive thickening of proximal medial aspects of femoral shafts
668	Possible rickets	Slight bowing of femora
673	Rickets	Anterior bowing of femora and lateral bowing of tibiae
686	Rickets	Lateral bowing of tibiae
694	Rickets	Marked anterior bowing of femora; L and R tibiae and fibulae: medial bowing and flaring of tibial condyles
703	Possible rickets	Anterior bowing of L humerus (rickets during years of crawling)
733	Rickets	Lateral bowing of the L and R tibiae
739	Possible rickets	L and R tibiae: medio-lateral bowing of shafts
749	Rickets	R and L rickets: anterior bowing of shafts (healed)
751	Rickets	R and L femora: anterior bowing of shafts; L and R tibiae: anterio-lateral bowing of shafts
761	Rickets	Severe anterior bowing of femoral shafts
957	Rickets	Bilateral bowing of tibiae, and shortening
975	Rickets	Slight lateral bowing of tibiae
952	Infantile rickets	L and R distal metaphyses flared, shafts thickened
1020	Infantile rickets	Distal radiae and ulnae; proximal humerii, distal femora and proximal and distal metaphyses flared, and appear 'plump'
1034	Rickets	L and R tibial shafts: bowing
1043	Rickets	L and R femora and tibiae: bowing and thickening of lower mesial femora and upper mesial tibiae.
1137	Rickets	R and L femora: shafts have exaggerated curvature and thickening of shafts
1236	Rickets	L and R fibulae very bowed; flaring of metaphyses of all major long bones
1262	Rickets	L and R femora: anterior bowing of shafts; tibiae: medial bowing of shafts
1279	Rickets	L and R femoral shafts: anterior bowing; L and R tibiae: lateral bowing
1287	Rickets	All major long bones: flaring of metaphyses, ribs and long bones very porous; L and R femora: slight anterior bowing; L and R tibiae and fibulae: severe bowing of shafts
1312	Rickets	L and R tibiae: lateral bowing of shafts
Rickets Count	**30**	
Joint disease		
498	Possible ankylosing spondylitis	Profuse osteophytic growth and fusion of sacro-iliac joint; T5-8, T9-11, T12-L3 and L4 and 5 fused-? AS or ? severe OA
Ankylosing Spondylitis Count	**1**	
490	Possible DISH	Fusion of sacro-iliac joint, fusion of L5 and S1, fusion of R proxmal fibula to R tibia (no thoracic vertebrae present)
521	DISH	T7-10 fused along the right side of the vertebral column with intervertebral joint spaces preserved
638	DISH	T5-11 fused along right side of the vertebral bodies, ossifications have a candle wax appearance; enthesophyte formation on calcanea, patellae and tibial eminences
817	DISH	T2-12: fusion of bodies along the right side; L1-5: moderate osteophytosis of anterior bodies; enthesophytes on proximal and distal ends of L and R tibiae, fibulae, patellae, and greater trochanter of femora; symphysis pubis fused, sacro-iliac joints fused
850	DISH	T5-7: fused along R side of bodies; T3-L5: large osteophytosis; fused sacro-iliac joint enthesophytes on patellae, posterior calcanea, posterior olecranon of proximal ulna
951	Possible DISH	T7-9: fused with osteophytses of a candle wax appearance; fusion of sacro-iliac joint; too damaged to be certain of diagnosis
996	DISH	T4-11 fused along the R side with dripping candle wax appearance, enthesophytes on patellae, R calcaneus, tibial eminence
1054	DISH	T4-11: bodies fused down R side, osteophyte has dripping candle wax appearance; enthesophytes present on patellae, tibial eminences and Achilles tendon insertion point on calcaneus
DISH	**8**	
190	Degenerative joint disease	Slight osteophytosis of distal L femoral and proximal L tibial joint surfaces; moderate osteophytosis and porosity on the R distal femur and proximal tibia.
191	Degenerative joint disease	Osteophytes on joint surfaces of L distal femur, L patella and L proximal femur
217	Degenerative joint disease	Severe left and right distal femoral DJD

224	Degenerative joint disease	Slight osteophytosis of L proximal femur, severe ostephytosis on distal R femur, R tibia proximal, L femur and R acetabulum
234	Degenerative joint disease	Left proximal humerus: moderate osteophytosis and flattening of the head
236	Degenerative joint disease	Slight DJD of R glenoid fossa, and porosity of L acromial facet
265	Degenerative joint disease	Slight in R acetabulum, R and L distal femora and proximal tibiae
268	Degenerative joint disease	Slight to moderate osteophtosis of L proximal ulna
291	Degenerative joint disease	R sacro-iliac join: slight osteophytosis
321	Degenerative joint disease	L 1st rib fused to manubrium; porosity of manubrium and medial end of L clavicle
347	Degenerative joint disease	Slight osteophytosis of R and L femora and tibiae
365	Degenerative joint disease	Medial clavicles, R humerus and ribs show marked porosity; T11 and 12: osteophytosis and porosity
367	Degenerative joint disease	L and R acetabulae: porosity
374	Degenerative joint disease	Distal tibiae and fibulae, tarsals and metatarsals, femoral heads and distal R femur: marked enthesopathies and lipping
426	Degenerative joint disease	L and R patellae: enthesopathies
498	Degenerative joint disease	L and R proximal femora: osteophytosis and flattening of joint surface. L and R acetabulae: osteophytosis and porosity
636	Degenerative joint disease	L and R proximal tibiae, distal femora and patellae: osteophytosis moderate; Costal rib facets, sterno-clavicular joint and acromio-clavicular joint: osteophytosis
653	Degenerative joint disease	L 1st metatarsal: degenerative changes of distal articular surface
694	Degenerative joint disease	L and R distal femur and proximal tibia: slight to moderate osteophytosis and porosity
740	Degenerative joint disease	Proximal 1st R phalange of foot: slight osteophytosis
741	Degenerative joint disease	L and R patellae, distal femora and proximal tibiae: slight osteophytosis
747	Degenerative joint disease	L and R distal femora: moderate osteophytosis around margin of distal joint surfaces
750	Degenerative joint disease	R glenoid fossa: moderate osteophytosis; R sacro-iliac joint fused
804	Degenerative joint disease	Proximal R humerus: slight porosity and osteophytosis
808	Degenerative joint disease	L and R mandibular fossae: pitting; L and R femora: slight lipping of patellar surfaces
885	Degenerative joint disease	L 1st metatarsal: porosity and lipping
1252	Degenerative joint disease	L and R distal 1st phalanges of feet: osteophytosis
1313	Degenerative joint disease	R clavicle, medial surface: moderate to severe porosity and slight osteophytosis
Degenerative joint disease Count	**27**	
216	Osteoarthritis	L knee: severe osteophytosis, eburnation, flattening of joint surface and shaft. R tibia: enthesopathy at insertion for ligament; anterior bowing of R and L femur
217	Osteoarthritis	R femoral condyles: slight osteophytosis and porosity, severe eburnation with marked grooving of lateral condyle
227	Osteoarthritis	2 x mid to lower thoracic vertebral bodies: moderate osteophytosis, slight porosity and Schmorl's nodes
232	Osteoarthritis	L knee: slight porosity and osteophytosis of femoral condyles and tibial condyles; R knee: moderate osteophytosis and slight porosity of femoral and tibial condyles
252	Osteoarthritis	Severe osteophytosis, flattening and marked porosity of L acetabulum and L femoral head; R proximal humerus and glenoid fossa: severe porosity, eburnation and osteophytosis
275	Osteoarthritis	R patella: eburnation, severe porosity, moderate osteophytes; Moderate porosity and slight osteophytes on distal R femur; severe porosity on R fibula.
277	Osteoarthritis	L proximal femur, L and R proximal humerus and glenoid fossa, R acetabulum: severe porosity, eburnation, osteophytosis and flattening of joint surfaces
278	Osteoarthritis	Severe eburnation, osteophytosis and porosity of L and R humeral head and glenoid

		fossa, and L proximal femur
280	Osteoarthritis	Severe osteophytosis and porosity of C2- C7, C2 and 3 fused and C5 and 6 bodies fused; similar lesions on T5-L5 with T5-T7 bodies fused anteriorly; R and L distal ulnae and radii: severe porosity, subchondral cysts and osteophytes; L proximal radius: porosity and eburnation; DJD of L and R carpals and metacarpals; distal and R distal humeri: severe porosity and slight osteophytosis; L and R medial clavicles: moderate osteophytosis and porosity; L and R distal femora: severe porosity, moderate osteophytosis
282	Osteoarthritis	Severe osteophytosis and porosity of C3-7 with C5 and 6 fused, fused T5-7 and osteophytosis and porosity in T5-L4
289	Osteoarthritis	Severe porosity and osteophytosis of C1-C7 and SDJD of L1-5, fusion of L5 and S1 with associated porosity and osteophytosis, severe eburnation and grooving of L5 inferior articular surfaces; R distal femur, patella and proximal tibia: severe eburnation, osteophytosis and porosity
348	Osteoarthritis	R acetabulum: severe osteophytosis, moderate porosity, severe eburnation of entire surface; R femoral head: severe porosity, moderate osteophytosis; L5: : severe eburnation and porosity, moderate osteophytosis; compressed body of L5
367	Osteoarthritis	Distal R humerus: eburnation
376	Osteoarthritis	L 1st metacarpal and proximal phalanx at articulation: eburnation and pitting, C3
409	Osteoarthritis	R patella and distal R femur: porosity and eburnation
437	Osteoarthritis	R femoral condyle: severe osteophytosis and eburnation; R tibial condyle, L tibial condyle, L femoral condyle: moderate to severe osteophytosis
438	Osteoarthritis	Severe osteophytosis and porosity in C3-L4 with bodies C5 and C6, T6 and 7, and T8-10 fused
440	Osteoarthritis	L femoral head and L acetabulum : severe osteophytosis, porosity, eburnation and flattening of joint surface; R distal femur: slight osteophytosis
441	Osteoarthritis	L and R proximal femora and L and R acetabulae: severe osteophytosis, porosity and eburnation
453	Osteoarthritis	C4-L5: osteophytosis ad porosity of bodies with T4-T10 fused
454	Osteoarthritis	Severe porosity, subchondral cysts, osteophytosis and eburnation of the distal joint surface of L radius. R 2 and 3 metacarpals fused to carpals, osteophytosis, porosity and subchondral cysts of carpals. R and L 1st metacarpals: severe porosity, osteophytosis and subchondral cysts of distal inter-carpal surface
461	Osteoarthritis	1st metatarsal and proximal phalange: osteophytosis and eburnation of proximal joint surface
498	Osteoarthritis	C5-T12: severe osteophytosis and porosity of bodies, L2-5: osteophytosis and porosity of bodies less marked
503	Osteoarthritis	Distal L and R 1st metatarsals: moderate osteophytosis, slight porosity and eburnation
523	Osteoarthritis	Carpo-metacarpal joint of R trapezius and R 1st metacarpal: osteophytosis, porosity, eburnation. Similar but less severe lesions on the L side
511	Osteoarthritis	Eburnation of L trapezoid
517	Osteoarthritis	Severe porosity and moderate osteophytosis of medial R clavicular joint
529	Osteoarthritis	L and R femoral condyles: lipping; patellae: eburnation, pitting and lipping
566	Osteoarthritis	R femoral head and acetabulum: severe eburnation and porosity, slight osteophytosis and flattening of head; R distal femur: eburnation, grooving and porosity; R proximal tibia: slight osteophytosis; L femoral head and acetabulum: moderate osteophytosis, porosity, and flattening of joint surfaces
569	Osteoarthritis	R 1st metatarsal: eburnation on posterior aspect of head
584	Osteoarthritis	L and R patellae: lipping, articular surfaces pitted and sclerotic; L and R femoral condyles: patellae surfaces are pitted and eburnated ; margins of joint are lipped
586	Osteoarthritis	L 1st metatarsal and sesamoid bone: distal articular surface on inferior side shows pitting and eburnation
590	Osteoarthritis	L acetabulum: eburnation and osteophytosis; lipping of L and R patellae, distal femur; distal L and R ulnae, L and R radial facets
630	Osteoarthritis	C2-7: proliferation of new bone on body surfaces, pitting, slight lipping; thoracic vertebrae: lipping
636	Osteoarthritis	C5-T7 and L1-5 bodies: osteophytosis and porosity with T2 and 3, and T6 and 7 fused; severe osteophytosis and porosity and eburnation of apophyseal facets of L1-5
654	Osteoarthritis	L femoral head and L acetabulum: severe pitting, lipping and eburnation of joint surfaces
659	Osteoarthritis	L distal femur and L proximal tibia: moderate osteophytosis; L distal femur and proximal tibiae: moderate osteophytosis, porosity and slight eburnation; L and R 1st metatarsals distal joint surfaces: severe porosity and osteophytosis; C5-C7 bodies and L4-L5 inferior and superior articular surfaces: severe osteophytosis and porosity; L4 and 5: severe eburnation also
662	Osteoarthritis	C6-7, T6-12 bodies severe osteophytosis and porosity with T9 and 10 fused; compression fracture of T8 with resultant kyphosis
664	Osteoarthritis	R and L tarsal bones: moderate to severe porosity, eburnation and osteophytosis; L trapezius saddle joint and proximal 1st metacarpal: moderate osteophytosis and severe

		eburnation; L acromial facet and L distal clavicular joint: severe osteophytosis, porosity and eburnation; T7-8: severe osteophytosis of bodies; T1-L5 bodies: severe osteophytosis and porosity
693	Osteoarthritis	1st R metatarsal and proximal 1st phalange: eburnation and lipping of metacarpo-phalangeal joint surfaces
733	Osteoarthritis	R humeral capitulum: pitting and eburnation; distal articular surface of R ulna: eburnation
739	Osteoarthritis	L and R humeral heads: proliferation on new bone around and on joint surfaces, eburnation and pitting; R 1st metacarpal: R distal joint surface and lunate articular surface
774	Osteoarthritis	C1-T5: osteophytosis; T6-L5: osteophytosis and porosity of bodies
850	Osteoarthritis	L and R 1st metatarsals: distal morphology of joint completely altered by profuse osteophytosis, pitting and eburnation; L clavicle: eburnation and pitting of acromial articular surface; C1 and 2: eburnation and osteophytosis of dens articulation
867	Osteoarthritis	R 1st metartarsal: eburnation of inferior aspect of head
876	Osteoarthritis	C1 and C2: bodies pitted and eburnated; C1-7: severe osteophyosis and pitting of bodies, T9 and 10, L4 and 5: moderate osteophytosis
892	Osteoarthritis	R 1st metatarsal, sclerotic bone; C5 and 6: osteophytosis and porosity; T11-L5: slight osteophytosis, T7-L1: Schmorl's nodes
893	Osteoarthritis	C2-7: osteophytosis, slight pitting and new bone growth on bodies; possible osteoporosis
941	Osteoarthritis	L femoral head: irregularly shaped due to marked osteophytosis around margin of joint surface (particularly inferior aspect); posterior aspect of joint surface: porosity and eburnation; L acetabulum: corresponding eburnation, porosity and osteophytosis of joint surface
945	Osteoarthritis	L 1st metacarpal: distal joint surface lipped, small area of eburnation
951	Osteoarthritis	L and R 1st metatarsals: severe pitting, lipping and eburnation of distal articular surface
984	Osteoarthritis	L4 and L5: lipping, pitting and eburnation of articular surfaces
993	Osteoarthritis	Capitulum of L humerus and proximal head of L radius: severe pitting, osteophytosis and eburnation; L hallux: interphalangeal joint pitted and eburnated; C4-7: moderate osteophytosis and pitting of bodies, C1-7: R superior and inferior facets pitted, lipped and eburnated
1007	Osteoarthritis	T1-12: osteophytosis, eburnation and porosity
1017	Osteoarthritis	R patella and patellar surface of R femoral condyle: lipping and eburnation; R femoral head: lipping of joint surface and new bone formation on surface, and eburnation
1041	Osteoarthritis	Osteophytosis, porosity and eburnation of distal joint surfaces of R and L 1st metatarsals
1171	Osteoarthritis	L acetabulum and femoral head: porosity, eburnation and osteophytosis
1041	Osteoarthritis	L and R 1st metatarsals: lipping and eburnation on distal surfaces
1108	Osteoarthritis	5 x thoracic vertebral bodies: eburnation, pitting and lipping
1112	Osteoarthritis	R femoral head and acetabulum: severe eburnation covering joint surfaces
1130	Osteoarthritis	L 1st metatarsal: distal joint surface lipped and eburnation
1167	Osteoarthritis	L and R femora: pitted, eburnation and lipping of joint surfaces, osteophytosis on surface also; C6 and 7: osteoarthritis; T10 and 11: wedging of bodies
1234	Osteoarthritis	R femoral head: lipping, eburnation of posterior joint surface; T4-7 and T10-11: fusion of bodies ; T1-3: eburnation
1245	Osteoarthritis	L and R distal femora and R patellae: marked eburnation and grooving of joint surfaces
1262	Osteoarthritis	L femoral condyle: lipping of joint surface; florid osteoarthritis of R knee
1248	Osteoarthritis	Capitulum of L humerus and L radial head: osteophytosis, slight porosity and eburnation
1268	Osteoarthritis	R femoral condyle: patellar surface heavily grooved and eburnated, porous and sclerotic, lipping
1269	Osteoarthritis	C2-5 superior and inferior articular facets: osteophytosis and pitting marked; C3-5: eburnation also
1276	Osteoarthritis	R scaphoid and trapezius, pisiform, proximal end of 1st metacarpal, 2 proximal and one middle finger phalange: eburnation and lipping; L5: lipping and eburnation
1281	Osteoarthritis	L clavicle, medial surface: severe osteophytosis and porosity; L and R distal femora: severe porosity, osteophytosis and eburnation; L proximal tibia: moderate osteophytosis; C3-C7 bodies: porosity and osteophytosis; T3-T7 bodies fused, bodies wedged to L causing slight scoliosis
Osteoarthritis Count	**71**	
209	Schmorl's nodes	T6-L4- large, deep Schmorl's nodes, associated with moderate to severe osteophytosis
268	Schmorl's nodes	T8-L3

298	Schmorl's nodes	T8-10
312	Schmorl's nodes	T7, T10-L2
327	Schmorl's nodes	Small, on thoracic vertebrae
447	Schmorl's nodes	T11 to L3 small
458	Schmorl's nodes	T6-T11
463	Schmorl's nodes	T11 T12
501	Schmorl's nodes	Slight on T7-T11
508	Schmorl's nodes	Lower T and L
580	Schmorl's nodes	T6-11
631	Schmorl's nodes	T7-L3
633	Schmorl's nodes	T7 and 8
673	Schmorl's nodes	T8-12 and L1-5
732	Schmorl's nodes	T8-10
746	Schmorl's nodes	T12
753	Schmorl's nodes	T10 (deep lesion)
811	Schmorl's nodes	T6-8 and T11-12, and L2, slight
836	Schmorl's nodes	Superior aspect of T7-T9
865	Schmorl's nodes	L5
866	Schmorl's nodes	T10-12
870	Schmorl's nodes	T6-8, L1-4
875	Schmorl's nodes	T10-11
892	Schmorl's nodes	L1-T7
957	Schmorl's nodes	T8-L4
975	Schmorl's nodes	L2-4
1044	Schmorl's nodes	T7-12
1059	Schmorl's nodes	T5, 7-10, T12 and L2
1117	Schmorl's nodes	T6-12
1120	Schmorl's nodes	T6-12, large
1230	Schmorl's nodes	T11-L1
1240	Schmorl's nodes	T7-9, L3 and 4
1310	Schmorl's nodes	T10-T12
1316	Schmorl's nodes	T5-L1, many large
Schmorl's node Count	**34**	
190	SDJD	T5-L5: slight to severe SDJ, T9 and T10 compressed bodies, fused
191	SDJD	Moderate osteophytosis of L distal femur, L patella and L proximal femur
195	SDJD	Osteophytosis, porosity and Schmorl's nodes on T6 to L5, compression fracture T6 and 7, osteochondritis to anterior body of T6- T8
213	SDJD	Osteophytosis and Schmorl's nodes on C2-C7, osteophytosis of T8-L2
214	SDJD	Osteophytosis and porosity
216	SDJD	Slight osteophytosis and porosity of cervical vertebrae
218	SDJD	Slight osteophytosis and porosity on T2-11 and L5
226	SDJD	Slight osteophytosis of thoracic vertebrae
227	SDJD	Two thoracic vertebrae: moderate osteophytosis, slight porosity and one has slight and severe Schmorl's nodes
234	SDJD	Slight osteophytosis on C7-T5,and L3-L5; Schmorl's nodes present on T12 , L1 and L5
244	SDJD	Osteophytosis on thoracic and lumbar vertebrae
245	SDJD	Slight osteophytosis and porosity to bodies of T4-L5, Schmorl's nodes on T4-L5
252 260	SDJD SDJD	Severe compression fractures, and porosity and marked osteophytosis of T5-L2, with T5-7, T9-10 and T11-12 bodies fused, Slight lower thoracic
264	SDJD	Severe, lumbar
267	SDJD	Kyphosis T6 to T9, Schmorl's nodes L1-5
268	SDJD	Slight osteophytosis and porosity

269	SDJD	Slight T8 to L3
274	SDJD	Severe osteophytosis and porosity of C1 to T1, T4 to L5. compression fractures C6 and C7
275	SDJD	Slight cervical
278	SDJD	Osteophytosis and porosity to bodies of C2-T1 and L1
279	SDJD	T4, T8-L1: severe osteophytosis and fusion of T8 and T9, slight anterior compression of body of T11
290	SDJD	Cervical fusion
291	SDJD	Slight osteophytosis and porosity in C6-10
297	SDJD	Moderate to severe porosity and osteophytosis on bodies of L3 and L5
314	SDJD	Schmorl's node on a thoracic vertebrae
316	SDJD	Slight osteophytosis and porosity of bodies of T5-7, L3, slight anterior compression of body of T7
319	SDJD	Slight on L4 and L5
320	SDJD	C5-7 bodies fused together
321	SDJD	Slight osteophytosis and porosity on thoracic vertebrae T4-7 and T12
322	SDJD	Osteophytosis, Schmorl's nodes and porosity on C3-7 and T6-L2
348	SDJD	Compressed L5, severe porosity and moderate osteophytosis
359	SDJD	Slight osteophytosis
365	SDJD	T11 and 12: porosity and osteophtosis, T4 to 6 fused
367	SDJD	Moderate osteophytosis and porosity
374	SDJD	Fusion of T5-6 and of T9-12, osteophytosis and porosity
376	SDJD	C4 and 5, L3-5: osteophytosis and porosity
378	SDJD	Slight osteophytosis of L3 and 4
414	SDJD	Porosity of C5-7
419	SDJD	T5: slight osteophytosis
426	SDJD	T5-6 fused
429	SDJD	Osteophytosis, Schmorl's nodes and porosity of L3 to 5
434	SDJD	Osteophytosis and porosity on thoracic and lumbar vertebrae
435	SDJD	Osteophytosis and porosity of thoracic and lumbar vertebrae
437	SDJD	Slight osteophytosis to T3-T8 and L5, osteochondritis of T6 and T7
440	SDJD	Slight osteophytosis and porosity of T12, L4 and 5
457	SDJD	Slight to moderate osteophytosis and porosity
479	SDJD	T5-T12: slight to severe osteophytosis, with T5-T8 bodies fused together
498	SDJD	Osteophytosis of vertebrae
499	SDJD	Severe in cervical and lower thoracic vertebrae
501	SDJD	Slight osteophytosis and porosity of T3 to T11
502	SDJD	Osteophytosis and porosity of C3-T1 bodies; T5-T9, and L4-5. Porosity severe in L5
506	SDJD	Severe osteophytosis and porosity
508	SDJD	Slight osteophytosis of lower T and L
512	SDJD	Moderate osteophytosis of lumbars, slight on T10-12, Schmorl's nodes T12-L5
517	SDJD	Cervical osteophytosis and porosity
519	SDJD	Slight
525	SDJD	T8-10
529	SDJD	T6-10: slight osteophyte formation
566	SDJD	T5-L2: slight porosity and osteophytosis
571	SDJD	C4-7: profuse osteophytosis of bodies with fusion of C4 and 5, and C6 and C7
572	SDJD	Severe osteophytosis of C4-C7, Schmorl's nodes on T9-L3 and L5
574	SDJD	Severe osteophytosis of T5-T11 with fusion of bodies of T5-7; porosity on T10-12
590	SDJD	T4-12: moderate osteophytosis of bodies, with T5-7 fused anteriorly
591	SDJD	Slight osteophytosis of C2-7, T5-9 and L3-4
593	SDJD	Slight osteophytosis of C3, T2-L5
615	SDJD	Cervical osteophytosis and porosity slight
624	SDJD	T10-12: moderate osteophytosis, T7-12: Schmorl's nodes; L4 and 5 Schmorl's nodes
635	SDJD	Slight osteophytosis of bodies of C4-7

642	SDJD	T3-T12: slight osteophytosis of vertebral bodies
647	SDJD	T9-11: slight osteophytosis of bodies
648	SDJD	T3-7, T10and L5: slight osteophytosis of bodies
651	SDJD	T11, T12 and L5: slight osteophytosis of bodies
654	SDJD	T11-12 and L1-5: moderate osteophytosis; T5-12 and L1-5: Schmorl's nodes
660	SDJD	C3-4, T11-L5: moderate osteophytosis of bodies: T4-T9: severe (bodies fused)
666	SDJD	L2-3: slight osteophytosis of bodies; T9-10 body fused anteriorly ; L5 fused to sacrum by facets
668	SDJD	T5-7: anterior aspect of bodies fused on R; T10-11: bodies fused anteriorly; L1: Schmorl's nodes
669	SDJD	T6-12: slight osteophytosis on bodies; T11-12: bodies fused; L1-5: moderate osteophytosis of bodies
681	SDJD	C5-7, T6-L1: osteophytosis and porosity on bodies, with T8-9 fused; T6, T9-11: Schmorl's nodes
687	SDJD	C5 and 6, T5-L5: slight to moderate osteophytosis of bodies
690	Possible SDJD	T7-9: bodies fused together, unclear aetiology but probably degenerative
693	SDJD	C2 and 3: bodies completely fused together
694	SDJD	T5-T12: osteophytosis and porosity of bodies; T12-L5: osteophytosis of articular facets
730	SDJD	T7-10, L3 and 4: Schmorl's nodes; T12 and L5: slight osteophytosis
733	SDJD	L4 and 5 bodies: medial osteophytosis and porosity
735	SDJD	C5 and 6: fusion of articular processes, C7: body pitted; T7-11 bodies: moderate osteophytosis
740	SDJD	T5-10 and L5 bodies: slight osteophytosis
741	SDJD	L4 and 5 bodies: slight osteophytosis, L sacro-iliac joint fused
742	SDJD	T9-10: slight osteophytosis, T11 and 12: eburnation of articular processes, compression fracture of T9- wedged to R causing slight scoliosis
750	SDJD	C2-3, T2-7 bodies: osteophytosis; T7-L3; Schmorl's nodes
759	SDJD	L1-4: Schmorl's nodes and slight osteophytosis
795	SDJD	T6 and T7: totally fused
798	SDJD	T7 and 8: fused bodies; T6: slight osteophytosis on body
803	SDJD	T6-12: slight osteophytosis of bodies and Schmorl's nodes
805	SDJD	C6 and 7: severe osteophytosis; T7, 8, 10 and 11: Schmorl's nodes
808	SDJD	C6-T1 bodies: islands of new bone formation on surfaces, pitted; T12-L4: Schmorl's nodes
810	SDJD	C5 and 6: slight to moderate osteophytosis; thoracic and lumbar fragments show severe osteophytosis
822	SDJD	T5-8: and L1-5 bodies: slight to moderate osteophytosis, with anterior compression of T5 and fusion of T5 and 6
838	SDJD	T2 and 3, and T8 and 9: anterior bodies fused
853	SDJD	C1, C2, C5-T12, and L5: osteophytosis and porosity of bodies
867	SDJD	T8 and 9: bodies fused anteriorly; L4: slight osteophytosis of body
873	SDJD	T5-8, T11-L1: slight osteophytosis, L9 and 10 bodies fused; sacro-iliac joints fused
892	SDJD	Osteophytosis of T12-11
1032	SDJD	Osteophytosis of L2-5
1038	SDJD	Slight enthesophytes on L5-T12
1051	SDJD	Wedge-shaped L5 body, osteophytosis of L2-T11
1174	SDJD	T3 to L5 slight enthesophytes
893	SDJD	Osteophytosis on C2-7, possible osteoarthritis of the neck
877	SDJD	C2 and 3 fused at left articular facet; L5: slight osteophytosis of superior facets
879	SDJD	C6 and C7: slight osteophytosis and porosity on the bodies and R inferior articular surface
882	SDJD	C4-5, T3-4, T7-L2: slight osteophytosis and porosity
883	SDJD	T4-8 bodies: fused at articular surfaces; fusion has caused kyphosis
885	SDJD	T8-10 bodies fused; L3-L5: slight lipping of bodies
889	SDJD	Slight osteophytosis and Schmorl's nodes of T8-12 and L5 bodies
915	SDJD	T11, L2 and 3: slight osteophytosis on bodies
932	SDJD	T3-4: fused at articular surface
933	SDJD	T9-10: slight osteophytosis of bodies
941	SDJD	L1-5: considerable osteophytosis on anterior bodies; L1 and 2 fused

956	SDJD	Thoracic bodies: moderate osteophytosis
959	SDJD	T3 and 4: bodies fused anteriorly; T9-10, L3 and 5: slight osteophytosis of bodies
983	SDJD	T7 and 8: fused at articular processes
1004	SDJD	Ankylosis of T10-11, fusion osteophytosis
1014	SDJD	Slight osteophytosis of lower thoracic and lumbar vertebrae
1015	SDJD	T4 and 5: slight osteophytosis; T9-L3: osteophytosis severe on bodies
1021	SDJD	T7-10 bodies: moderate osteophytosis; L1-5 bodies: slight osteophytosis
1030	SDJD	C5-7 bodies: moderate osteophytosis; T8-9: moderate osteophytosis; T10 and L5: slight osteophytosis
1031	SDJD	T6-10: bodies fused together; L3-5: bodies: slight osteophytosis; L5 and sacrum fused
1032	SDJD	L2-L5: slight osteophytosis
1038	SDJD	T12-L5 bodies: slight osteophytosis
1040	SDJD	T2-T12 bodies: osteophytosis, Schmorl's nodes: T7-T9
1045	SDJD	L2-5 bodies: slight osteophytosis
1046	SDJD	C6 and 7: slight osteophytosis; T5-12: profuse osteophytosis with T6 and 7 and T8 and 9 fused; Schmorl's nodes on T10-12
1051	SDJD	T11-L2: slight osteophytosis; T12: Schmorl's node
1115	SDJD	C5-7: slight osteophytosis and porosity of bodies
1183	SDJD	T10-T12 bodies: fused anteriorly, mainly on the right side.
1187	SDJD	Very slight DJD affecting the costal facets of vertebrae
1119	SDJD	C3-5: porosity and some new bone formation on bodies
1231	SDJD	C3-7: moderate osteophytosis; T1-2: slight osteophytosis
1232	SDJD	C4, T4-6 bodies: slight osteophytosis
1233	SDJD	C6 and 7 bodies: slight porosity and osteophytosis
1243	SDJD	T7-9: slight osteophytosis; T10 and 11: severe osteophytosis of bodies and fusion
1247	SDJD	T3-T6 bodies: osteophytosis
1248	SDJD	C3-T9 and L3-L5 bodies: osteophytosis, C3-C7 bodies: porosity; T10: Schmorl's node
1249	SDJD	T1-L5 bodies: osteophytosis, slight on T1-T6, considerable on T7-12 with T10 and 11 fused on the R side
1252	SDJD	L1 body: moderate osteophytosis
1283	SDJD	T9 and 10 bodies: moderate osteophytosis
1297	SDJD	T8-T11: slight osteophytosis of bodies
1313	SDJD	C5 body: Slight osteophytosis
Spinal joint disease Count	**152**	
Neoplasms		
586	Neoplasm	Parietals: crossing sagittal suture is a discrete raised bump on ectocranial surface; Endocranial surface shows marked thinning of table; within this area are fine, raised subcircular lytic lesions, smooth margins
591	Neoplasm	Large neoplasm on occipital bone involving both endo- and ectocranial surfaces
876	Possible ovarian cysts or tumours	Pelvic region: four irregularly shaped ossified masses were present in this region, of sea sponge appearance
Malignant neoplasms Count	**3**	
892	Button osteoma	1x button osteoma on R parietal
1247	Button osteoma	R frontal bone immediately anterior to coronal suture: button osteoma of 1.94 cm diameter
Button osteoma Count	**2**	
Infection		
209	Osteitis	Periostitis and osteitis of distal shaft of lateral R tibia (thickening of shaft, lamellar bone present)
234	Osteitis	Severe osteitis and thickening of L tibial mid-shaft, woven and lamellar bone (periostitis present)
269	Osteitis	L tibia: thickening of proximal shaft, pitted and lamellar bone; medial proximal shaft of R tibia: thickening of shaft, pitted and lamellar bone
313	Osteitis	R tibia
319	Osteitis	Lesions on femoral shafts and 1st metatarsals
878	Osteitis	Profuse osteitis and periostitis of R and L tibiae with flattening of shafts, periostitis of L and R fibulae (partly healed)
1175	Osteitis	Femora and tibiae active lesions
1279	Osteitis	L tibial shaft: mid-shaft and distal part on posterior and medial aspects thickened; L fibula: thickening of shaft; R tibia: medial and posterior thickening of mid-shaft; L ulna shaft: thickening of proximal shaft, above thickening due to new bone formation (striated). This may not be infection but may relate to rickets in this individual.
Osteitis Count	**9**	
209	Osteomyelitis	Secondary to R humeral fracture of midshaft; associated with traumatic arthritis

248	Osteomyelitis	Left radius secondary to fracture of proximal shaft
329	Osteomyelitis	L tibia: large cloaca in mid-shaft surrounded by pitted and striated bone
409	Osteomyelitis	R femur
411	Osteomyelitis	L ulna and radius, R tibia, L and R femur (healed)
569	Osteomyelitis	R radial distal 2/3 of shaft: marked thickening of shaft due to new bone formation, sinus on midshaft (unhealed)- ? secondary to fracture; R ulna shaft has considerable thickening due to osteitis; R distal humerus: thickening of posterior right side of shaft (uptracking infection)
695	Osteomyelitis	L humerus: proximal to mid-shaft thickening due to new bone growth, and sinus present - ? associated with oblique fracture
743	Osteomyelitis	Fracture of distal L fibular shaft with profuse growth of lamellar bone and cloaca present
866	Osteomyelitis	L and R tibiae: new bone formation, lesions healed
892	Osteomyelitis	New bone formation on L and R fibulae and femora
931	Osteomyelitis	R 5th metacarpal: thickening and deformity with sinous present
Osteomyelitis Count	**11**	
191	Periostitis	Distal shaft, medial aspect R and L tibia (striated bone)
209	Periostitis	R and L tibia
217	Periostitis	L and R distal anterior tibial shafts, and distal anterior L femur
234	Periostitis	L tibial mid-shaft: woven and lamellar bone; marked thickening of shaft
245	Periostitis	L. tibial mid and distal shaft: thickened, pitted and striated bone on lateral aspect
269	Periostitis	L and R tibia
275	Periostitis	Mid to distal shaft R tibia
278	Periostitis	L and R tibiae: thick, pitted and lamellar bone on medial aspects of mid to distal shafts
280	Periostitis	L and R tibiae: 2/3 of shafts have thick lamellar bone overlying periostium
313	Periostitis	Distal 1/3 of R. tibial shaft: swollen bone with pitted and lamellar bone
314	Periostitis	Distal 1/3 of L and R tibial shafts: fine pitted and striated bone on anterior and medial aspects
319	Periostitis	Proximal half of L and R femoral shafts: lamellar bone on anterior aspects of shafts
330	Periostitis	L tibia: small area of pitted and striated bone on medial aspect of distal 1/3 of shaft
374	Periostitis	healed distal tibiae and fibulae
455	Periostitis	Proximal shafts of R and L tibiae: patches of thickened pitted and striated new bone
482	Periostitis	L and R tibial shafts: new bone formation, healed.
519	Periostitis	R and L tibiae
527	Periostitis	L and R tibial and R fibula shafts: mixture of woven pitted and striated bone
588	Periostitis	R tibia: distal shaft on medial aspect, pitted and striated bone
589	Periostitis	R and L tibiae: shaft on medial and lateral aspects, striated bone
595	Periostitis	R and L tibiae: proximal shaft on lateral aspects, striated bone and raised plaque formations (healed)
652	Periostitis	L femur, (distal medial shaft), fibulae and calcanae: partly healed of periostitis
663	Periostitis	L and R tibiae, femora, fibulae and calcanae: new bone formation on periostium
667	Periostitis	Distal L tibia and fibula: new bone growth on periostium
667	Periostitis	R humerus, R radius and R femur, radial shaft very thickened
700	Periostitis	R tibia and R fibula, proximal end on posterior aspect of shafts: plaques or dense new bone (healed) and bony spicules; L tibial shaft, proximal half on lateral aspect: thickening of shaft, healed plaques of new bone
744	Periostitis	L and R tibiae: new bone formation on medial aspect of distal shafts (more severe on R tibia (healed)
811	Periostitis	L tibial mid-shaft: thickened medial aspect of shaft due to pitted and striated lamellar bone overlying periostium
866	Periostitis	L and R tibiae: long standing healed lesions on the medial and lateral aspects of the shafts
892	Periostitis	L and R fibulae: distal half of shaft had spicules and plaques, thickening of shafts; L and R tibiae: thickening of medial and lateral aspect of mid-shaft due to plaque formation
958	Periostitis	L and R fibulae, femora and tibiae
1299	Periostitis	L femur: thick woven bone covering all aspects of shaft. Absent on R femur
Periostitis Count	**33**	
1168	Middle ear infection	L auditory meatus: enlarges meatus with irregular sharp edge; ear canal: enlarged,

		bony plaques and spicules lining walls
1309	Middle ear infection	Lytic lesions on superior surface of L and R petrous bones (7 and 13 mm resp.)
Ear infection Count	**2**	
875	Mastoiditis	R mastoid process: smooth-walled oval lesion on antero-distally on mastoid
Mastoiditis Count	1	
683	Septic arthritis/ tuberculous arthritis	L acetabulum: severe lytic lesions penetrating joint surface; posterior iliac blade: large lytic lesion perforating bone, circular erosive lesions on anterior aspect also; L femur: femoral head and neck missing but lesser trochanter shows osteophytosis and lytic lesions; L leg and foot bones are atrophied and shorter than the R.
Septic arthritis Count	**1**	
608	Congenital syphilis	Mulberry molars, flaring of metaphyses of L and R femora
783	Congenital syphilis	Gross malformation and enamel hypoplasia of molars; slight femoral periostitis
954	Congenital syphilis	Thickened long bone shafts and flared metaphyses; malformation of molar cusps
975	Congenital syphilis	Mulberry molars
997	Congenital syphilis	Deciduous mandibular molars: mulberry molars
1024	Congenital syphilis	Hutchinson's malformation of mandibular canines, non-formation of dental enamel on 1st mandibular molars
1258	Congenital syphilis	1st mandibular and maxillary molars: classic mulberry molars; mandibular incisors: Hutchinson's incisors
Congenital syphilis Count	**7**	
196	Chronic sinusitis	Severe maxillary sinusitis: multiple plaques in L and R sinuses
225	Chronic sinusitis	Huge maxillary dental abscess causing infection- profuse new bone growth within L maxillary sinus
230	Chronic sinusitis	Plaques of new bone overlying base of L and R maxillary sinuses
428	Chronic sinusitis	New bone growth lining the sinus cavities bilaterally
506	Chronic sinusitis	Maxillary
1026	Chronic sinusitis	R maxillary sinus: plaques of lamellar bone overlying normal bone of sinus walls
Chronic sinusitis Count	**6**	
573	Chronic pulmonary infection/ disease	Healed new bone formation on 4 L and 1 R rib
947	Chronic pulmonary infection/ disease	5 R and 1 L mid-thoracic ribs: active new bone formation on visceral surfaces
1007	Chronic pulmonary infection/ disease	R ribs 5-11: active woven bone on visceral surfaces
Chronic pulmonary infection/ disease	**3**	
579	Possible tuberculosis	7 R ribs have new bone formation on the visceral surface; L1: 2 smooth-walled lytic lesions in anterior aspect of the body
757	Tuberculosis	3 L and 1 R ribs: new bone formation on visceral surface (L active, R healed); T12: anterior body penetrated by circular lytic lesions; T6-9: more severe but similar lesions with cortex destroyed revealing trabecular bone which has been perforated by smooth-sided lesions
944	Tuberculosis	Destruction and fusion of vertebral bodies, kyphosis on R side. Sacro-iliac fusion. R femur erosive lesion lateral condyle, lipping and osteophytosis
947	Tuberculosis	New bone formation on the visceral surface of 5x R ribs and 1x L rib.
1007	Tuberculosis	R ribs 6-11: active lesions with new bone formation on visceral surfaces
Tuberculosis Count	**5**	
Other disorders		
1007	Deformed ribs	L and R ribs 5-11: severe angulation of the shafts, with anterior straightening of shafts, possibly due to constriction from wearing corsets
Deformed ribs Count	**1**	
229	*Hyperostosis frontalis*	Thickening and uneven deposition of lamellar bone on endocranial surface of frontal bone
287	Endocranial bone growth	Lamellar bone present on endocranial surface of frontal and parietal bones (infant)
645	Endocranial bone growth	Endocranial surface of occiput: lamellar and woven bone overlaying surface -? birth-related trauma; individual had been buried in lime
***Hyperostosis frontalis* Count**	**1**	
319	Cyst	L and R first metatarsals: smooth edged lesions adjacent to or within the distal joint surface
Cyst	**1**	

993	Cholelithiasis	One gall stone recovered from abdominal region
Cholelithiasis Count	**1**	
114	Abdominal aortic aneurysm	Erosion of the anterior L side of bodies of L2 and L3
Abdominal aortic aneurysm	1	
594	Paget's disease	Massive disorganisation and thickening of occipital and frontal bones, thickening of femora, humeri, sacrum and vertebrae
1171	Paget's disease	Considerable thickening of mandible
Paget's dsease Count	**2**	

Depending upon the extent of the ankylosis, sufferers of this disorder experience lower back pain, limited chest expansion, immobility, weight loss and fever (Roberts and Manchester 1995, 119).

Osteochondritis dissecans

Osteochondritis dissecans is a fairly common osteological disorder found on the joint surfaces of the major long bones. Physically active young males (such as athletes) are most often affected in the first two decades of life. This disease is due to a significant localised obliteration of the blood supply, causing necrosis of small areas of joint tissue (Roberts and Manchester 1995, 87). Repeated, low-grade, chronic trauma or micro-trauma is thought to play a role in this injury to the blood vessels. The necrotic bone plaque breaks off from the joint surface and may remain loose in the joint, causing chronic pain and often precipitating osteoarthritic changes. Alternatively, the fragment may reattach in its original position or be resorbed, and no further symptoms will be experienced.

Five skeletons in the unnamed assemblage showed evidence of this disorder (453, 567, 576, 826 and 1112). All but one skeleton (576) were male. Two lesions were located on the femoral condyles, two on the humeral head and one on the olecranon of the ulna. None showed evidence of traumatic osteoarthritis.

Diffuse idiopathic skeletal hyperostosis (DISH)

As its name suggests, DISH is a systemic disorder where additional bone is deposited around a number of joints of the body. This is largely due to the ossification of surrounding ligaments. Typically, DISH begins with ankylosis of the mid-thoracic spine, due to the ossification of the anterior longitudinal ligament and paraspinal tissues. This produces a dripping candle wax appearance along the right side of the bodies of the vertebral column (Roberts and Manchester 1997, 120). This ankylosis extends superiorly and inferiorly along the vertebral column, leading to the gradual and complete fusion of the spine. The most common extraspinal sites to be affected

are the sternal rib ends (where the costal cartilage ossifies) and enthesophytes at ligament and tendon attachment sites at many locations on the skeleton. The underlying cause of DISH is not clearly understood, but appears to be associated with obesity and diabetes mellitus. The age of onset of the disease is usually from 50 years onwards. The disorder manifests clinically as pain, aching and stiffness in the affected joints (*ibid*).

Six definite and two probable cases of DISH were present in the unnamed assemblage from St Luke's church (1.221 %). These individuals displayed the classic ankylosis of the thoracic spine, and many have enthesophytes at tendon and ligament insertion sites, and ankylosis of the sacro-iliac joint in two individuals. Because of the florid nature of this disease, it is probable that the prevalence of DISH in the unnamed assemblage approximates the true rate of this disorder in this population.

Table 5.8 The prevalence of DISH in five English post-medieval assemblages (figures cited in Roberts and Cox 2003, 311); WC = working class, MC = middle class

Site name	Total No	Affected	CPR%	Class
St Luke's, Islington (unnamed)	655	8	1.22	Largely WC
St Luke's, Islington (named)	219	5	2.28	Mostly MC
St Bride's lower churchyard	533	10	1.88	WC
Newcastle Infirmary	189	2	1.06	WC
Christ Church, Spitalfields	968	56	5.79	Mostly MC
Kingston-upon-Thames	360	3	0.83	MC
Total	2924	84	2.87	

Table 5.8 shows the prevalence of DISH in six post-medieval burial assemblages. It is interesting to note that the rate of DISH amongst the unnamed population from St Luke's is significantly lower than that in the named assemblage. DISH in the former population more closely approximates the prevalence found in the Newcastle Infirmary and St Bride's Lower Churchyard assemblages (both predominantly working class populations), and is considerably lower than Christ Church, Spitalfields, where DISH was found in numbers far exceeding other sites of the period. These different rates may well reflect the differences between the diet and lifestyle of the urban working and middle classes of the period.

Historical accounts suggest that the diet of the middle classes during the 18th and 19th centuries was high in animal proteins and fats. Meat and alcohol were

consumed in large quantities (Roberts and Cox 2003, 313). A wide variety of fruits and vegetables was also available, albeit seasonally. Sugar was consumed in large quantities by the 19th century. The descriptions of the food served at dinner parties, and written descriptions of the daily menus suggest that over-indulgence was commonplace (Cox 1996, 50-57). The diet of the working classes was very different from the upper and middle class diets. Malnutrition was a regular occurrence, particularly amongst children and women, the majority of the common diet consisting of potatoes and bread, with little protein, fresh fruit or vegetables. Poor harvests and the subsequent rise in the price of grain occurred sporadically throughout this period, leaving the urban poor vulnerable to extreme privation, if not starvation in bad years. Thus, it is not surprising that the prevalence of DISH (a disease linked to corpulence and over-indulgence) was more common amongst the privileged classes than amongst the poor of Georgian and Victorian England.

Degenerative joint disease

Degenerative joint disease (DJD) is by far the most common joint disease found in skeletal populations, and the unnamed assemblage of St Luke's church was no exception. DJD occurs where there is damage to a joint through over-use (repetitive activity-related trauma) or through general wear and tear of the joint through life. These bone changes are often progressive and hence, correlate closely to the age-at-death of the individual, and on a palaeodemographic level, prevalence relates to the age-distribution of the population under study.

Degenerative changes manifest skeletally as the deposition and/or resorption of bone of the joint surface. Deposition of new bone (or osteophytosis) on or around the joint surface occurs as a compensatory attempt by the body to spread the load by increasing the joint surface area. Where osteophytosis becomes severe, the new bone may cause the joints to fuse together or ankylose. This is most commonly found in the vertebral bodies. When the cartilage overlying the bone at joints is destroyed, the bone may become very dense or sclerotic. Friction between the two bones may cause polishing or eburnation. Bone resorption often occurs concurrently with deposition. Macroscopically, this manifests as porosity of the joint surface. Infiltration of these pores by synovial fluid may cause subchondral cysts to develop, readily visible by radiography, but less obvious to the naked eye (Roberts and Manchester 1995, 112-114).

DJD is an umbrella term describing a number of degenerative joint diseases (including osteoarthritis, rheumatoid arthritis, and psoriatic arthritis) that do not manifest specifically enough to allow for a differential diagnosis. The vertebrae are the most common location for DJD, and this pathology has been listed separately as spinal degenerative joint disease or SDJD in Table 7 above. In addition to the osteophytosis, porosity and eburnation described above, Schmorl's nodes are another skeletal indicator of degenerative changes of the spine. Schmorl's nodes are depressed areas on the anterior and superior aspects of the vertebral bodies where the intervertebral disc contents have herniated and have exerted pressure on the vertebral body. In modern humans, Schmorl's nodes are very common in individuals aged 45 years and more, and are generally held to have few clinical effects (Aufderheide and Rodriguez-Martin 1998, 96), although recent work does suggest that back pain frequently does accompany modern sufferers.

Thirty-one skeletons in the unnamed assemblage were afflicted with non-spinal degenerative joint disease (4.74 %). SDJD was found in 153 adults (23.36 %), with an additional 34 skeletons showing Schmorl's nodes on the vertebral bodies in the absence of other degenerative changes (5.19 %).

Osteoarthritis

Osteoarthritis is the most common degenerative joint disease in both humans and animals, affecting 90% of modern people over aged 40 years (Denko 2003, 234-236). In its mildest form, osteoarthririts is not symptomatic, but approximately 30% of those showing clinical evidence of the disease do experience joint stiffness and chronic pain (Denko 2003, 235). These symptoms may become severely debilitating, greatly affecting the sufferer's quality of life, activities and earning potential.

In accordance with the recommendations of Rogers and Waldron (1995), osteoarthritis was diagnosed on joints of the unnamed assemblage where eburnation was present, and/or where at least two other features of osteoarthririts was present (namely porosity, osteophytosis or Schmorl's nodes). Osteoarthritis affected 67 skeletons of the unnamed population of St Luke's church (10.22 % of the total population). This prevalence is probably due to the older nature of the St Luke's unnamed population but occupational stress may also have played a role. The joints most affected were the spine, hips, knees and toe joints of the feet (particularly the big toe). This correlates with the general distribution of osteoarthritis seen in many past

and present populations, where the major weight-bearing joints experience the greatest physical stress (Rogers and Waldron 1995, 6).

Neoplasms

Malignant tumours

The cranial vaults of skeletons 586 and 591 show marked bony changes indicative of malignant neoplasm. Skeleton 591 had a large area of bone growth on the occiput, involving both the endocranial and ectocranial tables. The bony growth on the parietal bones of skeleton 586 suggested a malignant carcinoma of unspecified type but one that elicited both lytic and osteoblastic responses. The large oval growth (measuring 5.5 x 3.28 cm) was centrally located and crossed the sagittal suture at the crown of the head. The margins were clearly defined and possibly sclerotic. On the endocranial surface, there was considerable thinning of the bone, almost perforating the outer table. Five discrete sub-circular lytic lesions were present within this area.

Ovarian cysts or tumours

Four ossified masses were found within the pelvic region of an older female skeleton (876). These irregularly shaped masses resembled sea sponges. Although their exact nature cannot be determined without more sophisticated analysis, it is probable that they are the calcified remnants of ovarian cysts or tumours.

Benign tumours

Two skeletons (892 and 1247) had a button or ivory osteoma on the cranial vault. Skeleton 892 had a single lesion on the right parietal bone, whilst skeleton 1247 had one on the right frontal bone (diameter 1.94 mm). Both individuals were ageing adults, a male and a possible female, respectively. Button osteomas are small circular lumps on the ectocranial surface of the cranial vault, most commonly on the frontal bones. They are benign tumours of no clinical significance (Roberts and Manchester 1995, 188). They are more commonly found in males, and frequency rises after the fourth decade of life (Aufderheide and Rodriguez-Martin 1998, 375), as was the case with these two individuals.

Infection

Non-specific infection

Non-specific infection was noted on the long bones of 52 individuals of the unnamed assemblage. These have been categorised as periostitis, osteitis and osteomyelitis in

Table 5.8 depending of the depth of penetration of the infection into the bone tissue. Other sites of non-specific infection, such as the mastoid process, middle ear, maxillary sinuses and ribs, are listed separately. It is quite probable, given the low resolution analysis used for this assemblage, that the true prevalence was much higher.

Periostitis, osteitis and osteomyelitis

In the vast majority of archaeological skeletons, the specific bacteria responsible for bone infection cannot be identified, and it is referred to as 'non-specific' infection. Bone tissue response to infection involves both resorption and proliferation. Inflammation of the periostium, or periostitis, manifests osteologically as new bone formation on the surface of the bone. Penetration of infection deeper into the compact bone stimulates further osteoclastic activity, leading to noticeable thickening and sometimes, distortion of the bone. This is known as osteitis. Where the infection penetrates into the marrow cavity, resorption causes pitting and thinning of the cortical bone and an enlarged marrow cavity. The pressure of accumulated may cause this debris to burst through the thinned cortical bone, creating a smooth-sided sinus or cloaca (Roberts and Manchester 1995, 126). The pus is then discharged into the overlying soft tissue, spreading the infection further afield.

In the unnamed assemblage, the long bones of 33 individuals had periostitis. By far the most common location of these lesions was the tibial shafts, found in 28 individuals. This is perhaps not surprising, when one considers the lack of soft tissue overlying this bone, particularly on the anterior aspect, and the greater exposure of the lower leg to traumatic insults. In addition, severe peripheral vascular disease (common in the elderly, those with arteriosclerosis and diabetes mellitus) often result in arterial and venous ulcers of the feet and lower legs that are notoriously slow to heal, and vulnerable to secondary infection. Spread of infecion did occur in many cases, most commonly to the fibula, but also to the femur and calcaneus. In most cases, the lesions were either fully or largely healed, showing lamellar and smooth bony plaques.

Eight individuals showed evidence for osteitis. Here too most lesions were located on the tibiae and were largely or fully healed. Thickening of the bone shafts due to reactive bone proliferation was present.

Osteomyelitis is the most severe form of bone infection, penetrating to the marrow cavity. The capacity of the body's immune system to mount a defence against

this infection is severely hampered by the relatively small blood supply to bone tissue. Even today, in an era of sophisticated medical care and antibiotic treatment, osteomyelitis remains one of the most difficult infections to treat. In the unnamed assemblage, 11 skeletons showed evidence of this disorder. In four skeletons (209, 248, 569 and 695), osteomyelitis appeared to associated with a fracture (presumably a compound fracture where the broken bone penetrated the skin and provided a portal of entry for bacteria). In skeleton 569, a possible fracture and secondary osteomyelitis of the right distal radial shaft caused uptracking infection that spread to include much of the upper limb, with marked thickening of the shaft of the adjacent ulna and humerus (Plate 5.1). In skeleton 411, healed lesions were present on the left ulna and radius, the right tibia and the right and left femora. The widespread distribution of the infection suggests that the causative organism was spread systemically, although a more specific identification of the disease was not possible.

Otitis media

The ears of two skeletons (1168 and 1309) showed evidence for chronic *otitis media* or middle ear infection. In the former, the left auditory meatus was enlarged and had a sharp irregular edge of new bone. Deeper within the ear canal, bony plaques and spicules overlay the walls. In skeleton 1309, bony resorption associated with middle ear infection was so severe that lytic lesions had penetrated the superior aspects of the left and right petrous bones. The diameters of these lesions measured approximately 7 and 13 mm respectively. It is probable that this ear infection may have spread, causing potentially fatal meningitis or encephalitis in this adult.

The bony changes noted in the above two skeletons indicate prolonged infection, which would have caused considerable pain. Perforation of the ear drum occurs in many untreated modern cases of *otitis media*, and hence, it is likely that these individuals also suffered hearing impairment.

Mastoiditis

A small smooth-walled lesion was present on the anterio-distal aspect of the mastoid process of the left temporal bone of skeleton 875. Mastoiditis is the infection from the porous tissue of the mastoid process, and frequently is caused by infected material of a middle ear infection bursting into the surrounding tissue (Roberts and Manchester 1995, 132). Mastoiditis is potentially fatal if the infection spreads internally to the brain and meninges. However, the evidence of a small sinus on the exterior of the

mastoid process of skeleton 875 suggests that instead, the lesion had drained externally, probably resulting in a complete recovery.

Chronic sinusitis

Chronic sinusitis was of the unnamed assemblage. The maxillary sinuses of these individuals were exposed due to the post-mortem fracturing of the maxillae. It is highly probable that the true prevalence of the disorder was very much higher but could not be observed in skulls where the facial bones remained intact. The surfaces of the sinuses appeared roughened, rugose and porous due to overlying plaques of new bone. Chronic inflammation and/or infection of the maxillary sinuses frequently secondary to poor ventilation, allergy and the chronic exposure to polluted sooty air (Roberts and Manchester 1995, 131-132). This disease is particularly common in the smoggy cities of post-medieval Europe, and prevalence increased in line with air pollution associated with industrialisation. Long-term exposure to air-borne pollutants was compounded by many industrial processes, leaving industrial and manufacturing workers (eg. miners, foundry and cloth workers) at severe risk of diseases of the ears, nose, throat and chest.

A different cause of sinusitis was observed in skeleton 225. Here, a very large dental abscess had perforated the inferior aspect of the left maxillary sinus, spreading the infection into the sinus cavity.

Chronic respiratory disease

Respiratory disease was commonplace in the medieval period and became even more of a cause for ill health following rapid urbanisation in the later post-medieval period. From the 18th century, industrialisation led to a vast influx of rural poor into the cities. Living conditions amongst the slums of the urban working classes were poor with overcrowding in homes that were poorly heated and poorly ventilated, malnutrition and poor general hygiene being the norm. Long hours worked in factories with air-borne dust and chemicals also had a deleterious effect on respiratory health. One respiratory disease that thrived in these conditions was pulmonary tuberculosis, which became markedly more prevalent from the 17th century onwards, and by the 19th century reached epidemic proportions. Tuberculosis will be discussed more fully below.

The vast majority of respiratory diseases leave no trace on the bones. However, where a lesion (such as a bulla or abscess) is closely associated with the ribs, resorption or new bone proliferation on the visceral surface of the rib may occur

(Roberts *et al* 1998, 56). Traditionally, such lesions were associated with tuberculosis (TB) but Roberts *et al* (1998), concluded that no differential diagnosis was possible without the presence of tuberculoid lesions in other parts of the skeleton. Acute lobar pneumonia, brochiectasis (eg in chronic obstructive pulmonary disease, such as asthma, chronic bronchitis and emphysema), and less likely, metastatic carcinoma, non-specific osteomyelitis and syphilis may all be possible causes.

New bone growth was noted on the ribs of three skeletons (573, 947 and 1007) of the unnamed sample. In the first, the lesions had healed well before death, whereas in the latter two individuals, bone deposition was active at the time of death. Although it is impossible to prove that pulmonary disease was the cause of death in these two prime adult females, it is not an improbable conclusion.

Specific infections

Tuberculosis

Archaeological evidence of tuberculosis (TB) afflicting humans dates back at least to the Neolithic period, but in Europe it was from the 16th century that TB increased noticeably amongst urban populations, causing 20% of all recorded deaths at that time, the greatest concentration being in London (Johnston 2003, 339). This trend continued through the post-medieval period. By the early 19th century, autopsies undertaken on the most indigent dwellers of cities such as Paris and London revealed that close to 100% of all cadavers examined had developed tubercular lesions at some time in their lives, although many had died of other causes (*ibid*). Deaths from pulmonary tuberculosis or consumption (based on the Bills of Mortality of the 18th and 19th centuries) afflicted an estimated 400-500: 1,000,000 people, making it the most common cause of death in this period (Roberts and Cox 2003, 338).

Like most infectious diseases, TB was principally but by no means exclusively, a disease of poverty and urbanisation. Spread by droplet infection, the overcrowded and poorly ventilated housing and workplace conditions of these groups greatly facilitated its transmission amongst the urban poor. Greater vulnerability to the disease was noted in some occupation groups, with female textile factory workers exhibiting the highest TB rates of all occupational groups (Johnston 2003, 340).

TB is caused by the bacterium *Mycobacterium tuberculosis*, which most commonly invades lung tissue, but also may be found in the bones, the skin (where it was known as scrofula or the King's Evil), the gastrointestinal tract and the central nervous system (where it may cause tubercular meningitis). The bacteria may lie

dormant in the body tissues for many years, but may become active when the host's immunity is compromised, as occurs when an individual is diseased or malnourished.

In approximately 90% of cases, tuberculosis leaves no trace on the skeleton, and hence, osteological prevalence of the disease drastically under-represents the true pathology rates of this disease. Where bony lesions do occur, the most common locations are on the visceral surfaces of the ribs (but this may not be specific to tuberculosis), the vertebrae (in 25-50% of cases), and the hip and knee joints (Roberts and Manchester 1995, 141). New bone was present on the visceral surface of the ribs of three skeletons (see above). However, in the absence of other characteristic lesions, a specific diagnosis of tuberculosis could not be made. Three other skeletons (579, 757 and 944) showed similar rib lesions, but also displayed characteristic lytic and proliferative changes in the vertebrae. In skeleton 576, two smooth-walled lytic lesions were present on the anterior body of L1. More marked destruction of the cortical and trabecular bone of T6-9 and T12 was present in skeleton 757, but most extensive vertebral damage occurred in skeleton 944. In this skeleton, extensive resorption of the trabecular bone had caused collapse of the vertebral bodies, resulting in a right-sided kyphosis. Proliferation of bone had also caused ankylosis of the spine and fusion of the sacroiliac joint. An erosive lesion was also present on the lateral condyle of the right femur, associated with osteophytosis. In skeleton 638, several joints showed circular lytic lesions suggestive of tuberculosis. The joint surface of the left acetabulum was penetrated by a number of such lesions, whilst a large circular lesion penetrated the blade of the left ilium. Although the head and neck of the left femur were not present, similar lysis, but also osteophytosis, was noted on the lesser trochanter. The left leg and foot bones were atrophied and shortened, indicating that this insult had begun before the individual reached full maturity.

Syphilis

Venereal syphilis was long the most serious and dreaded of the sexually transmitted diseases. The disease was first encountered in the western world in the 15th century AD, and rapidly spread across Europe (Roberts and Cox 2003, 340). By the post-medieval period, the 'great pox' or the 'French pox' (as syphilis was known in England) had become a significant health problem. Prevention of contagion using early forms of condoms, and treatments using mercury and guaiacum were largely unsuccessful (*ibid).* It was really only with the invention of penicillin in the 1930s that any serious inroad was made into control of this disease. Venereal syphilis is a

sexually transmitted infection caused by the bacterium, *Trepanima pallidum*, and is the only one of the treponematoses (a group of diseases that includes yaws, pinta and endemic syphilis) that may have a fatal outcome. Syphilis is transmitted by sexual contact or may be passed from an infected mother to her foetus. The latter is known as congenital syphilis.

Venereal syphilis acquired in adulthood is a chronic infection characterised by three clinical stages separated by latent stages with no visible symptoms (Arrizabalaga 2003, 316). In primary syphilis, a small painless ulcer or chancre appears on the genitals (and less commonly elsewhere) within 2-6 weeks of infection. In most cases, after a brief latent period, there is a secondary stage characterised by widespread lesions on the skin and in the internal organs, a painless rash, fever, malaise and bone ache. These symptoms disappear after a few weeks, but in 25% of sufferers they recur during the first two years (*ibid*). The tertiary stage only develops in a third of untreated cases, and only following a latent phase that may vary in length from 1 to more than 20 years. It is this tertiary stage that causes such profound systemic damage that results in insanity and death. The bacterium causes progressive destruction of a number of systems of the body, including the skin, mucous membranes, bones, the heart and blood vessels and the nervous system. Nervous system involvement causes a loss of positional sense and sensation that manifests as locomotor ataxia (a stumbling, high stepping gait), and bouts of insanity, which is known as general paralysis of the insane (*ibid;* Roberts and Manchester 1995, 153). Fatality from tertiary syphilis occurs through cardiovascular involvement, such as ruptured aneurysm, or cardiac valve failure.

Congenital syphilis refers to syphilis transmitted to the unborn child of a mother suffering from venereal syphilis, and occurs in 80% of pregnancies where the mother is infected (Aufderheide and Rodriguez-Martin 1998, 164). The spirochete bacteria are transmitted across the placenta to the foetus after the first 16-18 weeks *in utero*. Spontaneous abortion and stillbirth are commonly associated with the condition. Surviving infants frequently manifest with developmental anomalies, such as deafness, cusp malformations of the permanent dentition (Hutchinson's incisors and mulberry molars), interstitial keratitis, impaired cognitive development, periostitis, osteochondritis and osteomyelitis. Syphilitic infection of the scalp, historically described as 'scald head', was a very visual, unsightly manifestation of congenital syphilis.

The London Bills of Mortality attributed between 1 and 30 deaths per year to 'scald head' in the period between 1740-1810 (Roberts and Cox 2003, 341-2). The true mortality rate of congenital syphilis was probably much higher. Nevertheless, many sufferers of congenital syphilis did survive into mature adulthood, as evidenced by skeleton 975 (a prime adult male) and skeleton 1258 (a young adult, possible female). The remaining five congenital syphilitics in this assemblage were less fortunate, with skeletons 954 and 997 dying within the first year of life; skeleton 608 and 1024 dying in childhood; and skeleton 783 surviving into later adolescence. All of the above skeletons displayed the mulberry molars characteristic of congenital syphilis, and two (skeletons 1024 and 1258) had Hutchinson incisors. Thickening of the long bone shafts and flaring of the metaphyses were present in skeletons 608 and 954. None of the seven showed the classical gummatous lesions of this condition, although periostitis was present on the femora of skeleton 783.

Other pathological conditions

Paget's disease

The skeletons of 594 and 1171 showed bony changes indicative of Paget's disease. In the former, massive disorganisation and thickening of bone was present in the occipital and frontal bones of the cranial vault, the femoral and humeral shafts, and the sacrum, and vertebrae. In skeleton 1171, bony proliferation was most marked on the mandible.

Paget's disease is a condition of unknown aetiology characterised by a profound increase in both bone resorption and new bone formation resulting in simultaneous mixtures of lytic and sclerotic processes, initiating as a localised condition but often terminating as a widespread state. The clinical, symptomatic form of the disease is certainly one of older people, most commonly aged over 60 years (Aufderheide and Rodríguez-Martin 1998, 413). A famous sufferer is thought to have been Jane Austen, a contemporary of the individuals buried at St Luke's church.

In Paget's disease, there is thickening of the skull particularly at the supra-orbital margins, thickening and porosity with new bone formation of the sternal body, manubrium, and bodies of all the vertebrae. The clavicles, shafts of the humeri, ulnae, radii, femora, tibiae and fibulae are all markedly thickened and porous with areas of plaque formation and spicules. The porosity is caused by hypervascularization while the thickening, caused by abnormal osteoblastic activity is most prominent in the

femora and tibiae to the extent where the cortices appear sclerotic. All the bones are heavier than normal. The involvement of multiple bones and the thickening of the shafts due to the proliferation of new bone were consistent with Paget's disease.

Aortic aneurysm erosion

A number of lumbar vertebrae of skeleton 114 show shallow concave erosions of the left anterior aspect of the bodies. These bone changes are characteristic of the presence of an abdominal aortic aneurysm of long standing (Aufderheide and Rodriguez-Martin 1998, 78-9). An aneurysm is a weakness in the wall of an artery (in this case, the aorta), which causes localised dilation of the artery. Tearing of the inner layers of the artery wall may also occur, which enables blood and arteriosclerotic plaques (composed largely of cholesterol) to penetrate, thereby narrowing the lumen of the artery and impeding the normal flow of blood through the cardiovascular system. The abdominal aorta is anatomically located immediately anterior and to the left of the vertebral column, bound to the spine by ligaments and fascia. Pulsating of the aorta may erode the left side of the vertebral bodies, particularly where this pulsation is exaggerated, as it is with an aneurysm.

Aneurysm of the aorta is a potentially fatal condition. In addition to the impedance of blood circulation to the abdominal, pelvic and lower limb regions, the propensity of the weakened walls to rupture may result in a sudden, catastrophic haemorrhage. Aneurysm formation is associated with age, hypertension, diabetes mellitus, and elevated lipid levels. Aneurysms found in tertiary syphilis are less commonly abdominal, tending to occur in the thoracic region close to the heart (*ibid*), but may have the same fatal outcome.

Cholelithiasis

One calcified gallstone was recovered from the abdominal region of skeleton 993, an ageing female. Cholelithiasis, or gallstone formation, is a fairly common disorder in modern populations, particularly amongst middle-aged, multiparous, obese women (the so-called 'fair, fat, fertile and forties or fifties females'), where prevalence is as high as 20% (Chandrasoma and Taylor 1995, 656). Diabetes mellitus also predisposes individuals to this disorder. In 30% of individuals with gallstones, there are no symptoms, but acute or chronic cholecystis may occur if the gallstones move from the gall bladder and block the common bile duct, resulting in biliary colic (severe intermittent abdominal pain) and nausea. Complete obstruction of the gut leads to deep jaundice and fever. Calcification of gallstones occurs only in chronic cases, and

hence, it may be assumed that skeleton 993 had suffered this condition for many years. Thus, at the time of onset she would indeed have fallen into the most common age group and sex for this condition.

Congenital anomalies

A number of congenital anomalies that would have had little or no effect on the growth, development and health of the affected individual were seen on 24 skeletons. These traits represent minor genetic variations between individuals, and loosely are

Table 5.9 Unnamed skeletons showing the presence of congenital anomalies (n = 655)

Sacralization	***Spina bifida occulta***	**Rib anomalies**	**Vertebral anomalies**
265	1025	871: used shafts of two adjacent ribs, with separate costal and vertebral ends	756: 6th lumbar associated with cleft S1-3, L5 compression and scoliosis
289	1043		1226- 13th thoracic vertebra
458	1226		660- fusion of atlas to the occipital condyles by means of an additional process extending from L transverse process
529			
591			
595			
836			
871			
883			
677			
689			
759			
956			
1015			
1044			
1139			
1224			
17 (2.60 %)	3 (0.46 %)	1 (0.15 %)	3 (0.46 %)

thought to indicate familial relationships. The congenital anomalies found in the unnamed population are listed in Table 8 below. Sacralisation (fusion of the last

lumbar vertebra to the first sacral segment) was present in 17 individuals (2.60 %). this was by far the most common anomaly. *Spina bifida occulta* was recorded in three individuals. This condition involves non-fusion of some or all of the sacral segments dorsally. Unlike *spina bifida* proper, there is no clinical sequele to this condition, and at most, the abnormality may be marked superficially by a small tuft of hair on the lower back.

Craniotomy

The skulls of skeletons 448 (a prime adult possible male) and 1165 (a young adult male) had undergone horizontal craniotomies soon after death. It is assumed that they had been used for medical dissection prior to their interment.

In the Georgian and Victorian periods, post-mortem dissection was an uncommon procedure, and usually one over which the deceased and their relatives exercised little control. In the 18th century, there was a growing need in medical institutions to be provided with cadavers on which students might learn anatomy and practise dissection. In 1752, the Company of Surgeons was granted the corpses of all executed felons. However, demand far outstripped supply, and many additional cadavers were supplied to anatomy halls by 'resurrectionists', who raided graveyards, exhuming corpses and selling them on for a handsome profit (Porter 1997, 318). In 1829, public outrage at this practice reached a peak with the notorious case of Burke and Hare. The outcome of this outrage was the passing of the Anatomy Act (1832), in which the medical profession were permitted to take for dissection all 'unclaimed bodies' of those dying without family, or those dying in the workhouse or hospitals. As a result of the act, there was a reduction in bodysnatching, but the act also served to deepen the fear and shame amongst the poor of dying at the expense of the parish.

The antithesis to the notion of being dissected was based around religious and social perceptions. The Christian belief in the resurrection of the whole body on Judgement Day led to fears that dissection would damage the spiritual state of the dissected person. A deep-seated solicitude for the corpse causes reactions of revulsion at the indignity that the body suffered during exhumation and dissection. Particularly with regards to female corpses, the physical exposure of the naked body to the gaze of young men was perceived as harrowing, a process tantamount to sexual assault (Rugg 1999, 225).

Discussion

The unnamed population of St Luke's church constitutes a large skeletal assemblage of the later post-medieval period. Useful comparisons in assemblage composition, stature and some skeletal pathologies may be made with the growing number of burial assemblages known from this period. By virtue of the low resolution methodology used, comparison between other pathology prevalences cannot be made.

From the known burial traditions of the late Georgian/early Victorian period and parish records, it was postulated that the unnamed assemblage from St Luke's church was principally composed of the working classes resident in the parish. This was in contrast to the named individuals from the church, who were largely middle class. Some skeletal and dental indicators do suggest that social differences did exist between these two groups, but these differences were not always as clearly defined as was anticipated. However, the unnamed assemblage of St Luke's church do not appear as deprived as the destitute lower working classes of the Cross Bones burial ground, Southwark.

Islington in the Georgian/early Victorian period was a gracious suburb, described by Goldsmith (in Porter 2000, 148) as a 'pretty neat town, mostly built of brick, with a church and bells', celebrated for its well or spa of health giving waters, its fine air and its high location with a magnificent panarama of the city. It was a far cry from the tangle of warehouses and slums of Southwark, and had more in common with the new modern urban developments of the West End. The working classes of Islington appeared to have benefited from the cleaner air and removed location from the factories of the East End. Although certainly not living off the fat of the land, overall the working classes in Islington do appeared to have enjoyed a better quality of life than experienced elsewhere in the metropolis. This does appear to be reflected on their mortal remains.

The named assemblage

Introduction

The skeletons of 231 named individuals buried within the precinct of St Luke's church underwent full osteological analysis. Of these, 219 (90.87%) were adult, and 22 (9.13%) subadult. The majority of this assemblage (77.56%) was located within

the crypt of the church or within extramural vaults or brick-lined shaft graves in the north and south churchyards. From these burial contexts, it would appear that the named skeletal assemblage represents the upper and middle classes buried at the church. Interesting comparisons with the unnamed St Luke's assemblage and a number of broadly contemporary burial assemblages have been made wherever possible.

Surviving *departum* plate inscriptions for this assemblage display the name, age and sex of the deceased. This provided osteologists with a rare and very valuable opportunity to evaluate the precision and accuracy of the different ageing and sexing techniques commonly employed by archaeologists against chronological age and sex. The results of these blind studies are discussed in the report.

Estimation of age

Osteological assessment of age provides the biological age of the skeleton and not the chronological age. Differences between the two may occur as a result of the exposure to external factors, nutrition and lifestyle, which impact on skeletal growth and subsequent degeneration. Osteological ageing of subadults provides more narrow age ranges since the growth and maturation sequence of children is fairly predictable and uniform. The development and eruption of both deciduous and permanent dentition are also less affected by environmental influences than skeletal tissue (Roberts 1997, 111). Osteological age estimation of adults over the age of 25 relies on the degeneration of various sites on the skeleton.

In order to increase the accuracy of the assessment of osteological age in all individuals, multiple methods were used. For the subadults, one or more of the following methods were used: the formation and resorption of deciduous dentition and the formation of the permanent dentition (Moorees *et al*. 1963 a and b), length of long bones (Hoppa 1992) and epiphyseal fusion (Workshop 1980; Schwartz 1995). Epiphyseal fusion was also used for adults up to the age of around 28 years.

For the assessment of osteological age of the adults, the degenerative changes of the auricular surface (Lovejoy *et al* 1985) the pubic symphyses (Todd 1920; 1921; Suchey and Brooks 1990), and the sternal rib end (Iscan *et al* 1984, 1985) was used. Cranial suture closure (Meindl and Lovejoy 1985) and dental attrition (Roden 1997) were also used but these two methods were not as rigorously applied as the aforementioned since their accuracy generally not held to be high.

Sex determination

Differences in sexual morphology between males and females emerge after the onset of puberty. Generally, sex can therefore only be determined with any degree of accuracy in individuals aged more than 17 years. Cranial, pelvic and post-cranial metric measurements are used in the determination of sex. The differences between the sexes are most pronounced in the pelvis, due to the adaptation of the female pelvis to childbirth. The female pelvis is generally lower and broader to allow for the passage of the foetal head. The male cranium tends to be more robust than the female, with pronounced brow ridges, and larger muscle attachment sites.

Post-cranial measurements rely on the generalisation that males tend to be larger than females. The measurements of the diameters of certain joints can therefore be used to determine sex. However, in both modern and past populations there are larger females and smaller males. This overlap between the sexes therefore provides a substantial zone of intermediate values where sex cannot be determined using this method alone.

Six cranial features and a maximum of ten pelvic features were used for sexing. On the cranium, the features used were those recommended by Buikstra and Ubelaker (1994). Pelvic features included the sciatic notch, the preauricular sulcus (Workshop 1980) as well as the pubic bone region (Phenice, TW 1969). The measurements used in sex determination were the diameters of the femoral, humeral and radial heads, the length of the clavicles and the width of the glenoid fossa (Chamberlain 1994).

Assemblage composition

The assemblage of named individuals that underwent osteological and palaeopathological analysis comprised 241 individuals. A skeleton was classified as a named individual when it was associated with a legible breastplate. The maximum information available from the plates are the full name, age-at-death and date of death. However, an individual with a partially legible plate (for example, a surname and a year of death was discernible) was also included in the named sample. Hence, all skeletons with any biographical information were included in this group.

The majority of the named individuals had been interred within the crypt (67.22%). A further 10.37% were found within the extramural vaults in the northern and southern churchyards. The remaining 22.41% were located in earth-cut or brick-

lined graves within the northern and southern churchyard (Table 5.10). From a socio-economic viewpoint, the individuals from the crypt and the vaults (77.59%) are likely to have been more affluent and from a higher social class than the people interred in the earth-cut graves of the churchyards. In general, individuals buried within brick-lined shaft graves were typically from the middle classes (Litten 1991). The named assemblage is therefore believed to be a rather more affluent group of individuals than the unnamed assemblage.

Table 5.10 Distribution of named individuals (n = 241)

Burial location	**Named individuals**
South churchyard	14.94%
	(36/241)
South churchyard, vault	6.64%
	(16/241)
North churchyard	7.47%
	(18/241)
North churchyard, vault	3.73%
	(9/241)
Crypt	67.22%
	(162/241)
Total	100%
	(241)

Preservation and completeness

Preservation of human remains may vary considerably between different areas within a cemetery, due to the complex interaction between a wide range of variables within the buried environment. The preservation of human remains and associated funerary paraphernalia depends entirely on the micro-environment within each grave and coffin (Henderson 1987, 43).

A number of factors affect both the preservation and completeness of a skeleton. The primary factor is the pH value of the soil. However, the depth of the burial, the degree of compression *in situ*, and the quality of excavation and post-excavation treatment will also have an effect (Brothwell 1981, 7-9). The type of burial container and the use of absorbent material, such as sawdust, bran or lime, within the coffin also affects preservation. Other factors include the age and sex of the individual, as well as various pathological conditions (such as osteoporosis). Root

intrusion, burrowing animals and sacrosaprophagous insects may also cause pseudopathologies (Wells 1967, 8-11).

Preservation and completeness were scored on a scale from 1 (poor) to 4 (excellent) during analysis. Overall, regardless of the location of the burial, 80.92% of the inhumations had a completeness score of either good or excellent and the preservation of 57.26% of the assemblage was either good or excellent (Table 5.11).

Table 5.11 Completeness and preservation of the named assemblage (n = 231)

Completeness	Number of individuals	Preservation	Number of individuals
1 (poor)	8.30% (20/241)	1 (poor)	5.39% (13/241)
2	10.79% (26/241)	2	37.34% (90/241)
3	19.91% (48/241)	3	47.30% (114/241)
4 (excellent)	61.0% 147/241)	4 (excellent)	9.96% (24/241)

Location clearly affected skeletal preservation. The highest proportion of the least well-preserved individuals (26.55%, combined preservation grades 1 and 2) was located in the crypt (Table 5.12). This poorer bone preservation is in part due to past and recent vandalism of the coffins, and in part, due to accelerated deminerlization of bone salts due to the presence of sawdust within many of the coffins. The type of coffin material also influenced skeletal preservation. The advanced age of many individuals interred within the crypt may also have influences bone preservation since conditions, such as osteoporosis, render bone more fragile, and hence, more susceptible to accelerated degradation. A relatively high number of individuals (11.62%, combined preservation grades 1 and 2) were also not very complete (Table 5.13). Loss of body parts, particularly skulls, is likely to be directly due to vandalism.

Table 5.12 Bone preservation and burial location (n = 241)

	1 (Poor)	**2**	**3**	**4 (excellent)**	**Total number of individuals**
South churchyard	0	9.13% (22/241)	4.98% (12/241)	0.83% (2/241)	14.94% (36/241)
South churchyard, vault	0	2.91%	2.91%	0.82%	6.64%

		(7/241)	(7/241)	(2/241)	(16/241)
North churchyard	0	2.90%	4.15%	0.42%	7.47%
		(7/241)	(10/241)	(1/241)	(18/241)
North churchyard, Vault	0	1.24%	2.49%	0	3.73%
		(3/241)	(6/241)		(9/241)
Crypt	5.39%	21.16%	32.78%	7.89%	67.22%
	(13/241)	(51/241)	(79/241)	(19/241)	(162/241)
Total number of individuals	5.39%	37.34%	47.30%	9.96%	100%
	(13/241)	(90/241)	(114/241)	(24/241)	(241)

There was little difference in skeletal preservation between those buried within in earth-cut graves or those within the extramural vaults of the churchyards. However, a higher proportion of these skeletons were more complete than those interred within the crypt (Table 5.12). This reflects the greater inaccessibility of these inhumations to vandals.

Table 5.13 Completeness and burial location (n = 241)

	1 (Poor)	**2**	**3**	**4 (excellent)**	**Total number of individuals**
South churchyard	0.42%	2.49%	4.15%	7.88%	14.94%
	(1/241)	(6/241)	(10/241)	(19/241)	(36/241)
South churchyard, vault	0	1.24%	0.83%	4.57%	6.64%
		(3/241)	(2/241)	(11/241)	(16/241)
North churchyard	0.83%	1.24%	1.24%	4.16%	7.47%
	(2/241)	(3/241)	(3/241)	(10/241)	(18/241)
North churchyard, Vault	0.83%	0.42%	1.24%	1.24%	3.73%
	(2/241)	(1/241)	(3/241)	(3/241)	(9/241)
Crypt	6.22%	5.40%	12.45%	43.15%	67.22%
	(15/241)	(13/241)	(30/241)	(104/241)	(162/241)
Total number of individuals	8.30%	10.79%	19.91%	61.0%	100%
	(20/241)	(26/241)	(48/241)	(147/241)	(241)

Demography

Demographic profiles in living populations involve the comparison of statistics of fertility, mortality and migration patterns. The demographic analysis of past populations based on skeletal samples normally concentrates on mortality, since in the absence of historical records, fertility and migrations can only be inferred from the osteological data. The survival of burial records adds an extra dimension to the study of population structure in the post-medieval period. This allows comparison between

osteological ageing and sexing methods and the actual chronological age and sex of the individuals as recorded on coffin plate inscriptions.

For the comparison of the real age of the individuals with the osteological age, the adults with an unknown age from both categories were proportionately redistributed. The coffin inscription data has also been grouped into the same broad age categories as those used for the ageing of the skeletal remains.

Osteological age and sex

The assemblage of 241 individuals comprised 23 (9.54%) subadults and 218 (90.46%) adults (Table 14). A total of 24 adults were assigned to the broad adult category (18+ years), and have been proportionately redistributed. The osteological age indicates a gradual rise of mortality of the adults with 162 individuals (67.22%) living beyond 40 years. Of these, 101 (41.91%) were aged over 50.

Ten adults could not be sexed. These were proportionately redistributed. In addition, numbers of females and possible females, and males and possible male skeletons have been combined to produce single female and male totals. Of the adults, 55.71% were male and 44.29% (including a juvenile) were female. The proportion of males to females is slightly higher in the named than the unnamed assemblage (52.53% and 47.47%) from St Luke's church. Similarly, the former proportions are higher than the deaths listed in the London Bills of Mortality 1790-1840 (cited in Molleson and Cox 1993, 208).

The mortality rates for males still gives a gradual rise through the age categories followed by a sharp increase in the ageing adult category. The female mortality rates mirror this same curve.

Table 5.14 Osteological age/sex (redistributed totals) of the named assemblage (n = 241)

	Neonate	**Infant 1**	**Infant 2**	**Juvenile**	**Young adult**	**Prime adult**	**Mature adult**	**Ageing adult**	**Total**
	(0-11 months)	(1-5)	(6-11)	(12-17)	(18-25)	(26-40)	(40+)	(50+)	
?M/M	-	-	-	-	4.15% (10/241)	9.54% (23/241)	14.11% (34/241)	22.82% (55/241)	50.62% (122/241)
?F/F	-	-	-	0.42% (1/241)	3.73% (9/241)	5.81% (14/241)	11.20% (27/241)	19.09% (46/241)	40.25% (97/241)
Unknown	4.15% (10/241)	3.32% (8/241)	0.83% (2/241)	0.83% (2/241)	-	-	-	-	9.13% (22/241)
Total	4.15% (10/241)	3.32% (8/241)	0.83% (2/241)	1.25% (3/241)	7.88% (19/241)	15.35% (37/241)	25.31% (61/241)	41.91% (101/241)	100% (241)

Known chronological age and sex

Of the total number of individuals classified as named, 19 were of unknown age and for comparative reasons, were redistributed proportionately. The assemblage consisted of 22 (9.13%) subadults and 219 (90.87%) adults (Table 15). The mortality trend of the adult indicates that 149 individuals (61.82%) lived to an age greater than 50 years.

Of the adult sample, four were unsexed and were redistributed proportionately. In total, 53.12% were male and 46.88% were female. The assemblage therefore consisted of 6.24% more males than females. In the neonate category (the first year of life), it is striking that 50% more females died before the age of one year than male babies. The significance of this finding is difficult to assess given the small size of the neonatal age group (n = 10). The mortality rates of male and female children aged between 1and 10 appear to be very closely matched. However, the death rate is strikingly higher in young adult males than females, with 50% more males dying between 18-25 years. This is surprising given the high rate of childbirth-related deaths historically known from this period. In the adults aged over 26 years, there is little difference in the mortality rates between males and females.

Table 5.15 Known chronological age/sex (redistributed totals) in the named assemblage (n = 241)

	Neonate	**Infant 1**	**Infant 2**	**Juvenile**	**Young adult**	**Prime adult**	**Mature adult**	**Ageing adult**	**Total**
	(0-11 months)	(1-5)	(6-11)	(12-17)	(18-25)	(26-40)	(40+)	(50+)	
Male	1.25% (3/241)	2.08% (5/241)	0.42% (1/241)	0.42% (1/241)	6.22% (15/241)	5.81% (14/241)	2.90% (7/241)	34.02% (82/241)	53.12% (128/241)
Female	2.49% (6/241)	1.66% (4/241)	0.0% (0/241)	0.83% (2/241)	2.90% (7/241)	6.64% (16/241)	4.56% (11/241)	27.80% (67/241)	46.88% (113/241)
Total	3.74% (9/241)	3.74% (9/241)	0.42% (1/241)	1.25% (3/241)	9.12% (22/241)	12.45% (30/241)	7.46% (18/241)	61.82% (149/241)	100% (241)

Discussion

Overall, 23 subadults (9.54%) and 218 adults (90.46%) were identified osteologically. From breastplate inscriptions, there were 22 subadults and 219 adults. Hence, one subadult had been wrongly assigned an incorrect age. This is probably due to the actual age at death being around 18 years but skeletally the individual appeared more

immature. Indeed, skeleton 597 was aged 18 but the epiphyseal fusion age was 15-16 years and dental development 12-18 years (Table 5.13). Prolonged poor health may have affected the growth and development of this skeleton, causing delayed epiphyseal fusion, and hence, a younger osteological age estimate.

The London Bills of Mortality during the years in which the cemetery was in use demonstrate that 50% of the population died before the age of 21 (Molleson and Cox 1993, 208). In contrast, there was a very low number of subadults in the named assemblage. Of the named individuals that underwent osteological analysis, 3.74% of the children were aged younger than a year, 7.48% were aged between 0 and 5 years, and 18.27% were aged below 25 years. However, when looking at all the named individuals, including those who were reburied without any osteological analysis, 351 individuals could be aged from the coffin inscriptions. Of these, 5.98% (n = 21) were less than one year old, and 13.96% (n = 49) were aged between 0 and 5 years. Eighty individuals (22.79%) also died before the age of 21 years.

These figures were compared to the broadly contemporary crypt population (n = 357) of Christ Church, Spitalfields, where 9.30% died before aged one, 19.12% were aged between 0 and five and 23% were aged below 21 (Cox 1996, 20). This indicates that both at St Luke's church, Islington, and Christ Church, Spitalfields, children are under-represented by at least 27% in the vaults and the crypt. In the latter, Cox (1996) suggested that many people from outside the parish buried their children in the parish in which they lived, despite themselves being buried in the parish of their birth. Children were therefore buried in the most convenient place (Cox 1996, 20).

This conclusion is surprising given the sentimentality surrounding infant deaths, and the emphasis placed on burial within family groups in this time period. It is however striking that the mortality rates of subadults in these two upper to middle class groups are so similar. This similarity may be explained more successfully in socio-economic terms than in terms of differential treatment of the dead of different age categories. It is probable that these rather affluent populations did indeed have a lower than average infant mortality rate for the period, due to their access to better nutrition and higher standard of living. Indeed, mortality figures compiled from nine different locations in England in 1840 highlight the great differences in child mortality rates between the classes. The average child mortality rate amongst the gentry and professionals was 20%, whereas amongst labourers, artisans and servants, the mortality rate was approximately 50% (Rugg 1999, 216). This clearly illustrates

that the mortality rates from the named sample from St Luke's are similar to those of the upper and middle classes, and probably do reflect a social reality rather than a different funerary practice or retrieval bias.

There is a striking difference between the osteologically derived and the known chronological age and sex rates for adults. In general, in the osteologically aged and sexed group, the mortality rates rose gradually with most people dying in the ageing adult group. There was no real difference between the sexes. Indeed, the only noticeable difference was that there are more males than females in the assemblage (Figure 5.4).

Trends in the known chronological age and sex mortality rates show quite a different picture (Figure 5.4). Firstly, in the young adult category there are disproportionately more males than females. This elevated level of mortality of young males is a phenomenon known as the 'trauma hump'. In modern populations, this increase is associated with deaths due to accidents. This kink is apparent in life tables for 1838-1854, but diminishes towards the end of the Victorian period (Woods and Shelton 1997, 93). Although trauma may have been a contributory factor amongst young males, the cause of death was dominated by phthisis (respiratory disease of mixed aetiology) and pulmonary tuberculosis (*ibid*, 93).

Comparatively, there are more individuals in the mature adult category in the osteologically aged group than in the known chronological age group. The main reason for this is that many adults were osteologically under-aged. Indeed, 19.91% (41 individuals) have been under-aged. The mortality rates for the individuals of known chronological age and sex clearly shows that 61,82% reached an age over 50 years. This clearly demonstrates the limitations of the ageing methods used by the osteologist. These are discussed in more detail in the next section.

Evaluation of the age at death methods

The adult population

The age of 165 adults is known from biographical data. This allowed for the evaluation of the ageing methods. A maximum of six ageing methods were used on individuals aged over 28 years. Dental development and epiphyseal fusion were used to age adults younger than 28 years, and less frequently, diaphyseal long bone length. The results of the accuracy of these methods are discussed below. Eight (4.85%) adult

individuals were osteologically aged using five methods. The majority of the individuals were however aged using two (47 individuals, 28.49%) or three (45 individuals, 27.27%), see Table 5.16.

Table 5.16 Quantification of osteological age assessment methods used per individual (n = 165)

	Number of osteological methods used					**Total**
Number of methods	5	4	3	2	1	
Number of individuals	8	33	45	47	32	165
% of individuals	4.85%	20%	27.27%	28.49%	19.19%	100%

The most commonly used method for ageing the adults was degenerative changes to the iliac auricular surface (Lovejoy *et al* 1985). This method was applied to 138 (83.63%) individuals (Table 5.17). This part of the pelvis most commonly survives archaeologically as the bone structure is strong. The Suchey-Brooks method of ageing from the symphyis pubis was favoured over other methods, being the most recently developed. This method was used to age 78 individuals (47.27%). Due to unusually good preservation of the sternal rib ends, degenerative changes of the sternal rib could be used for 80 individuals (48.48%). Dental attrition was analysed in 64 individuals (38.79%). The extent of ectocranial cranial suture closure was used to age 26 individuals (15.75%). Dental development was used twice and epiphyseal fusion on eleven young adults. When results of the individual osteological ageing methods are compared with the chronological ages, a number of interesting general observations could be made. Each method and the success of its application will be discussed

Table5.17 Quantification of ageing methods used on the named adults (n = 165)

Auricular surface	Suture closure	Dental attrition	Dental development	Epiphyseal fusion	Pubic symphyses (Suchey-Brooks)	Pubic symphyses (Todd)	Sternal rib end
138	26	64	2	11	78	34	80

individually. The full summary of the age at death obtained by each method and the actual age of the individual appears in Table 5.18.

Iliac auricular surface

When comparing the osteological auricular surface age ranges with the chronological age at death, it appears that, in general, skeleton aged between 20 and 40 are accurately aged (ie. this age range closely approximates the true age of the individual). However, in older age brackets there is a general tendency to underage the skeletons. Individuals in their 50s tended to be under-aged by as much as 15 years, and individuals in their seventies and eighties (grouped in the 60+ bracket were generally under-aged by approximately 20 to 30 years. Many of these septo and octogenarians were osteologically aged within the 40-44 age category. However, all of the individuals in the 'older than 60' category were indeed aged over 60.

Ectocranial suture closure

This method provided a very poor correlation between the chronological age and the osteological age range. Very few osteological age ranges correlated with the chronological age. Having so many ageing adults in the named assemblage meant that in many skeletons the cranial sutures were fully fused and therefore, could not be assessed. Nevertheless, those who were aged by this method were generally under-aged by as much as 10 years.

Table 5.18 Chronological age of adults compared with biological age (The mean age for the Suchey-Brooks method has been use); n = 165.

Skeleton Number	Age at Death	Auricular surface	Cranial suture closure	Dental attrition	Dental development	Epiphyseal fusion	Pubic symphysis (Suchey & Brooks)	Pubic symphysis (Todd)	Sternal rib end
113	76	>60		>50			61		59-71
114	83	50-60		30-38					33-42
116	58	35-39		26-30					>70
117	54	50-60							
122	75	>60							
254	80	>60					60		
255	17					20-25			
262	84	>60					48	45-50	59-71
264	84	>60						45-50	54-64
281	57	45-49					>61	>50	>65
284	35	40-44							
303	74	>60						45-50	>70
304	84	>60							>70
307	59	40-44					35	27-30	33-42
338	23	25-29				22-25	15-23	20-21	20-23
339	23	20-25				22-25			16-19
343	70	40-44					35		
355	60	35-44							59-71
361	76	50-59					45		
362	83		30-50						
364	35	25-29		24-30					
449	56	40-44		30-38					
467	22	20-24		18-19	>18	20-28	20-27		
468	35	35-45		25			38	30-39	59-71
469	53	50-59	>50				45		54-74
472	25	19-24		18-25		18-28	19		
475	66		40-50	30					
477	68	>60	52						59-71
478	65						48	45-49	59-71

488	70	40-44					48	45-50	59-71
492	78	45-49					46	>50	70
494	46	35-39		24-32			35	27-30	33-42
495	24			18-24		19-20			20-23
497	53	40-44					46	50	
513	50	45-49					46	50	65
522	62	50-60							
532	77	45-49		40-50					43-55
537	39	40-59		30-32			38-48		43-58
538	20	20-25		18-25		<28	18		21-23
539	70	50-59					61		
542	57	45-49							
563	25	25-29		24-30			23-29		
597	18				12-18	15-16			
600	58	40-44							33-46
603	69	40-50	44-52						59-82
609	47	35-44		25-36			38		33-46
614	51	45-49							59-71
616	48		50	48			61		65-78
617	69	>60					>60	>50	70
618	72	45-49					48-60		
619	82	>60					> 61		65-78
620	76	>60					48-60	>50	59-71
621	74	>60					46	>50	43-58
622	45	50-60					46	50	
623	31	30-34		30-36					
626	79	40-49					48-60		43-58
628	81	40-44	35-50	24-30					
629	57						61		
655	69	45-49							33-46
656	71	50-60							
657	68	45-55					46		44-55
697	69	50-60							
699	61	50-59		24-25			61		54-64

701	63	50-60							54-64
704	69	50-59	40-60				48		
705	61	50-59					46		65-78
707	69	45-49	40-60				46		
708	54	50-60		39			46		44-55
709	25	25-29		24-25			23		24-28
711	70			18-25					
713	69	>60						45-50	
719	52	45-49					48	45-50	33-58
722	29	40-44							33-46
724	56	40-44							34-46
764	66								65-78
771	85	>60					46	45-50	65
772	36	40-44							
777	39	35							33-42
778	77		40-50						
779	78	40-44					61	>50	65
782	18	40-50					38-48		43-58
789	49	30-34		31-38			35		
807	75			18-25					
812	78		50-60				>60	50	59-71
821	72	30-34							43-58
831	57	50-59		24-25					43-58
837	80	50-60							
839	74	>60					60	50	70
845	60	50-59							43-58
846	68	45-60							43-58
851	65		40-50						
852	55	45-60		30-38			35	45-50	
855	78	40-59					35-45		54-64
856	64	60					60		59-71
858	69	>60	>50	30-32			61		59-71
859	29	20-29		18-24			24		
860	71	50-60					>60	50	

861	90	40-60							
862	58			36					
868	74	>60							
869	33	30-34		18-25					33-46
888	46	40-44					46	45-50	54-64
890	61	55-63							54-64
898	36	45-55					46		
908	66		40-60						
910	59	55-60					45-61	50	
916	44			24-30					33-46
920	80	40-59					>60	>50	
922	26	25-29		25					24-30
923	20			18-25					
925	45	45-49							
928	34	35-39		18-25			35	30-35	54-64
934	63	60		18-25			48	50	
935	39	35-44	35-65	24-32			48		
936	78	>60		24			61		
938	27	20-24							
946	54	45-55					48		
961	59	45-49		57			46		
966	68	55-63		25-32					54-64
967	59	54-59		42-48			35		
968	81	>60							65-78
969	75	40-44	44-46						
970	24	20-25		24-25		23-28	19-25		
973	40		38-51	32-38					34-46
976	61	60					61		
977	23	30-34		30-36					
980	70	60							
981	58	50					46		
985	65	50-59					48-60		
986	51		52	25			35		59-71
989	75	45-49							

990	80	>60	>50						
994	47	40-49		26-32					
1008	58	60					61		
1009	78	50	32-50						43-58
1057	51	40-50		45			46		
1062	63		40-50	24					54-64
1065	43	30-44		18-25			35	30-35	33-42
1068	44	35-60		18-25					33-46
1069	49	30-34	20-40	30					
1071	56	40-44					61	50	43-58
1078	34	30-39							26-32
1087	59	45-60							
1088	61	25-34		32-38					
1128	69			26-32					
1135	65	45-60							
1141	85	50-59	35-59				61		
1142	26	25-30		24-25		24-27			24-31
1144	51	40-44		25-39					
1145	75	44-55							
1146	42	35-39		36-42			48		
1147	53	30-34		25					
1148	30	30-39		39					
1153	36	25-29		24-25					
1155	76		40-50						43-55
1156	74	40-49		30					
1157	78	50-59							44-57
1169	34					17-18			
1172	37		35-45	25					
1193	23	30-34		30					
1203	77	40-49					46	45-50	43-55
1219	71			24-25			60		59-71
1223	38	35-45		25			23		34-42
1225	59		40-60						
1304	22	25-29					25	22-24	

Dental attrition

Due to the softer diet available in the 18th and 19th century, dental attrition is generally negligible within these population groups. It is therefore not possible to apply a methodology devised for prehistoric and medieval population groups (such as Miles 1962 in Brothwell (1981). Instead, Roden's (1997) dental attrition method was used. This method was developed on a 19th century pauper population from Newcastle Infirmary, Newcastle-upon-Tyne, and was hoped to be more appropriate to later post-medieval populations. Roden's method was developed by first ageing all subadults by using the tooth formation standards by Smith (1991) and then sequenced by age. The adult dentition was then sequenced in order of increased attrition. The ageing method was then tested against the Suchey-Brooks pubic symphysis and auricular surface ageing techniques. The infirmary population group from Newcastle Infirmary was contemporary with the St Luke's assemblage, but was composed of the poor, a very different social class to the named assemblage from St Luke's church. As yet this method is in its infancy. This study aimed to test the value and applicability of Roden's ageing method in other post-medieval populations.

The method proved only accurate with young individuals in their twenties, when dental attrition is still slight. It became more inaccurate with increasing age. In general, individuals in their thirties were assigned an osteological age of 18-25 years, and individuals in their fifties and older had a dental attrition age of about 30-40 years. It is therefore clear that this method cannot be used for this type of population. It may however be accurate for skeletal assemblages comprising paupers and the lower working class in general, where diets were more coarse and dental attrition was greater.

Pubic symphysis

Two methods of ageing from the symphysis pubis were used: the Suchey-Brooks system (Suchey and Brooks 1990) and that devised by Todd (1921a and 1921b). The Suchey-Brooks method was used more widely, and will be discussed in comparison to the method devised by Todd. The mean age for the Suchey-Brooks method was used since the ranges for the standard deviations are very large and therefore, essentially meaningless. In a few instances an age range was present. This age range was attained when different osteological age was given from right and left pubic symphysis (Table 5.18).

The Suchey-Brooks method follows the same trend as the auricular surface ageing method. Again, it appears that this method was highly accurate for younger individuals aged between 20 and 30 years. Individuals in their forties were generally under-aged by about 10 years, and older individuals who should have been aged as 'over 60' were found to be under-aged by 20 to 30 years.

The Todd method was also highly accurate in the younger age categories. Although some individuals in their forties were under-aged, in general, most were aged correctly. Indeed, the vast majority of the over fifties were accurately aged as being over the age of 50 years (the oldest category the individuals could be aged to using this method). Though fewer skeletons were aged using the Todd method, it appears that this older method is the more accurate of the two.

Sternal rib end

Assessment of the degenerative changes of the sternal rib end is a method not commonly used for archaeological assemblages. This is largely due to the fragile structure of the rib ends that rarely survive well archaeologically. The method specifies that the fourth rib should be used. However, due to widespread fragmentation of the ribs of skeletons from archaeological contexts, it is seldom that one can be this specific. In testing this method, a sternal rib end from the mid-thoracic region was chosen, even if it might not be the fourth rib. The advantage of this method is that individuals may be osteologically aged up to almost 80 years. Potentially, this method is very valuable in ageing older individuals beyond 60 years (the uppermost limit of all other ageing methods discussed above).

Again, the sternal rib end method proved highly accurate amongst the individuals aged between 20 and 30 years. The accuracy for those aged 30 to 50 years was still good, but a few were either over- or under-aged. Moreover, this trend continued for all the adults aged up to 80 years old. However, compared to other ageing methods, greater accuracy was attained for ageing adults. The older adults, mainly in their seventies, who were not correctly aged tended to be under-aged rather than over-aged.

Discussion of the accuracy and precision of different ageing methods

To summarise, all of the methods used have a degree of error. This is due to the fact that there is considerable individual variation in the rate that the human skeleton ages, depending on the degree of activity-related mechanical wear, environmental

influences and genetic variability. It is therefore impossible to obtain a method with 100% accuracy at all times. Using multiple ageing methods ensures a higher degree of accuracy.

Three individuals were chosen at random, and the age ranges estimated by a number of methods were plotted against the true chronological age of the individuals. To conclude, the most accurate method for ageing older adults appear to have been the sternal rib end and the least accurate method for all adults was the dental attrition method.

All methods used for this population group were very accurate when used for adults younger than 30 years old. Between 30 and 50 years, there is a high variability where methods almost appear to be somewhat hit and miss. Though some methods age an individual accurately, other tends to either over or under-age by about 10-15 years.

Skeletons are under-aged by approximately 10 years. This margin of error tends to increase as the individual gets older. This is illustrated in Figures 5.5- 5.7 where three individuals were selected as examples of the discrepancies in true age and estimated age obtained using osteological ageing methods.

The subadults

Sixteen subadults of known chronological age were aged osteologically using a combination of up to three methods (Table 5.19). The method most commonly used was dental development, which was applied to 15 (93.75%) of the children. Epiphyseal fusion was used on 13 subadults (81.25%) (excluding the 11 adults aged by this method). Diaphyseal long bone length was used on 10 subadults (62.5%). Most of the subadults were aged by using a combination of three (8 individuals, 50%) or two (4 individuals, 25%) of the above techniques.

Dental development

Twelve of the children were aged correctly using this method. The three of those whose true chronological age did not correspond to the osteological age were found to have been underaged by one and three years. The average ranges provided using this method were 5.28 months amongst the children aged below one year, and 2.5 years for those aged over a year.

One of the two adults aged by this method was correctly aged and the other was under-aged by two years.

Table 5.19 Subadult ageing methods used on the named sample (n = 16)

Coffin Number	Age at Death (years)	Age at Death (months)	Age at Death (days)	dental development	epiphyseal fusion	long bone length	sternal rib end
256		5	14	3-9 months	>12 months	5-8 months	
353		12			7- 12 months		
360	5	11		4-8 years	3-4 years		
363	13			12-18 years	13-15 years		>16 years
540	5	5		3-5 years	3-5 years	3 years	
541	7	3		5-6 years	5-6 years	5 years	
601	2			2-4 years	4-5 years	2-3 years	
602	12			10-11 years			
781	3	4		3-5 years	2-4 years	2-3 years	
927		10	12	8-16 months	6-18 months	8-10 months	
991		3	14	3-9 months	>12 months		
1072		6		6-9 months	9-12 months	6-6 months	
1126		10	21	7-12 months		4-6 months	
1195	3	8		20-36 months	24-36 months	24-36 months	
1218		9	28	6-12 months	>12 months	6-12 months	
1261		10		5-8 months			

Epiphyseal fusion

Ten of the 13 individuals aged by this method were aged correctly. Two of the incorrectly aged children were under-aged by a year, and one was over-aged by two years. The average ranges given by this method was six months for those aged under a year, and 1.28 years for the children over a year old.

Of the eleven young adults (18 to 25 years) aged by this method, six were correctly aged. All but one of the five individuals aged incorrectly were under-aged. These were under-aged by between one and sixteen years. The age range average for this group was 3.8 years.

Diaphyseal long bone length

Seven of the ten individuals aged by measurements of the unfused long bones were aged correctly. The three individuals whose assessed age was incorrect were all under-aged by two and four years. The age ranges obtained by using this method was 2.6 months for the children aged below one year, and 0.6 years for those above the age of one.

Discussion of the subadult ageing methods used

All of the methods used to age the subadults provided impressive results with a high level of accuracy and tight age ranges. Though there was a slightly higher degree of error in the age attained by the measurements of long bones, this method produced on average the tightest age ranges for both the individuals below the age of one year and

those aged over one year. Though the assemblage is too small to be statistically valid it does suggest that the slightly elevated levels of incorrectly aged individuals is due to the tighter age ranges. This is positively correlated when looking at the dental development method. This method had the greatest levels of accuracy but the average age range was also the greatest of the three methods.

Eight of the nine incorrectly aged children were under-aged. It is interesting that overall, across all three methods, the individuals who were incorrectly aged were more likely to be under-aged than over-aged. Since in effect, these children died prematurely, they would have been unwell. They may have been ill for some time and this is likely to have caused growth disruptions of the skeleton as well as the dentition. The methods used for ageing were developed using modern collections or x-rays. Since these methods were therefore developed using healthy individuals, it is clear that the subadults of past populations are more likely to be under-aged than over-aged.

Evaluation of osteological sexing methods

As discussed in the methodology section, the osteologically assigned sex was based upon the sexually diagnostic morphological differences of the pelvis, skull and metrical measurements. All subadults and any adult individual with an unknown real and/or osteological sex were omitted from the study. Overall, 207 adults were of known sex (from *departum* plate inscriptions), and 216 individuals were sexed osteologically. Of the 207 adults of known sex, 112 were male (54.10%) and 95 (45.90%) were females. Of the osteologically sexed individuals, 92 (42.59%) were females and 113 (52.31%) were males, and 11 (5.10%) were indeterminate. In total, 15 individuals (7.24%) had been sexed wrongly. These comprised eight (3.86%) females who had been sexed as male, and seven (3.38%) males who had been sexed as females.

When examining each of the three methods used for osteological sexing the results vary depending which method is used (Table 5.20). The methods will be discussed comparatively to each other and subsequently compared with the actual sex of the individuals.

Table 5.20 Sex determination per method used on adult skeletons (n = 201)

Sex	Pelvic sex	Cranial sex	Metric sex
Female?	3.11%	5.08%	2.98%
	(6/193)	(9/177)	(6/201)
Female	38.34%	30.51%	40.30%
	(74/193)	(54/177)	(81/201)
Male?	6.22%	7.34%	5.47%
	(12/193)	(13/177)	(11/201)
Male	49.22%	50.28%	28.85%
	(95/193)	(89/177)	(58/201)
Indeterminate	3.11%	6.79%	22.39%
	(6/193)	(12/177)	(45/201)

When comparing the methods used (Table 5.20), it was apparent that the distribution of the assigned sexes varied quite considerably. Sex estimation using only the cranium had the highest proportion of probable males and females, and overall there were far more males than females. It was noted during the analysis that many skeletons had crania that appeared very masculine, although the pelves were unequivocally female.

In contrast, the metrical sex determinations have the least probable males and females but the highest proportion of indeterminate individuals. There are also far more females than males. Sex determined by the pelvic elements alone has the lowest levels of intermediate values, as well as the lowest number of probable males and probable females. There was also a more equal split between the sexes.

When comparing the sex obtained using the three methods with the combined osteological sex and the known sex of the individuals (Figure 5.8), it was clear that sex determined by differences in pelvic morphology was the most accurate method. This is unsurprising since the sexual differences in shape are due to the female pelvis being functionally adapted for childbearing. It was also clear that there was a distinct lack of sexual dimorphism between the sexes within this population group. To a lesser extent, this is apparent in the cranial sexed group, in which rather ephemeral sexually dimorphic traits created a bias towards males. This trend was also apparent in the metric sexed group, although here the data was skewed towards the females, and a large number of individuals who were sexually indeterminate.

Stature

The stature of the named individuals was calculated using the regression formulae devised by Trotter (1970) for white males and females. Complete long bones were used in the calculation of stature. The bones of the lower limb were favoured over those of the arm as these have been shown to carry the least error.

Figure 5.9 illustrates the sexual dimorphism within the named adult assemblage. All females fell within a range of 1.49-1.72 m and males between 1.55-1.93 m. There was a slight overlap of females of a taller than average stature and males of shorter than average stature. There was a difference in mean stature estimation of 0.12 m between male and female individuals (Table 21).

Table 5.21 Comparison between stature estimation of seven post-medieval burial assemblages in England

Sites	**Male (Mean)**	**Male (Range)**	**Female (Mean)**	**Female (Range)**	**References**
St.Luke's,Islington (named)	1.70 m	1.55-1.93m	1.58 m	1.49 m-1.72 m	
St.Luke's,Islington (unnamed)	1.70 m	1.49-1.94 m	1.58 m	1.39 m-1.74 m	
Newcastle Infirmary	1.71 m	1.60 m-1.83 m	1.60 m	1.50 m-1.76 m	Nolan 1997
St Bartholomew's, Penn	1.75 m	1.45 m-1.85 m	1.60 m	1.42 m-1.83 m	Boyle 2004, 77
St Nicholas, Sevenoaks	1.73 m	1.62 m-1.83 m	1.61 m	1.49 m-1.72 m	Boyle and Keevil 1998
St George's Bloomsbury	1.72 m	1.52 m- 185 m	1.60 m	1.49 m-172 m	Boston and Witkin unpublished
Christ Church, Spitalfields	-	1.68 m-1.70 m	-	1.54 m-1.59 m	Molleson and Cox 1993
Cross Bones, Southwark	1.69 m	1.53 m-1.80 m	1.58 m	1.42 m-1.72 m	Brickley *et al* 1999
Kingston, London	1.69 m	1.54 m-1.90 m	1.60 m	1.40 m-1.75 m	Bashford and Pollard 1998

The stature ranges and the means for both males and females are comparable to other assemblages of the same time period but of various socio-economic backgrounds (Table 21). Interestingly, the named and unnamed individuals of St Luke's church were slightly shorter than the paupers of Newcastle Infirmary, particularly the females, whose range was also more narrow.

Summary of contemporary sites discussed in the text

The Cross Bones Burial Ground, Red Cross Way, Southwark, London

The following summary is derived from Brickley *et al* (1999). Historical data suggests that the burial ground was in use for 10-30 years in the mid 19th century. Documentary evidence indicates that those buried there were the poorest members of a poor community, with 18% coming from the workhouse. Osteologially, it appeared that ill health was widespread in this population (n = 148). Over 70% of the skeletons were subadult (under 16 years), an unusually high proportion for a normal cemetery population, but representing the high infant mortality rates recorded from documentary sources of the time. Dental caries were present on the dentition of all but eight of the individuals examined. Twelve of the 39 adults had one or more periapical abscesses. Most of the skeletons in which there was significant ante mortem tooth loss were in the 46+ age category, but some younger individuals also had significant tooth loss. There was no evidence for any type of restorative dental treatment, which is unsurprising given the poverty of the assemblage.

Newcastle Infirmary, Newcastle-upon-Tyne

The human skeletal remains from the cemetery attached to the Newcastle Infirmary, dated to between 1745-1845. These individuals could not afford to receive medical treatment in their home, and hence, were unlikely to belong to the upper or middle classes. Nor were they paupers (Nolan 1997). It is therefore safe to assume that the individuals buried here were likely to have belonged to the working class, although they were probably not destitute.

St Bartholomew's Church, Penn, Wolverhampton

The following information is taken from Boyle (2004). A total of 372 burials had been buried in a rural churchyard, and presumably therefore lived in a relatively healthy environment. In general terms, the sample population appears to have been a healthy one, in which many lived well into old age. Skeletal pathology was occasional, and this included degenerative joint disease and trauma. It is noteworthy that many of the coffin fittings were made of brass rather than iron, perhaps suggesting a degree of wealth. The statistician William Farr noted in 1840 that life expectancies in England were up to 20 years higher in rural districts compared with the worst urban areas (Woods and Woodward 1984).

Although it is traditionally assumed that burials within churchyards are generally less wealthy than those buried inside the church, at St Bartholomew's church a number of wealthy burials within elaborate triple-shell wood-lead-wood coffins were discovered within extramural vaults, presumably because there was insufficient room for burial remaining within the church itself.

From legible *departum* plates and gravestone inscriptions it was possible to identify 49 named individuals. Most of these were buried within extramural vaults and brick-lined shaft graves. Osteologically, it was evident that the later 18th and 19th century people of Penn were in good health, and generally lived well into old age. A total of 372 individuals were excavated comprising 100 males, 25 probable males, 102 females, 21 probable females, 45 adults of uncertain sex, 58 subadults (below the age of 16) and 21 for whom no osteological data was available. The last were recovered in sealed lead coffins that were not opened but reburied immediately. It is clear that the vast majority of the assemblage comprises adult individuals (314, 84.4%). This is comparable with St Luke's, Islington, where 86.4% of the assemblage were adults. Age at death ranged from newborn to 89 years. More than half of the adult assemblage was aged greater than 40 years (162 individuals, 51.6%). It is noteworthy that where age at death was known, there was a marked tendency to underage skeletons. There is no doubt that inaccuracy increased with the age of the individual. Dental wear was the least accurate method. The majority of subadults died aged greater than 5 years (39 individuals, 71%). This is marked contrast to the urban assemblage from St Luke's, Islington, where 74.4% of subadults died younger than 5 years. Standard dental recording was undertaken for all burials so the level of ante-mortem loss and the prevalence of dental disease are a true reflection of the dental health of the excavated sample. Ante-mortem tooth loss was comparable with St Nicholas' Church, Sevenoaks, Kent, but was lower than rates from London Road, Kingston-upon-Thames, and more than twice the rate at Christ Church, Spitalfields. Caries rate however was more comparable with London Road, Kingston-upon-Thames, and considerably less than St Nicholas'church and Christ Church. Very few abscesses were recorded at St Bartholomew's, London Road and St Nicholas (no data for Christ Church was available).

Quaker burial ground in London Road, Kingston-upon-Thames

The following summary is based on Bashford and Pollard (1998) and Start and Kirk (1998). The interments dated from 1664-1814; 497 burials were historically documented and a total of 360 were excavated. There were 65 individuals in the subadult categories (foetal to age 17 years), and 295 in the adult categories. The Quakers presented an osteological picture of a generally healthy sample that mirrors the historical picture of a thriving, largely middle class community.

Christ Church, Spitalfields

The following brief summary is based on Reeve and Adams (1993) and Molleson *et al* (1993). The excavations in the crypt unearthed *c* 1000 burials of which more than 400 were named, ranging in date from 1729 to 1872. Most of the individuals were of Huguenot descent, who lived in the Spitalfields area of London and had worked in the flourishing silk industry. Some were prosperous master weavers, whilst others were hard-working journeymen weavers who, together with merchants, surgeons and tradesmen, comprised the 'middling sort' of the 18th century.

St Nicholas' Church, Sevenoaks, Kent

The following brief summary is based on Boyle and Keevill (1998). Work at St Nicholas' church involved near total excavation of the interior of the church along with watching briefs of various external works. The post-medieval assemblage of 192 ranged in date from 1550-1875 and comprised 55 males, 61 females, 59 adults of unknown sex, and 17 subadults. Most of the population were middle class.

Dental pathology

Dental pathology, such as periodontal disease, calculus, caries, abscesses and antemortem tooth loss (AMTL), is most commonly caused by the consumption of carbohydrates and by poor oral hygiene practices. In the post-medieval period, the consumption of cane sugar gradually increased. In the 16th and 17th centuries, sugar was an expensive and high status luxury available only to the most wealthy. However, the development of sugar plantations in the West Indies in the 18th century generated a more ready and affordable supply of the commodity to markets in Europe. Sugar consumption gradually spread down the social classes, until by the latter half of the 19th century it was available to all but the most indigent. By this time, the annual sugar consumption per capita ranged between 11.74 lb and 30.45 lb. In the early 19th

century, sugar was widely available to the middle classes, but was not yet cheap enough to be readily accessible to the lower classes. Thus, the wealthier individuals buried at St. Luke's church certainly could afford such a luxury, and paid for their pleasure with widespread dental decay, whilst the poorer individuals were less vulnerable to this new epidemic.

Thus, dental pathology serves as a useful indicator of the general health and cultural practices of this late Georgian/early Victorian population, including dietary habits and oral hygiene practices, pipe smoking and early dentistry undertaken by this population.

For the purpose of this section, the oral health of the individuals with permanent dentition only is discussed. Subadults with mixed or deciduous dentition were omitted due to the low number of individuals present. It is impossible to distinguish between those teeth lost as a result of caries, and those deliberately extracted by a tooth-puller or dentist. Table 5.22 compares the prevalence rates for dental pathology with a number of other assemblages of post-medieval date.

Table 5.22 Summary of dental pathology in adults from eight post-medieval sites in England

	Ante-mortem tooth loss	**Dental abscesses**	**Calculus**	**Caries**	**Dental enamel Hypoplasia**	**Fillings**
St Luke's, Islington (named)	35.35% (1726/4883)	1.78% (87/4883)	46.33% (1042/2249)	9.74% (219/2249)	10.27% (231/2249)	0.27% (6/2249)
Newcastle Infirmary, Newcastle	19.3% (604/3123)	0.9% (29/3123)	55.85% (718/1287)	11% (146/1327)	17% (219/1287)	0.0%
St Bartholomew's, Wolverhampton	38.40% (1671/4349)	0.07% (3/4334)	Data not available	8.10% (166/2047)	Data not available	0.0%
St Nicholas, Sevenoaks, Kent	37.95% (529/1394)	0.41% (5/1394)	Data not available	14.08% (113/803)	Data not available	Data not available
Christ Church, Spital-fields, London	19.91% (324/1627)	Data not available	Data not available	19.11% (311/1627)	Data not available	0.24% (4/1627)
London Road, Kingston, London	34.61% (1436/4149)	0.07% (3/4149)	Data not available	5.40% (210/3858)	Data not available	Data not available
CrossBones, Southwark, London	17.30% (211/1216)	2.30% 28/1216	Data not available	26% (161/621)	29% (adults)	Data not available
St Georges, Bloomsbury (named)	40.99% (669/1632)	2.82% (46/1632)	70.85% (592/844)	13.39% (110/844)	16.35% (138/844)	0.83% (7/844)

Ante-mortem tooth loss

Although teeth were sometimes drawn electively, in anticipation of the agonies of toothache in later life, or lost as a result of trauma, most teeth were lost as a result of dental decay due to diets high in carbohydrates. Teeth may be lost by a number of processes. Calculus deposits may irritate the soft tissue and underlying bone, leading to the reduction of the bone (periodontal disease) and ante-mortem tooth loss (AMTL) (Roberts and Manchester, 1995, 45). Teeth may also be lost due to periapical abcesses secondary to caries or excessive attrition of the tooth crown. Internal lytic lesions, in which the tooth destroys itself from within, may also cause an abscess and vertical bone loss of the alveolar margin, and the subsequent loss of the tooth. Ante mortem tooth loss is regarded as a degenerative disease, in which the main contributing factors are old age and poor oral hygiene. It is no surprise that the older members of the named population suffered higher rates of tooth loss, and that where a population is old, AMTL rates are higher.

The presence of AMTL is apparent from remodelling of the dental sockets, which eventually heal over. The prevalence of AMTL was calculated by dividing the total number of teeth lost ante mortem by the number of alveolar sockets present. There was an AMTL prevalence of 36.10% in the named assemblage from St Luke's church. This compares broadly with other middle class burial populations of St Bartholomew's Church, Penn, St Nicholas' Church, Sevenoaks, the Quaker cemetery at Kingston-upon-Thames, and St George's Church, Bloomsbury. Interestingly, the largely middle class population of Christ Church, Spitalfields, suffered a much lower rate of AMTL, more similar to the rates found in the working class populations of Newcastle Infirmary and the Cross Bones burial ground, Southwark. Lower AMTL in these two groups is probably due to a lower consumption of refined sugar, and because the general age at death of the populations was younger.

Periodontal disease

Periodontal disease is the inflammation of the soft tissues of the mouth, namely the gums, and/or the peridontal ligament and alveolar bone (Levins 2003, 245). Retraction of the gums exposes the vulnerable root of the tooth to attack by acidic plaques, commonly resulting in caries, abscesses and ante-mortem tooth loss. The main predisposing factor for periodontal disease is calculus build-up in the dental pockets. Peridontal disease is strongly associated with increasing age in both modern

and archaeological populations. However, the aetiology is multifactoral with genetic predisposition, environment, diet and oral hygiene all playing a role in its development.

The disease may express itself as either horizontal or vertical bone loss. In the former, more than one tooth is affected, often involving the whole dental arcade. All alveolar walls are lost uniformly. This is by far the more common form of peridontal disease. In vertical bone loss, the lesion is localised around one or two teeth. This bony resorption around the tooth is irregular, and generally occurs without horizontal bone loss (Hillson 1996, 263-65).

Periodontal disease was recorded by subdividing the jaws into four quadrants, which were scored independently. The severity of the disease was scored as slight, medium or considerable, using the universally accepted standards set out by Brothwell (1981). Peridontal disease was observed in 75 (20.11%) named individuals. Thus, in both the named and unnamed assemblages of St Luke's church, periodontal disease rates are much the same; 20.11% and 20.0% respectively.

Periapical abscesses

Periapical abscesses may develop as a result of a number of pathological processes. Bacteria may enter the pulp cavity through dental caries, excessive attrition or trauma to the tooth crown. Bungled dental extractions and the transplantation of teeth from cadavers or from less fortunate living donors were also frequently associated with abscess development in the later post-medieval period. An abscess may also occur when a periodontal pocket is formed, allowing bacteria to accumulate within the pulp cavity and to track downwards to the apex of the root.

Considerable pain and inflammation of surrounding soft tissues is associated with periapical abscesses, often resolved only following dental interventions, such as extraction of the affected tooth, or drainage of the sinus via the root canal (as described by Pierre Fouchard in his 1746 treatise on early dentistry (translated by Lindsay 1946, 64-65). Alternatively, in untreated cases the continuous accumulation of pus around the root apex may become so severe that the pressure within the alveolar bone forces a hole or sinus to be created between the root apex and the jaw surface. This sinus allows the pus to drain (Roberts and Manchester 1995, 50), and frequently leads to the eventual healing of such lesions. It is at this advanced stage that the abscess is visible osteologically.

The prevalence of dental abscesses in the named assemblage from St Luke's church was calculated per dental socket present. The rate in this sample was 1.78% (87/4883), which was considerably higher than the all other post-medieval assemblages listed in Table 5.22, except for St George's Church, Bloomsbury, and the Cross Bones burial ground, Southwark.

Dental enamel hypoplasia

Dental enamel hypoplasia (DEH) manifests on the buccal surface of the tooth crowns as pits, horizontal lines or lines of pits. These features are the result of a thinning of the enamel caused by an interruption or slowing of the normal deposition of enamel during crown formation (Goodman and Rose 1990). DEH is induced by a number of metabolic insults, such as nutritional deficiency, weaning and bouts of childhood diseases lasting more than three weeks (Hillson 1996, 165-66, Aufderheide and Rodriguez-Martin 1998, 405). Unlike bone, enamel does not remodel during life, and so remains as a permanent indicator of such a stress episode in the first six or seven years of life.

In this analysis, the type and number of defect (groove, line or pit) present on each tooth was recorded. This level of detail has not been quantified for this assemblage. DEH was identified on the buccal surface of 231 out of 2249 permanent teeth (10.27%) in the named assemblage. This rate is slightly lower than St George's Church, Bloomsbury (16.35%), but considerably lower than the Cross Bones assemblage, Southwark, where 29% of teeth showed DEH. Given the destitution of so many buried at the latter, it is not surprising that individuals did suffer greater stress episodes in childhood, which were permanently recorded on their dentition through DEH.

Dental caries

Dental caries is a destruction of the enamel surface, the dentine (internal part of the tooth) and the cement (outer layer of the roots), caused by the acid produced by bacteria present in dental plaque (Hillson 1996, 269). The association of acidogenic bacteria and sugars in the diet is a well established cause of cavitations (Lukacs 1989, 265). Caries is classified as an infectious disease which usually progresses slowly, with the first sign being a white or brown opaque spot on archaeological teeth. In this assemblage, the size of each carious lesion was classified according to the universally used grading system produced by Lukacs (1989, 265). These grades are (i) pit or

small fissure; (ii) medium sized, less than half of the crown destroyed; (iii) large, more than half of the crown destroyed; (iv) complete destruction of the crown with only the roots remaining. The location of the lesion was also recorded. However, the frequencies pertaining to the location on the tooth, size of the lesions and which tooth affected are not considered here.

Caries prevalence was calculated per tooth. This included those caries filled by metal fillings but excluding lesions removed by filing of the tooth crown. Inescapably, caries rates are an approximation of the true prevalence, since it is not known how many of the teeth lost post mortem contained such lesions. The prevalence does however provide a general measure of the rate of caries within the population group.

In the named assemblage from St Luke's church, the caries rate per tooth was 9.74% (219/ 2249). In comparison with the other post-medieval sites listed in Table 22, this prevalence is lower than most, with the exceptions of the burial assemblages from the Quaker cemetery in Kingston-on-Thames (5.4%), and St Bartholomew's church, Penn.

Dental calculus

Calculus consists of mineralised plaque. Micro-organisms that accumulate in the mouth after eating become imbedded in a matrix composed of proteins and the saliva and the organisms themselves. Processed sugar in the diet accelerates this process (Hillson 1996, 254-55). These plaques may mineralise to form calculus (colloquially known as tartar). There are two types of calculus: supra-gingival calculus situated above the gum line, and sub-gingival calculus that is found below the gum line on exposed roots. The deposits are commonly seen on the teeth nearest to the saliva glands (Roberts and Manchester 1995, 55). Regular brushing of the teeth removes most plaque deposits, thus preventing the formation of calculus. In the late Georgian/ early Victorian periods, tooth brushing was rarely undertaken, and most cleaning (when done at all) consisted of rubbing the teeth with a cloth containing abrasive tooth powders (Hillam 1995).

The calculus rate was recorded per tooth present, and the size and position on the crown was noted, using recording criteria set out by Brothwell (1981). However, such a detailed presentation of this data is beyond the scope of this report. Calculus was identified on 46.33% of permanent teeth present. This varied in severity from slight flecks to a heavy coating covering substantial tooth surfaces. The prevalence of

calculus in the named sample from St Luke's church compared favourably to the burial assemblages of Newcastle Infirmary (55.85%) and St George's church, Bloomsbury (70.85%).

Table 5.23 Summary of dental pathology in the named sample (n =219)

Skeleton	Forename	Surname	Abscesses	AMTL	Calculus	Caries	DEH	Impaction	Periodontal disease	Permanent dentition	PMTL	Fillings	Pipe notch
112	Mills	Edwin											
113	Mary	Bailey		27		2				3	2		
114	John	Bailey		3	20	3				20	6		
116	Ann	Hills		8	4	2	2		1	17	7		
117	Samuel	Roberts		18	1					2	12		
118	Sarah	Brown											
122	Ann	Webb	2	18	9	5	1		1	9	5		
161	Edmund	Roberts											
162	Thomas	Brown											
193	Ann	Elliott											
194	James	Eltham											
253	Catherine	Forbes											
254	Cath	Wood			3	1			1	4	5		
255	Cath	Forbes											
256	Ester	Stevens											
258	Nicholas	Stevens											
259	Ann Maria	Tomkies											
262	Sarah	Hathorn		27	1	3				4	1		
263	Henry	Cheape											
264	George	Hathorn		18	3	3			1	10	4		
281	Noah	Nicholls	1	19	10	1			1	10	3		
284	Barbara	Holyland		1	3	2				12	6		
291			1	19	5				1	9	4		
299	Margaret	Cheape											
300	Lindsay	Cheape											
301	Henry	Budd											
302	Emma	Sowter											

Skeleton	Forename	Surname	Abscesses	AMTL	Calculus	Caries	DEH	Impaction	Periodontal disease	Permanent dentition	PMTL	Fillings	Pipe notch
303	Rebecca	Sowter											
304	Sarah	Stockall											
307	Thomas	Hughes		22					1	2			
333	Hetser	Stevens											
334	John	Hunter											
335	John	Carr											
336	Ann	Carr											
337	Mattew												
338	Henry	Stevens			4		5			19	11		
339	Sophia	Patch											
340	Elizabeth	Patch											
341	George	Wyatt											
342	Martha	Hughes											
343	Charles	Stokes		7		3			1	7	2		
344	David	Hughes											
350	Bowes	Todd											
352	Clara	Cuerton											
353	Thomas	Cuerton											
355	Charles	Cuerton	2	17	9	1	7			12	3		
356	Anthony	Barbre											
360	Emma	Gardner								4	3		
361	Thomas	Sowter	1	18	7		1		1	10	2		1
362	Ann	Brown	2	32						0			
363	Keith	Stewart					15			24	4		
364	Sarah	Hathorn		6	17	2			1	17	9		
392	Mary	Sheppard		4	22	9				22	2		
393	John	Sheppard	3	26		2			1	2	3		
394	William	H			1	4	9			32			
400	James												

Skeleton	Forename	Surname	Abscesses	AMTL	Calculus	Caries	DEH	Impaction	Periodontal disease	Permanent dentition	PMTL	Fillings	Pipe notch
446	Rebecca	Unknown	1	5	5	5	3			15	7		
449	George	Jeffreys			10					27	1		
450	Sarah	Jeffreys							1	27	4		
453	Benjamin	Smith			5	7	2			15			
454	Elizabeth	Smith											
466	Thomas	Hathorn											
467	John	Pugh			18					27	5		
468	Susannah	Joselyn		3	24	1				24	4		
469	Thomas	Tribe		10	14	1			1	14	4		
471	Elizabeth	Cassell											
472	Mary	Cassell	2		4		4			24	6		
475	Elizabeth	Ainge		5	2					2	9		
476	William	Freson											
477	Ann	Turner		23						1	7		
478	Mary	Tilford	1	7	4	3			1	12	5		
479	Mary	Hooker		24						5	3		
480	Douglas	Bailey											
481	Albert	Bailey											
488	Elizabeth	Rider		28					1	0	4		
491	Elizabeth	Burnhill											
492	John	Capion											
493	Catherine	Forbes											
494	William	Wood		1	13					25	6		
495	William	Wood				1				13	4		
497	John	Lowe		1	5		5			7	8		
513	Thomas	Dennis	3	8	20	3	4			20	4		
522	Laurance	Sidney		19	6		1		1	6	7		
531	Sarah	Wilson											
532	John	Markham	4	12	3					8	12		

Skeleton	Forename	Surname	Abscesses	AMTL	Calculus	Caries	DEH	Impaction	Periodontal disease	Permanent dentition	PMTL	Fillings	Pipe notch
533	Thomas	Wilson											
534	Joseph	Deer											
536	Eliza	Smith											
537	Susannah	Smith			13					28	4		
538	Thomas	Giles		1	5	3	1			16	14		
539	James	Jones	2	21	2	1				3	8		
540	Elizabeth	Giles											
541	John	Giles											
542		Nash	3	11	8		1			11	10		
543	Elizabeth	Bailey											
563	William	Craghill						4		28	3		
597	Henry	Giles			19	2		1		21	7		
600	Catherine	Lowe		23		2			1	6	3		
601	Matilda	Goxall											
602	Louisa	Goxall								4	6		
603	Mary	Deer		16	5	5	5		1	12	3		
609	Susanna	Rogers		2	19	1	6			23	7		
610	Cordelia	Scotter											
611	Charles	Yoxall											
612	John	Sowter											
613	Mary	Newton											
614	Elizabeth	Egner	5	18		1			1	2	12		
616	George	Girsewood		1	6				1	8	20		
617	Lydia	Prosser		32					1	0			
618	Ann	Seward		29						0			
619	Charles	Cole		22	1				1	1	1		
620	Sophia	Cole		32						0			
621	Thomas	Cole		32						0			
622		Cole	1	5	11	1	2			22	5		

Skeleton	Forename	Surname	Abscesses	AMTL	Calculus	Caries	DEH	Impaction	Periodontal disease	Permanent dentition	PMTL	Fillings	Pipe notch
623	Sarah	Lars		2	3	2				22	6		
625	Zara	Turner											
626	Sophia	Louch		4						0	2		
628	Thomas	Moore			20		6			25	4		
629	Thomas	Coventry								2			
655	Ann	Davidson		10						0	2		
656	Mary	Williamson		31					1	1			
657	Cuthbert	Wilkinson								2			
696	John	Hollinshead		9					1	4	2		
697	Elizabeth	Sewell	1	25	2		2		1	2	5		
698	Martha	Smith											
699	Thomas	Willet		2					1	22	6		
701	Thomas	Moor											
702	Thomas	Murdon											
704	Elizabeth	Willet		7	14	1			1	18	6		
705	Thomas	Willet		10	1				1	1	5		
706	Diana	Egner											
707	Andrew	Egner		32						0			
708	John	Horton	2	7	12	1			1	22	2		
709	John	Horlor		1						25	4		
711	James	Aston	1		8	1	7			12			
712	Anne	Higgins											
713	William	Prosser		6	3	1	1		1	16	10		
714	Edward	Seward											
715	William	Dawson											
716	William	Sutton											
717	Hannah	Sutton											
718	Adolfus	Matthessen											
719	Elizabeth	Jones	2	7	4	2	2		1	18	7		

Skeleton	Forename	Surname	Abscesses	AMTL	Calculus	Caries	DEH	Impaction	Periodontal disease	Permanent dentition	PMTL	Fillings	Pipe notch
720	Elizabeth	Godman											
721	Sarah	Phillips											
722	Samuel	Corney	1	1	6	2	11		1	27	4		
723	Elizabeth	Treson											
724	Ann	Hooker	1	12	7	1			1	11	5		
725	Henry	Lane											
726	John	Lane											
727	John	Lane											
730				14					1	2	7		
762	Ester	Gardner											
763	Emma	Lane											
764	John	Gardner	3	3						16	13		
765	Mary	Love											
767	Judith	Neiyton											
769	Frances	Love											
770	Elizabeth	Harrison											
771	Thomas	Dalton	11	15		8			1	9	8		
772	John	Amburger	3	5		4	5			15			
773	Louisa	Elliot											
775	William	Feast											
776	John	Bringloe											
777	John	Russell		4						22			
778	Elizabeth	Seward		14						0			
779	Joseph	Seward		32						0			
780	Isabel	Bailey											
781	George	Laghlan									5		
782	Catherine	Bailey		32						0			
784	Ann	Senard											
785	Charles	Holilengart											

Skeleton	Forename	Surname	Abscesses	AMTL	Calculus	Caries	DEH	Impaction	Periodontal disease	Permanent dentition	PMTL	Fillings	Pipe notch
788	George	Wright		16						0			
789	Mary	Feast	1	1	7	2			1	17	9		
791	Alfred	Bailey											
792	Emerson	Archer											
793	Septenus	Bailey											
794	Ellen	Lycett											
807	Charles	Triggs	1	4	4	1	4		1	16	9		
812	Mary	Combers		27	5		2		1	5			
813	John	C---											
820													
821	Sarah?	Cheswell?			4	5	3			10			
829	C..s(z)a	J..ogg		14		1				17	1		
830	Mary	Coleman											
831	Mary	Monk		4	16	1			1	18	6		
833	Francis	Lycett											
835	Hannah	Nicholls											
837	Lewis	Willet		10	4		7		1	19	3		
839	Sarh (Sarah)	Coventry											
841	Mary	Dore											
842	Mary	Dore											
843	William	Dore											
844	William	Tanner											
845	John	Wright		16						0			
846	Elizabeth	Lorimer		32						0			
849	Rebecca	Benson											
851	Elizabeth	Maxwell		22						0	6		
852	Willem	Spier			8	1				28	4		
854	Amelia	Allen											
855	Trefusis	Lovell		11						3	2		

Skeleton	Forename	Surname	Abscesses	AMTL	Calculus	Caries	DEH	Impaction	Periodontal disease	Permanent dentition	PMTL	Fillings	Pipe notch
856	Margaret	Lovell		15						0	1		
857	Hannah	Jones											
858	Thomas	Dallison		4	26	4			1	26			
859	James	Lumley			3					20	4		
860	Mary	Lockin		28	2				1	2			
861	Alex	Bailly	2	13		1				1	2		
862	Elizabeth	Baillie				2				5	11		
864	Elizabeth	Cra??											
868	Mary	Aston											
869	Ann	Webb			21					25	6		
888	Charles				15		4			31	1		
890	Samuel Austin	Fuller		16		1			1	6	4		
894	Elizabeth	Smith											
895	Hannah	Hickin											
896	Richard	Tomkies											
898	Henry	Bryant		11	5				1	10	11		
899	Catherine	MacKenzie											
900	Elizabeth	Hewet											
901	Emily Sarah	Backhouse											
904	Mary	Pearson											
905	Fred	Gibson				2	8	2		32			
906	Jemima	Henwood											
907	James	Phillips											
908	Ann	Lucas		5		1				1	4		
909	Ann	Lucas											
910	William	Rone	2	8	4	2	2		1	16	4		
911	Thomas	Feast											
912	Richard	Davis											
913	Thomas	Godman											

Skeleton	Forename	Surname	Abscesses	AMTL	Calculus	Caries	DEH	Impaction	Periodontal disease	Permanent dentition	PMTL	Fillings	Pipe notch
914	Mary	Davis											
916	Susanna	Stanley		5	6	1				13	6		
917	Thomas	Fox											
918	James												
920	Sarah	Fuller		26						0			
921	Thomas	Young											
922	Sarah	Palmer			9		9			22	7		
923	Thomas	Roberts				6			1	25	3		
924	Thomas	Hudson											
925	Christina	Lanton	1	11	4	2			1	11	10		
927	Isabella	Fuller											
928	James	Fuller		11	17	1	11		1	21			
934	Catherine	Allan	2	9	12	2			1	17	5		
935	Elizabeth	Richardson			4				1	4			
936	James	Allan		9	4	4	1			7	14		
938	Charles	Allan											
939	Rebecca	Allan				1				1			
946	Lydia	Batty		6	2					2	9		
950	Ann	Ricardo		9		2				22			
951	John	Stubbs		5						23	2		
961	Edward	Keat	2	4	24				1	24	4		
962	Lucy	Farmer											
963	Frances	Pay											
964	Mary	Lumley											
965	William	MacKenzie											
966	Andrew	MacKenzie	1	4	9	1	2		1	20	4		
967	John	Farmer		2	23		7		1	25	4		
968	Jane	Colchett		32						0			
969	William	Williamson											

Skeleton	Forename	Surname	Abscesses	AMTL	Calculus	Caries	DEH	Impaction	Periodontal disease	Permanent dentition	PMTL	Fillings	Pipe notch
970	Matilda	Gibson			9	4				20	10		
971	Oliver	Wilson											
972	Ellen	Robinson											
973	Mary	Robinson			19	2			1	29	3		
975				2	16	7	17			24	3	6	
976	George	Nightingale		16	7	1				8	5		
977	George	Nightingale		1	10	1	1		1	26	3		
980	George	Lowe											
981	Foy	Walford											
982	John	Kelly											
985	Ann	Bateman		32						0			
986	George	Walford			25				1	25	3		
989	Matthew	Hewlett								1			
990	Elizabeth	Hewlett											
991	James	Lumley											
994	Thomas	Ramsbottom		1	7					12	11		
997	James	MacCallum											
1008	George	Scott		2	18	1			1	18	8		
1009	Mary	Clark	1	22	5				1	6	4		
1022	William	Linsley											
1045	Elizabeth	Lindsay		5						11	12		
1046				9	2					2	5		
1057	William	Graham			21	7			1	21	5		
1060	Jane	Mattheson											
1061	Frederick	Matteson											
1062	Richard	Sumption		23						2			
1065	William	Bukridge		3	16		6			22	4		1
1066	James	Dick											
1067	William	Turner											

Skeleton	Forename	Surname	Abscesses	AMTL	Calculus	Caries	DEH	Impaction	Periodontal disease	Permanent dentition	PMTL	Fillings	Pipe notch
1068	Elizabeth	Simpson		4	20		13		1	22	6		
1069	Ann	Nightingale		3	8	2				12	8		
1070	Elina												
1071	Andrew	Duff	1	11	3	2	3			6	5		
1072	Edna	Coleman											
1073	Elizabeth	Duff											
1074	Lucretia	Wright											
1075	Arabella	Feast											
1076	Caroline	Joselin											
1077	Rouland	Owen											
1078	Thomas	Roberts			8	2				8	1		
1079	Judith	Pigott											
1080	James	Dalby											
1081													
1082	Anne	Lycett											
1083	John	Davies											
1084	Douglas	Aylwin											
1086	Thomas	Fisher		25						0	2		
1087	Joan	Wilson		12	4	3	2		1	8	12		
1088	Ann	Fisher		6		1				8	16		
1089	Ann	Ruff											
1090	Margaret	Martin											
1120		Doherty				2	5	3		27	2		
1125	James	Dudley											
1126	Eliza	Dudley											
1127	Matilda	Bonelly											
1128	William	Moore	4		19	7	2			27	5		
1130	James	Roe	1	3						27	2		1
1131	Ester	Taylor		17			1		1	1	10		

Skeleton	Forename	Surname	Abscesses	AMTL	Calculus	Caries	DEH	Impaction	Periodontal disease	Permanent dentition	PMTL	Fillings	Pipe notch
1132	John	Clarke											
1133	Letitia	Clarke											
1134	John	Wright											
1135	Susannah	Wright		10		2				5	1		
1140	Eliza	Dudley											
1141	William	Patch	1	6	8	2	1		1	8	15		
1142	Charles Frederick	Wellsted	1	1	21	5				25	6		
1143	Mary	Ellis											
1144	Mary	Millward	1	9	4				1	19	2		
1145	Mary	Lan	1	7					1	1	3		
1146	Thomas	Lan			11	2			1	22	10		
1147	Michael	Lan		1	16				1	16	13		
1148	Ann	Lerich											
1149	Michael	Lan		3		1				12	1		
1152	Janet	Tilford											
1153	William	Moir								14	6		
1154	Leon	Matthers											
1155	John	Smith		12	5				1	5	10		
1156	Elizabeth	Farmer		2	14				1	14	14		
1157	Peter	Clarke		20	5	2	6		1	7	4		
1162	Ann	Holloway											
1163	Thomas			32						0			
1169	Emily	Porter				2				5	10		
1170	Mary	Porter		5	12					12	8		
1172	Amelia	Porter	2		17	2				20	12		
1176	Thomas	Boyle											
1177	Celia	Boyle		8					1	22	2		
1184	Sarah	Boorman	2	1		2				8	14		
1191	Frederick												

Skeleton	Forename	Surname	Abscesses	AMTL	Calculus	Caries	DEH	Impaction	Periodontal disease	Permanent dentition	PMTL	Fillings	Pipe notch
1193	Jonathan	Bateman		5	5	3				5			
1194	Edmund	Morier											
1195	George	White											
1196	Robinson	Turner											
1202	Ester	Tomkies											
1203	William	Farmer	1	17	10	1	6			11	3		
1204	Phoebe	Lester											
1205	Frances	Woodin											
1206	William	Hobson											
1208	Sarah	Willcox		13					1	11	4		
1210	Henry	Waring											
1212	Eliza	Keat											
1215	Alfred	Matthews								2			
1216	Sarah	Matthews											
1217	Thomas	Gillett											
1218	Sarah	Hyde Clarke											
1219	Martha	Burton		6	10				1	10	12		
1220	Susn (Susan)	Clarke											
1221	Caroline												
1223	Rouland	Wilkes			20	4			1	23	8		
1225	Anthony	Falder		10						0	4		
1233	Thomas			2					1	24	4		
1257	Joseph	Clarke		3						6	4		
1258	William	Clarke				2				25	4		
1259	Edward	Clarke											
1261	Alfred	Clarke											
1304	Jane Elizth (Elizabeth)	Campion											
Totals			**87**	**1726**	**1034**	**219**	**231**	**10**	**75**	**2252**	**875**	**6**	**3**

Dental anomalies

A variety of dental anomalies can be found within the human dental arcade. These include impacted teeth, congenitally absent teeth (agenesis), supernumerary teeth and the retention of deciduous teeth. Ten impacted teeth, no supernumerary teeth and no retention of deciduous dentition in adulthood were present. Most commonly congenitally absent teeth are the third molars. In the named sample 117 teeth were congenitally absent.

Dental interventions

Although the first dental school, the College of Dentists and of the Odonological Society, was not established until 1856, it has been estimated that about 40 dentists operated in London by 1800, and another 20 outside the capital (British Dental Association Museum display). In addition, there were many informal unregulated tooth drawers for those who could not afford the fees of a bona fide dentist. For the privileged, there was an array of dental treatments on offer at a price. These included fillings, removal of carious lesions by filing the tooth, dental implants and a variety of dentures using human, animal or porcelain teeth.

No dentures were recorded from the burials of St Luke's church. This is somewhat surprising given the large burial population, as in this period it was common to be buried wearing one's dentures, and often accompanied by a spare set, as was found in St George's Church, Bloomsbury, Christ Church, Spitalfields, and St Martin's church, Birmingham (Bateux 2003, 137).

However, the caries in six teeth had been filled. During the 18th and 19th centuries, the cheapest form of fillings was either tin or lead. From the beginning of the 19th century, various forms of amalgams became available. These were based on heavy metals such as mercury that was mixed with copper or silver filed from coins (British Dental Association Museum display). Pellets of the amalgam were placed in the cavity and tamped down with a hot instrument. Gold fillings were the most suitable material but also the most expensive. A typical dentist's fees of 1781 advertised gold fillings at seven shillings and sixpence, whilst lead fillings cost five shillings each (Wilson 1985, 38).

Skeletal pathology

Unlike the unnamed population, the named skeletons were formally analysed for pathology. Like many other post-medieval populations, the prevalence of skeletal pathology was very high. This is summarised in Table 5.23 below.

Congenital disorders

Congenital dislocation of the hip

Congenital dislocation of the hip, or congenital acetabular dysplasia, is a developmental defect in which the acetabulum or hip socket is abnormally shallow and the upper margin has a smooth edge due to the tendency of the joint to dislocate. Degenerative arthritis is commonly associated with this condition, with extensive osteophytosis of the acetabulum and femoral head being common (Roberts and Manchester 1995, 38). In some cases, a false acetabulum develops superiorly on the iliac bone. An individual afflicted with the condition would experience considerable pain and difficulty in walking. A young adult female named Matilda Gibson (skeleton 970) had bilateral congenital hip dislocation. The right hip was ankylosed and immobile but the left hip joint appeared to have been used.

Tapes equinovarus or club foot

One mature adult male skeleton (skeleton 888) showed abnormal morphology of the bones of the right foot typical of club foot. All the tarsals were ankylosed, and there was malalignment of the bones superio-inferiorly rather than their usual relative position of mediolateral rows. The anterior part of the foot would have been held inverted. It is probable that this foot deformity was congenital, but traumatic damage to the bones was not ruled out (although no fractures were observed macroscopically).

Clubfoot is a fairly rare condition in modern populations, and probably was similarly rare in the past. It is a problematic disorder to recognise osteologically, and is probably very under-reported in skeletal populations (Roberts and Manchester (1995, 38).

Scoliosis

Two named skeletons from St Luke's church suffered from scoliosis. Scoliosis is the abnormal curvature of the spinal column to the left or right in the coronal plane. It differs from kyphosis, which is the abnormal curvature in the anterio-posterior plane (colloquially known as a hunchback). In skeleton 723, there was lateral deviation from the midline in T3 to T9. The spinal column of Mary Lockin (ageing skeleton

860) showed marked deviation to the right in the upper lumbar region (L2), and to the left at the level of T12. T3 and 4, L1 and 2, and L3 and 4 were fused together. The ribs were modified in shape to accommodate this abnormal curvature. The internal organs, particularly the lungs, would have been compressed on the right side, possibly causing respiratory problems as well as an increased risk of blockages in the intestines. This type of spinal deformity may be caused by trauma (Aufderheide and Rodriguez-Martin 1998, 66-67), but the severity of the deformity in this individual, and the morphological changes to the ribs indicate that the scoliosis was congenital.

Os acromiale

During normal development, the acromial process begins to fuse to the scapula at approximately 10-14 years (Schwartz 2000). In some adults, non-union persists into adulthood, and is known as os acromiale. Originally believed to be a developmental anomaly, work on skeletons from the ship the Mary Rose, which sank off the coast of England in 1545 AD, suggests an occupational role in the development of this condition (Roberts and Manchester 1995, 113). In this assemblage, 13.6 % had os acromiale, in comparison with modern dissection room frequencies of 8.0 %. The highest frequency was found amongst skeletons found where archery equipment was stored, suggesting that prolonged archery practice from childhood was a factor in aetiology of this condition.

A mature and an ageing male (skeletons 723 and 1203) had this disorder. In the former only the left scapula displayed this anomaly, whereas in the latter individual both scapulae were involved. It is unclear how much genetic variation or repetitive arm movements sustained from childhood into adulthood underlay the development of this condition. In a society where child labour was commonplace, it is not improbable that repetitive arm motions enacted over many years of childhood, adolescence and adulthood (for example, weaving or minding a machine) caused or contributed towards this condition.

Other congenital abnormalities

Two skeletons had developmental defects of the spine. In ageing adult skeleton 1131 the neural arch of the atlas had not fully closed, leaving the neural canal open. In skeleton 777, the transverse process of T2 was underdeveloped. The inferior articular facets were also abnormal, being split in two. In skeleton 619, it was the right maxillary sinus that was bipartite. The extent to which these anomalies impacted on

the health and wellbeing of these individuals is difficult to surmise. However, no degenerative changes were present to indicate pathology.

Trauma

Fractures

Thirty-nine named individuals showed fractures indicative of trauma. All fractures were found on adult skeletons, with twice the number being male (males, 26%; females, 13%).

Fractures may be defined by their nature and their anatomical alignment relative to the long axis of the bone. In the named assemblage, eight individuals showed oblique fractures, four showed depressed fractures of the cranial vault, two individuals had compression fractures of the vertebral bodies, and one showed transverse fractures of two proximal foot phalanges. The types of fractures on a further 24 skeletons could not be identified without the aid of radiography, largely due to callous formation obscuring the line of the fracture. These fractures were located mainly on the ribs and the smaller bones of the hands and feet. Fracture of the ribs is due to a direct blow to the chest, and occurs most commonly as a result of interpersonal violence and falls. Depressed fractures of the cranial vault have a similar aetiology. These involved three males and one female.

Oblique fractures were located peripherally, with five (skeletons 162, 522, 845, 1145 and 1208) located on the lower legs, one on the femur (skeleton 1065), one of the humerus (skeleton 859), and one Colles fracture of the distal radius (skeleton 1177). The distal radius is the second most common location of fractures associated with osteoporsis, where even a slight fall onto an outstretched arm may result in fracture of the porous bone. Given the advanced age and the sex of Celia Boyle (skeleton 1177), it is probable that her fracture was secondary to osteoporosis.

Compression fractures of the vertebral bodies were found in two individuals (skeletons 114 and 343). Crush or compression fractures result when a sudden excessive force is applied to the bone (Ortner and Putchar 1981, 56), and the bone is compressed along the plane of impact (in this instance vertically), either collapsing the body uniformly, or forming a wedge-shaped vertebral body. Crush fractures often occur where there is already an inherent weakness of the bone (most commonly due to underlying osteoporosis, but also present in pathologies such as tuberculosis or

metastatic carcinoma). In skeleton 343 new bone formation on the ribs suggests that the crush fracture of L4 in this skeleton may be tuberculoid in origin.

In severe compression fractures, the uneven collapse of the bodies precipitates a misalignment of the spinal column (scoliosis or kyphosis), which may result in compression of the spinal nerves, causing chronic pain and disturbance of sensation to the peripheries of the body. In skeleton 114, ankylosis and crush fractures of the bodies of vertebrae T5-T10 resulted in a mild kyphosis. The underlying condition afflicting skeleton 114 is unclear, but was either or both ankylosing spondylitis or severe osteoarthritis.

Table 5.24 Prevalence of fractures in the named assemblage (n =219)

	Male	**Female**	**Total**
Adults	22%	12.87%	17.81%
	(26/118)	(13/101)	(39/219)
Subadults	0	0	0

Soft tissue trauma

Enthesophyte formation was noted on six adult skeletons of the named assemblage (2.74%). Enthesophytes occur when there is ossification of the tendons and ligaments at their point of insertion onto the skeleton. This ossification is typical in some pathologies, such as DISH, but most commonly occur as a result of tears to the muscle fibres due to overuse or trauma.

Table 5.25 Prevalence of enthesophytes in the named assemblage from St Luke's church (n =219)

	Male	**Female**	**Total**
Adults	3.39%	1.98%	2.74%
	(4/118)	(2/101)	(6/219)
Subadults	0	0	0

Dislocation of the shoulder joint

Chronic dislocation of the left humerus was present in adult male skeleton 890. The humerus had become totally displaced inferiorly, and a new false shoulder socket had formed as a result of prolific osteophytosis. The shoulder joint is probably the most common joint to be dislocated through trauma, being shallow, which allows free

movement of the arm (Roberts and Manchester 1995, 87). Frequently the dislocation either is reduced spontaneously, or may be fairly easily (albeit painfully) manipulated back ito its correct position. However, this did not occur with skeleton 890, who would have suffered considerable pain and reduction in function of the left arm for many years.

Osteochondritis dissecans

Osteochondritis dissecans is a fairly common osteological disorder found on the joint surfaces of the major long bones. Physically active young males (such as athletes) are most often affected in the first two decades of life. This disease is due to a significant localised obliteration of the blood supply, causing necrosis of small areas of joint tissue (Roberts and Manchester 1995, 87). Repeated, low-grade, chronic trauma or micro-trauma is thought to play a role in this injury to the blood vessels. The necrotic bone plaque breaks off from the joint surface and may remain loose in the joint, causing chronic pain and often precipitating osteoarthritic changes. Alternatively, the fragment may reattach in its original position or be resorbed, and no further symptoms will be experienced.

Three male adults of the named assemblage from St Luke's church (skeletons 701, 1078 and 1223) showed evidence of this disorder.

Neoplastic disease

Button osteomas

Five skeletons (122, 772, 777, 846 and 1145) of the named assemblage of St Luke's church had a button or ivory osteoma on the cranial vault. Skeleton 122 and 772 had a single lesion on the frontal bone, whilst skeleton 777 had one on the right parietal, and skeleton 846 on the occipital bone. Skeleton 1145 had two button osteomas: one on the frontal bone and one on the right parietal. All but skeleton 777 were mature to ageing adults. Button osteomas are small circular lumps on the ectocranial surface of the cranial vault, most commonly on the frontal bones. They are benign tumours of no clinical significance (Roberts and Manchester 1995, 188). They are more commonly found in males. Frequency rises after the fourth decade of life (Aufderheide and Rodriguez-Martin 1998, 375), as was the case in four of the five skeletons above.

Table 5.26 Prevalence of button osteomas in the named assemblage from St Luke's church (n =219)

	Male	**Female**	**Total**
Adults	1.70%	2.97%	2.28%
	(2/118)	(3/101)	(5/219)
Subadults	0	0	0

Malignant neoplasms

Two skeletons (469 and 973) showed lesions characteristic of malignant neoplasms, which ultimately may or may not have caused their deaths. Thomas Tribe (skeleton 469) was suffering from a large lytic lesion in the left eye orbit, which had caused considerable destruction of the orbit and the nasal cavity (Plate 5.X). The diagnosis of a lytic metastatic carcinoma was made. The location of a primary tumour was not made elsewhere on the skeleton and probably involved the soft tissues only. A craniotomy was performed on Thomas Tribe following his death. This is discussed more fully below.

Table 5.27 Prevalence of malignant neoplasms in the named assemblage from St Luke's church(n =219)

	Male	**Female**	**Total**
Adults	0.85%	0.99%	0.91%
	(1/118)	(1/101)	(2/219)
Subadults	0	0	0

A mature adult female, Mary Robinson (skeleton 973) had lesions that were neoplastic in nature, but a differential diagnosis between multiple myeloma and osteolytic metastatic carcinoma could not be made.

Metabolic disorders

Acromegaly

The skeleton of John Farmer (skeleton 967) showed bone changes indicative of acromegaly. The skull had very pronounced supraorbital ridges, and the bones of the face and mandible were enlarged, giving the face an elongated, flattened appearance. Deposition of new bone on the mandible, particularly around the mental eminence, was very marked, generating prominent prognathism. The long bones of the hands

appeared slightly thickened and the terminal digits showed ‘tufting’ typical of this condition.

Acromegaly is caused by an excessive production of growth hormone in adulthood, most commonly generated by a tumour of the pituitary gland. Where this occurs before full adulthood is reached, giantism results, and the individual becomes excessively tall, but in proportion. When a tumour develops after the epiphyses of the long bones have fused, no change in stature can occur. Indeed, John Farmer stood only 162.6 cm (or 5 foot 3 inches) tall. Bone growth occurs in the flat bones, most commonly in the face, particularly the mandible, but thickening of bone does occur in the vertebrae and hand bones. The bony changes observed on the skeleton of John Farmer are very characteristic of this rare disease. Although the lifespan of modern treated acromegalics is not significantly shortened by the disease, earlier cases are reported to have had substantially shortened lifespans. It is assumed that this was the case in the more distant past. John Farmer lived into his forties.

Cribra orbitalia and porotic hyperostosis

Cribra orbitalia is widely thought to occur in response to a deficiency of iron during childhood, most commonly the result of inadequate dietary intake of iron, and/or as a result of severe intestinal parasite infestation (Stuart-Macadam 1991, 101). Iron is a central component of haemoglobin, the molecule necessary for the transportation of oxygen in the red blood cells of the blood. Red blood cells are produced within the red bone marrow of a number of bones of the body, which include the diploe of the cranial vault, the sternum and the pelvis. In childhood, the diploe are particularly important, but become a secondary site of red blood cell production later in life. In iron deficiency anaemia, the body attempts to compensate for low serum iron levels by hypertrophy of these bones. In children, this manifests osteologically as an increased porosity and thickening of the diploe of the cranial vault (known as porotic hyperostosis) and of the orbital sockets (Cribra orbitalia). Cribra orbitalia is often used as a generic indicator of physical stress in childhood.

Twenty-three skeletons (9.54%) showed bony changes in the eye orbits consistent with cribra orbitalia. These lesions were graded in severity, using the standards set out by Stuart-Macadam (1991, 101-113). There was wide variation in the severity of the disease, with six graded as 1 (mild), five as 2 (slight), eight as grade 3 (moderate) and one as marked (grade 4).

Table 5.28 The prevalence of cribra orbitalia in the named assemblage (n =241)

	Male	Female	Total
Adults	5.93%	8.91%	8.67%
	(7/118)	(9/101)	(19/219)
Subadults	(10.0%)	25.0%	18.18%
	(1/10)	(3/12)	(4/22)

Porotic hyperostosis, manifesting as thickening and pitting of the left and right parietal bones, was present in ten adult individuals (4.15%). In all but one the lesions had healed.

Table 5.29 Prevalence of porotic hyperostosis in the named assemblage (n =241)

	Male	**Female**	**Total**
Adults	6.78%	0.99%	4.10%
	(8/118)	(1/101)	(9/219)
Subadults	10.0%	-	4.54%
	(1/10)		(1/22)

Rickets

Anterior-posterior bowing of the femoral shafts and/or medio-lateral bowing of the tibiae diagnostic of rickets was observed on 11 adults and 4 subadults in the named assemblage (6.22%). Rickets is a deficiency disease caused by a lack of vitamin D. Vitamin D is central to the absorption of dietary calcium. A deficiency results in soft, thin bones. Weight-bearing during crawling and walking in childhood cause the long bone shafts of the arms and legs to bow. Although Vitamin D may be obtained in foodstuffs such as oily fish and animal fat, the majority of vitamin D is formed by the exposure of the skin to ultraviolet radiation. The presence of rickets usually indicates an individual who had not received sufficient exposure to sunlight in early childhood.

Rickets was fairly uncommon in pre-industrial and rural agrarian societies (Ortner and Putschar 1981, 274), but became widespread in the industrial cities of the later post-medieval period. The smog that blanketed the great manufacturing centres (including London) for much of the year served to block out a great deal of sunlight. Long hours of child labour in factories and mines also ensured that many working class children were not exposed to sufficient daylight necessary for the adequate

production of vitamin D. In 1773, Fordyce (quoted in Roberts and Cox 2003, 309) estimated that 20,000 poor children in London were afflicted with this disease. The scale of the disease was still vast in the mid-19th century, with a third of all admissions to Great Ormond Street Hospital in London being diagnosed as rachitic.

However, rickets was not necessarily the sole preserve of the poor. The 17th century physician Francis Glisson (the first to describe rickets in precise clinical detail) observed that it was a disease of children of the wealthy classes, where it was common practice not to be suckled by one's natural mother, but by a wet nurse (Sloan 1996, 44). This practice usually resulted in early weaning onto gruels high in calories but poor in animal fat, and hence, low in vitamin D (Steinbock 2003a, 281-282). This social practice, coupled with keeping the young child indoors for long periods, resulted in a child from a privileged background developing the disease.

Table 5.30 Prevalence of rickets in the named assemblage (n =241)

	Male	**Female**	**Total**
Adults	5.08%	4.95%	5.02%
	(6/118)	(5/101)	(11/219)
Subadults	20.0%	16.67%	18.18%
	(2/10)	(2/12)	(4/22)

Osteoporosis

Osteoporosis is a proportional decrease of both the bone mineral and the bone matrix, leading to bone which is light and brittle, and liable to fracture after minimal trauma (Steinbock 2003, 236). There are two types of osteoporosis: Type 1 or post-menopausal osteoporosis (affecting women over 50 years of age), and commonly the underlying condition in vertebral crush fractures and fractures of the distal radius; and Type 2 or senile osteoporosis, which affects both males and females over the age of 60 years equally, and predisposes individuals to vertebral wedge fractures and fractures of the femoral neck (ibid). A drop in oestrogen levels following the menopause accounts for 10-20% loss of total bone mass in modern women (ibid). This often serves to aggravate a pre-existing negative calcium balance caused by a poor dietary calcium intake and/or the net bone calcium lost during the reproductive years through multiple pregnancies.

Table 5.31 Prevalence of osteoporosis in the named assemblage (n =118)

	Male	**Female**	**Total**
Adults	0.99% (1/118)	0	0.99% (1/118)
Subadults	0	0	0

Osteoporosis was noted in one ageing male skeleton (1157). Osteoporosis is difficult to recognise macroscopically, and it is certain that the true prevalence of this disorder in the named assemblage from St Luke's church was much higher.

Joint disease

Ankylosisng spondylitis

Ankylosisng spondylylitis was identified on skeletons 114 (John Bailey, a prime adult male) and skeleton 1208, an ageing female named Sarah Wilcox. The lesion noted on John Bailey's skeleton is characteristic of the disease, with fusion of the sacro-iliac joint, and of adjacent thoracic and lumbar vertebrae L1 and 2, T5-T10, and T3 and 4. A slight kyphosis had developed in the region of T5-10. Enthysophyte development present on the skeleton was more typical of DISH than ankylosing spondylitis, but the ankylosis of the sacro-iliac joint and the appearance of the spinal osteophytes made the latter diagnosis more probable.

Ankylosing spondilitis is a systemic, non-infectious, progressive inflammatory disorder of connective tissue calcification (Roberts and Manchester 1995, 118-120; Aufderheide and Rodriguez-Martin1998, 102). The aetiology of the disease is poorly understood, but there appears to be a strong autoimmune causation. AS is a rare disease affecting only about 1 in 2000 individuals, 90% of which are male (ibid).

The sacro-iliac joint, spine and major peripheral joints are most frequently involved. The disease process usually begins in early adulthood, classically beginning with erosion, new bone growth and ankylosis or fusion of the sacro-iliac joint and calcification of associated ligaments. Skeleton 114 suffered from such ankylosis of the sacroiliac joint and osteophytic projections from the left auricular surface. Typically in ankylosing spondylitis, the lower thoracic/upper lumbar vertebral bodies and small vertebral joints begin to fuse, and the intervertebral disks and longitudinal ligaments ossify. This process progresses up and down the spinal column (but more

typically the lumbar vertebrae are first to fuse), creating the classical 'bamboo spine' of this disorder.

Depending upon the extent of the ankylosis, sufferers of this disorder experience lower back pain, limited chest expansion, immobility, weight loss and fever (Roberts and Manchester 1995, 119).

Diffuse idiopathic skeletal hyperostosis (DISH)

As its name suggests, DISH is a systemic disorder where additional bone is deposited around a number of joints of the body. This is largely due to the ossification of surrounding ligaments. Typically, DISH begins with ankylosis of the mid-thoracic spine, due to the ossification of the anterior longitudinal ligament and paraspinal tissues. This produces a dripping candle wax appearance along the right side of the bodies of the vertebral column (Roberts and Manchester 1995, 120). This ankylosis extends superiorly and inferiorly along the vertebral column, leading to the gradual and complete fusion of the spine. Most common extraspinal sites to be affected are the sternal rib ends (where the costal cartilage ossifies) and enthesophytes at ligament and tendon attachment sites at many sites on the skeleton. The underlying cause of DISH is not clearly understood, but appears to be associated with obesity and diabetes mellitus. The disorder manifests clinically as pain, aching and stiffness in the affected joints (ibid).

Table 5.32 Prevalence of DISH in the named assemblage (n = 219)

	Male	**Female**	**Total**
Adults	1.69% (2/118)	2.97% (3/101)	2.28% (5/219)

Five cases of DISH were identified in the named assemblage from St Luke's church (2.28%). Of these, two were ageing males (skeletons 616 and 951), one a mature possible female (skeleton 778) and two were ageing females (skeletons 254 and 920). The ages of these individuals is consistent with the modern average age of onset of the disease, which is from 50 years onwards. These individuals exhibited the classic dripping candlewax osteophytes and ankylosis of the thoracic vertebrae, and marked enthesophyte formation at ligament and tendon insertion sites on diverse bones of the postcranial skeleton (Plate 5.3).

Table 5.32 shows the prevalence of DISH in six post-medieval burial assemblages. It is interesting to note that the rate of DISH amongst the unnamed population from St Luke's is significantly lower than that in the named assemblage. DISH in the former population more closely approximates to the prevalence found in the Newcastle Infirmary and St Bride's Lower Churchyard assemblages (both predominantly working class populations), and is considerably lower than Christ

Table 5.33 The prevalence of DISH in five English post-medieval assemblages (figures taken from Roberts and Cox 2003, 311); WC = working class, MC = middle class

Site name	Total No	Affected	CPR%	Class
St Luke's, Islington (named)	219	5	2.28	Mostly MC
St Luke's, Islington (unnamed)	655	8	1.22	Mostly WC
St Bride's lower churchyard	533	10	1.88	WC
Newcastle Infirmary	189	2	1.06	WC
Christ Church, Spitalfields	968	56	5.79	Mostly MC
Kingston-upon-Thames	360	3	0.83	MC
Total	**2924**	**84**	**2.87**	

Church, Spitalfields, where DISH was found in numbers far exceeding other sites of the period. These different rates may well reflect the differences between the diet and lifestyle of the urban working and middle classes of the period.

Historical accounts suggest that the diet of the middle classes during the 18th and 19th centuries was high in animal proteins and fats. Meat and alcohol were consumed in large quantities (Roberts and Cox 2003, 313). A wide variety of fruits and vegetables was also available, albeit seasonally. Sugar was consumed in large quantities by 19th century. The descriptions of the food served at dinner parties, and written descriptions of the daily menus suggest that overindulgence was commonplace (Cox 1996, 50-57). The diet of the working classes was very different from the upper and middle class diets. Malnutrition, particularly amongst children and women was commonplace, the majority of the common diet consisting of potatoes and bread, with little protein, fresh fruit or vegetables. Poor harvests and the subsequent rise in the price of grain occurred sporadically throughout this period, leaving the urban poor vulnerable to extreme privation, if not starvation in bad years. Thus, it is not surprising that the prevalence of DISH (a disease linked to corpulence

and over-indulgence) was more common amongst the more privileged classes than amongst the poor of Georgian and Victorian England.

Rheumatoid arthritis

Rheumatoid arthritis is a disease of the synovial membrane of the joints that become infiltrated with inflammatory cells, causing it to become thickened and vascular (Rogers and Waldron 1995, 56). Chronic inflammation of the synovium causes outgrowths of the membrane, which gradually grow over the cartilage of the joint surface, progressively destroying it. Eburnation of the joint surfaces follows the cartilaginous erosion. As the disease progresses the joints become deformed, swollen and may dislocate. End stage rheumatoid arthritis is extremely painful and disabling, with crippling deformities most commonly of the hands and feet, but sometimes also involving the wrist, knee, cervical spine, shoulder, subtalar joint, elbow and hip (ibid).

The aetiology of the disease is poorly understood but it does demonstrate many features of an autoimmune nature (ibid; Auferheide and Rodriguez-Martin 1998, 99). It affects approximately 1% of the total modern population, with women being affected three times more often than men. It is uncertain whether this prevalence has changed over time. A famous sufferer contemporary with the St Luke's burial assemblage is thought to have been the poet Samuel Taylor Coleridge, whose attempts to deaden the severe pain of his disease with laudanum led to his famous addiction to opium and the penning of such masterpieces as 'Kubla Khan'.

An ageing female (skeleton 860) of the named assemblage of St Luke's church showed the erosive lesion characteristic of the disease on the proximal interphalangeal joint of digit three of the left and right hands. A second possible sufferer of the disease was an ageing male (skeleton 616). His left and right hands showed bilateral joint disease involving eburnation and lytic lesions on the joint surfaces of three proximal phalanges on each hand. It was not possible to confidently differentially diagnose these lesions from osteoarthritis.

Degenerative joint disease

Degenerative joint disease (DJD) is by far the most common joint disease found in skeletal populations, and the named assemblage of St Luke's church was no exception. DJD occurs where there is damage to a joint through overuse (repetitive activity-related trauma) or through general wear and tear of the joint through life. These bone changes are often progressive and hence, correlate closely to the age-at-

death of the individual, and on a palaeodemographic level, prevalence of DJD relates to the age-distribution of the population under study.

Degenerative changes manifest skeletally as the deposition and/or resorption of bone of the joint surface. Deposition of new bone (or osteophytosis) on or around the joint surface occurs as a compensatory attempt by the body to spread the load by increasing the joint surface area. Where osteophytosis becomes severe, the new bone may cause the joints to fuse together or ankylose. This is most commonly found in the vertebral bodies. When the cartilage overlying the bone at joints is destroyed, the bone may become very dense or sclerotic. Friction between the two bones may cause polishing or eburnation. Bone resorption often occurs concurrently with bone deposition. Macroscopically, this manifests as porosity of the joint surface. Infiltration of these pores by synovial fluid may cause subchondral cysts to develop, readily visible by radiography, but less obvious to the naked eye (Roberts and Manchester 1995, 112-114).

DJD is an umbrella term describing a number of degenerative joint diseases (including osteoarthritis, rheumatoid arthritis, and psoriatic arthritis) that do not manifest specifically enough to allow for a differential diagnosis. The vertebrae are the most common location for DJD, and this pathology has been listed separately as spinal degenerative joint disease or SDJD in Table 5.43 below. In addition to the osteophytosis, porosity and eburnation described above, Schmorl's nodes are another skeletal indicator of degenerative changes of the spine. Schmorl's nodes are depressed areas on the anterior and superior aspects of the vertebral bodies where the intervertebral disc contents have herniated and have exerted pressure on the vertebral body. In modern humans, Schmorl's nodes are very common in individuals aged 45 years and more, and are generally held to have few clinical effects (Aufderheide and Rodriguez-Martin 1998, 96), although recent work does suggest that back pain frequently does accompany modern sufferers.

Seventy-eight skeletons in the named assemblage were afflicted with non-spinal degenerative joint disease (32.37%). SDJD was found in 124 adults (51.45 % of the total population, or 56.62% of the adult population). Schmorl's nodes were found on the vertebral bodies of 68 individuals (28.22%). Overwhelmingly these changes were located in the middle to lower thoracic region, and to a much lesser extent in the upper lumbar region. The high prevalence of these degenerative changes

is closely related to the age distribution of the named assemblage, in which the older age categories predominated.

Osteoarthritis

Osteoarthritis is the most common degenerative joint disease in both humans and animals, affecting 90% of modern people over aged 40 years (Denko 2003, 234-236). In its mildest form, osteoarthririts is not symptomatic, but approximately 30% of those showing clinical evidence of the disease do experience joint stiffness and chronic pain (Denko 2003, 235). These symptoms may become severely debilitating, greatly affecting the sufferer's quality of life, activities and earning potential.

In accordance with the recommendations of Rogers and Waldron (1995), osteoarthritis was diagnosed on joints of the named assemblage where eburnation was present, and/or where at least two other features of osteoarthririts were present (namely porosity, osteophytosis or Schmorl's nodes). Osteoarthritis affected 66 skeletons in the named assemblage (27.29%). This high prevalence of degenerative joint disease and osteoarthritis is probably due to the older nature of the St Luke's named population. It is doubtful given the probable middle class composition of the assemblage that occupational stress from manual labour played a large role in the development of the disease. The location of osteoarthritis on the skeletons correlates with the general distribution of osteoarthritis seen in many past and present populations, where the major weight-bearing joints experience the greatest physical stress (Rogers and Waldron 1995, 6). The joints most affected were the spine, hips, knees and toe joints of the feet (particularly the big toe). Osteoarthritis was also identified on the wrist joints and finger joints of 11 of the named population.

Infection

Non- specific infection

In the vast majority of archaeological skeletons, the specific bacteria responsible for bone infection cannot be identified, and is referred to as 'non-specific' infection. Bone tissue's response to infection involves both resorption and proliferation. Inflammation of the periostium, or periostitis, manifests osteologically as new bone formation on the surface of the bone. Penetration of infection deeper into the compact bone stimulates further osteoclastic activity, leading to noticeable thickening and sometimes, distortion of the bone. This is known as osteitis. Where the infection penetrates into the marrow cavity, resorption causes pitting and thinning of the

cortical bone and an enlarged marrow cavity. The pressure of accumulated pus of this abscess may cause this debris to burst through the thinned cortical bone, creating a smooth-sided sinus or cloaca (Roberts and Manchester 1995, 126). The pus is then discharged into the overlying soft tissue, spreading the infection further afield.

Table 5.34 Prevalence of periostitis in the named assemblage (n =241)

	Male	**Female**	**Total**
Adults	18.64%	14.85%	16.89%
	(22/118)	(15/101)	(37/219)
Subadults	-	8.3%	4.54%
		(1/12)	(1/22)

In the named assemblage of St Luke's church, 37 individuals showed evidence for periostitis. Rib lesions were noted on 12 skeletons and are discussed below. By far the most common location of the rest of these infective lesions was the tibial shafts, found in 20 individuals. This is perhaps not surprising, when one considers the lack of soft tissue overlying this bone, particularly on the anterior aspect, and the greater exposure of the lower leg to traumatic insults. In addition, severe peripheral vascular disease (common in the elderly, those with atherosclerosis and diabetes mellitus) often result in arterial and venous ulcers of the feet and lower legs that are notoriously slow to heal, and vulnerable to secondary infection. Spread of infection did occur in many cases, most commonly to the fibula, but also to the femur and calcaneus. In most cases, the lesions were either fully or largely healed, showing lamellar and smooth bony plaques. Other commonly affected bones were the fibulae and the femora.

Four individuals showed evidence of osteitis. Lesions were located on the femoral shaft in two skeletons (831 and 1069), on the tibial shaft in one individual (skeleton 916) and on the proximal ulna shaft of skeleton 1078. Thickening of the bone shafts due to reactive bone proliferation was present in these bones.

Table 5.35: Prevalence of osteitis in the named assemblage (n =241)

	Male	**Female**	**Total**
Adults	1.69%	2.97%	2.28%
	(2/118)	(3/101)	(5/219)
Subadults	-	-	0/22

Osteomyelitis is the most severe form of bone infection, penetrating to the marrow cavity. The capacity of the body's immune system to mount a defence against this infection is severely hampered by the relatively small blood supply to bone tissue. Even today, in an era of sophisticated medical care and antiobiotic treatment, osteomyelitis remains one of the most difficult infections to treat. In the named assemblage of St Luke's church, three skeletons (812, 1071 and 1086) showed evidence of this disorder. Osteomyelitis is frequently a complication of compound fractures, where the broken bone penetrates the skin allowing the invasion of bacteria into the marrow cavity. However, this was not the case with any named skeletons from St Luke's church. The isolated nature of the lesions precludes a systemic infection. Hence, it is most probable that the osteomyelitis formed from more superficial periostitis that progressively invaded the bone.

Table 5.36 Prevalence of osteomyelitis in the named assemblage (n =219)

	Male	**Female**	**Total**
Adults	1.69%	0.99%	1.37%
	(2/118)	(1/101)	(3/219)
Subadults			0/22

Otitis media

The bones of the middle ear of skeleton 1218 showed evidence for chronic otitis media or middle ear infection. The malleus, incas and stapes of this young infant showed bony proliferation with spicules projecting from their surfaces. The lesions were still active at the time of death. These bony changes indicate prolonged infection, which would have caused considerable pain. Perforation of the tympanum or eardrum occurs in many untreated modern cases of otitis media, and hence, it is

Table 5.37 Prevalence of otitis media in the named assemblage (n =34)

	Male	**Female**	**Total**
Adults	0	0	0
Subadults	0	8.33%	4.54%
		(1/12)	(1/22)

likely that this individual also suffered hearing impairment. Although the cause of death of this infant could not be known for certain, it is very possible that this severe and prolonged ear infection may have spread internally, causing potentially fatal meningitis or encephalitis.

Chronic sinusitis

Chronic sinusitis was noted on four skeletons (522, 628, 916 and 977) of the named assemblage (1.66%). Due to the post-mortem fracturing of the maxillae, the maxillary sinuses of these individuals were exposed. It is highly probable that the true prevalence of the disorder was very much higher but could not be observed in skulls where the facial bones remained intact. The surfaces of the sinuses appeared roughened, rugose and porous due to overlying plaques of new bone. Chronic inflammation and/or infection of the maxillary sinuses frequently secondary to poor ventilation, allergy and the chronic exposure to polluted sooty air (Roberts and Manchester 1995, 131-132). This disease was particularly common in the smoggy cities of post-medieval Europe, and the prevalence increased in line with air pollution

Table 5.38 Prevalence of maxillary sinusitis in the named assemblage (n =241)

	Male	**Female**	**Total**
Adults	2.54%	0.99%	1.83%
	(3/118)	(1/101)	(4/219)
Subadults	0	0	0 % (0/32)

associated with industrialisation. Long-term exposure to air-borne pollutants was compounded by many industrial processes, leaving industrial and manufacturing workers (eg. miners, foundry and cloth workers) at severe risk of diseases of the ears, nose, throat and chest.

Chronic respiratory disease

Respiratory disease was commonplace in the medieval period and became even more of a cause for ill health following rapid urbanisation in the later post-medieval period. From the 18th century, industrialisation led to a vast influx of rural poor into the cities. Living conditions amongst the slums of the urban working classes were poor with overcrowding within poorly heated and poorly ventilated houses, malnutrition and poor general hygiene being the norm. Long hours worked in factories with air-

borne dust and chemicals also had a deleterious effect on respiratory health. One respiratory disease that thrived in these conditions was pulmonary tuberculosis, which became markedly more prevalent from the 17th century onwards, and by the 19th century reached epidemic proportions. Tuberculosis will be discussed more fully below.

The vast majority of respiratory disease leaves no trace on the bones. However, where a lesion (such as a bulla or abscess) approximates the ribs, resorption or new bone proliferation on the visceral surface of the rib may occur (Roberts et al 1998, 56). Traditionally, such lesions were associated with tuberculosis (TB) but Roberts et al (1998, 55-60) concluded that no differential diagnosis was possible without the presence of tuberculoid lesions in other parts of the skeleton. Acute lobar pneumonia, brochiectasis (eg in chronic obstructive pulmonary disease, such as asthma, chronic bronchitis and emphasaema), and less likely, metastatic carcinoma, non-specific osteomyelitis and syphilis may all be possible causes.

New bone growth was noted on the ribs of eight skeletons (3.32%) of the named assemblage of St Luke's church. In all cases, the lesions had healed before death, and hence, it is improbable that the respiratory disease that had caused these lesions was responsible for the demise of these individuals.

Specific infections

Tuberculosis

Archaeological evidence of tuberculosis (TB) afflicting humans dates back at least to the Neolithic period, but in Europe it was from the 16th century that TB increased noticeably amongst urban populations, causing 20% of all recorded deaths at that time, the greatest concentration being in London (Johnston 2003, 339). This trend continued over the post-medieval period. By the early 19th century, autopsies undertaken on the most indigent dwellers of cities such as Paris and London revealed that close to 100% of all cadavers examined had developed tubercular lesions at some time in their lives, although many had died of other causes (ibid). Deaths from pulmonary tuberculosis or consumption (based on the Bills of Mortality of the 18th and 19th centuries) afflicted an estimated 400-500: 1,000,000 people, making it the most common cause of death in this period (Roberts and Cox 2003, 338).

Like most infectious diseases, TB was principally but by no means exclusively, a disease of poverty and urbanisation. Spread by droplet infection, the

overcrowded and poorly ventilated housing and workplace conditions of these groups greatly facilitated its transmission amongst the urban poor. Greater vulnerability to the disease was noted in some occupation groups, with female textile factory workers exhibiting the highest TB rates of all occupational groups (Johnston 2003, 340).

TB is caused by the bacterium Mycobacterium tuberculosis, which most commonly invades lung tissue, but also may be found in the bones, the skin (where it was known as scrofula or the King's Evil), the gastrointestinal tract and the central nervous system (where it may cause tubercular meningitis). The bacteria may lay dormant in the body tissues for many years, but may become active when the host's immunity is compromised, as occurs when an individual is diseased or malnourished.

In approximately 90% of cases, tuberculosis leaves no trace on the skeleton, and hence, osteological prevalence of the disease drastically underepresents the true pathology rates of this disease. Where bony lesions do occur, the most common locations are on the visceral surfaces of the ribs (but this may not be specific to tuberculosis), the vertebrae (in 25-50% of cases), and the hip and knee joints (Roberts and Manchester 1995, 141). New bone was present on the visceral surface of the ribs of eight skeletons of the named assemblage from St Luke's church (see above). However, in the absence of other characteristic lesions, a specific diagnosis of tuberculosis could not be made.

Two other skeletons (538 and 1142) displayed characteristic lytic and proliferative changes in the thoracic vertebrae. The former, Thomas Giles, a young adult, had characteristic smooth-walled lytic lesions in the bodies of T5-8 and L1. Frederick Welsted, another young adult male, displayed sub-circular lesions on the inferior and superior surfaces of the bodies of T11- L1, which were tentatively diagnosed as tubercular. The lesions had exposed the trabecular structure beneath. The average size of the lesions was 5-7 mm with a depth of 4-6 mm.

Congenital syphilis

Venereal syphilis was long the most serious and dreaded of the sexually transmitted diseases. The disease was first encountered in the western world in the 15th century AD, and rapidly spread across Europe (Roberts and Cox 2003, 340). By the post-medieval period, the 'great pox' or the 'French pox' (as syphilis was known in England) had become a significant health problem. Prevention of contagion using early forms of condoms, and treatments using mercury and guaiacum were largely

unsuccessful (ibid). It was really only with the invention of penicillin in the 1930s that any serious inroad was made into control of this disease. Venereal syphilis is a sexually transmitted infection caused by the bacterium, Trepanima pallidum, and is the only one of the treponematoses (a group of diseases that includes yaws, pinta and endemic syphilis) that may have a fatal outcome. Syphilis is transmitted by sexual contact or may be passed from an infected mother to her foetus. The latter is known as congenital syphilis.

Venereal syphilis acquired in adulthood is a chronic infection characterised by three clinical stages separated by latent stages with no visible symptoms (Arrizabalaga 2003, 316). In primary syphilis, a small painless ulcer or chancre appears on the genitals (and less commonly elsewhere) within 2-6 weeks of infection. In most cases, after a brief latent period, there is a secondary stage characterised by widespread lesions on the skin and in the internal organs, a painless rash, fever, malaise and bone ache. These symptoms disappear after a few weeks, but in 25% of sufferers they recur during the first two years (ibid). The tertiary stage only develops in a third of untreated cases, and only following a latent phase that may vary in length from 1 to more than 20 years. It is this tertiary stage that causes such profound systemic damage that results in insanity and death. The bacterium causes progressive destruction of a number of systems of the body, including the skin, mucous membranes, bones, the heart and blood vessels and the nervous system. Nervous system involvement causes a loss of positional sense and sensation that manifests as locomotor ataxia (a stumbling, high stepping gait), and bouts of insanity, generally known as general paralysis of the insane (ibid; Roberts and Manchester 1995, 153). Fatality from tertiary syphilis occurs through cardiovascular involvement, such as ruptured aneurysm, or cardiac valve failure.

Congenital syphilis refers to syphilis transmitted to the unborn child of a mother suffering from venereal syphilis, and occurs in 80% of pregnancies where the mother is infected (Aufdeheide and Rodriguez-Martin 1998, 164). The spirochete bacteria are transmitted across the placenta to the foetus after the first 16-18 weeks in utero. Spontaneous abortion and stillbirth are commonly associated with the condition. Surviving infants frequently manifest with developmental anomalies, such as deafness, cusp malformations of the permanent dentition (Hutchinson’s incisors and mulberry molars), interstitial keratitis, impaired cognitive development,

periostitis, osteochondritis and osteomyelitis. Syphilitic infection of the scalp, historically described as ‘scald head’, was a very visual, unsightly manifestation of congenital syphilis.

Four individuals in the named assemblage from St Luke’s Church (skeletons 363, 975. 1072 and 1258) showed dental malformations characteristic of congenital syphilis. No skeletal manifestations of syphilis were noted in these skeletons. One neonate (skeleton 997) with gross dental enamel hypoplasia may have also suffered from this condition, but a differential diagnosis could not be made confidently in this case.

The London Bills of Mortality attributed between one and 30 deaths per year to ‘scald head’ in the period between 1740-1810 (Roberts and Cox 2003, 341-2). The true mortality rate of congenital syphilis was probably much higher. Nevertheless, many sufferers of congenital syphilis did survive into mature adulthood, as evidenced by the young adult William Clarke (skeleton 1258) and a prime adult male of unknown name (skeleton 975). James MacCallum (skeleton 1072) was less fortunate, dying within the first year of life. Keith Stewart (skeleton 363) survived into adolescence and may well have died of an unrelated disorder.

Other pathologies

Paget’s disease

Male skeleton 898 aged 36 from the departum plate inscription and osteologically aged between 45-55 years may have had Paget’s disease. It is a condition of unknown aetiology characterised by a profound increase in both bone resorption and new bone formation resulting in simultaneous mixtures of lytic and sclerotic processes, initiating as a localised condition but often terminating as a widespread state. The clinical, symptomatic form of the disease is certainly one of older people, most commonly aged over 60 years (Aufderheide and Rodríguez-Martin 1998, 413). There was thickening of the skull, particularly at the supra-orbital margins, thickening and porosity with new bone formation of the sternum and the manubrium, bodies of all the vertebrae. The clavicles, shafts of the humeri, ulnae, radii, femora, tibiae and fibulae are all markedly thickened and porous with areas of plaque formation and spicules. The porosity is caused by hypervascularization while the thickening, caused by abnormal osteoblastic activity is most prominent in the femora and tibiae to the extent where the cortices appear sclerotic. All the bones are heavier than normal. The

involvement of multiple bones and the thickening of the shafts due to the proliferation of new bone are consistent with Paget's disease.

Congenital anomalies

A number of congenital anomalies are present in many individuals but which would have little or no effect on their physical wellbeing. They occur as the result of minor genetic mutations and as such may be inherited. Many are thought to indicate familial relationships between members within an assemblage. Sacralization (fusion of the last lumbar vertebra to the first sacral segment) was present in four individuals (1.83 %). Another midline defect, Spina bifida occulta, was recorded in three adults (skeletons 117, 121 and 364) of the named assemblage (1.37%). This condition involves non-fusion of some or all of the neural arches of sacral segments dorsally. As a result, the lower portion of the spinal canal is not fully enclosed by bony tissue. Unlike spina bifida proper, there is no clinical sequele to this condition, and at most the abnormality may be marked superficially by a small tuft of hair on the lower back.

Medical interventions

Post-mortem dissection

In the Georgian and Victorian periods, post-mortem dissection was an uncommon procedure, and usually one over which the deceased and their relatives exercised little control. In the 18th century there was a growing need in medical institutions to be provided with cadavers on which students might learn anatomy and practice dissection. In 1752, the Company of Surgeons was granted the corpses of all executed felons. However, demand far outstripped supply, and many additional cadavers were supplied to anatomy halls by 'resurrectionists', who raided graveyards, exhuming corpses and selling them on for a handsome profit (Porter 1997, 318). Public outrage at this practice reached a height in 1829 with the notorious case of Burke and Hare. The outcome of this outrage was the passing of the Anatomy Act (1832), in which the medical profession could take for dissection all 'unclaimed bodies' of those dying without family, or those dying in the workhouse or hospitals. As a result of the act, there was a reduction in body-snatching, but the act also served to deepen the fear and disgrace of dying 'on the parish'.

The antithesis to the notion of being dissected was based around religious and social perceptions. The Christian belief in the resurrection of the whole body on Judgement Day led to fears that dissection would damage the spiritual state of the

dissected person. A deep-seated solicitude for the corpse causes reactions of revulsion at the indignity that the body suffered during exhumation and dissection. Particularly with regards to female corpses, the physical exposure of the naked body to the gaze of young men was perceived as harrowing, a process tantamount to sexual assault (Rugg 1999, 225).

Table 5.40 The prevalence of craniotomies in the named assemblage (n =241)

	Male	**Female**	**Total**
Adults	**2.54%** (3/118)	0	**1.36%** (3/219)
Subadults	0	**8.33%** (1/12)	**4.54%** (1/22)

In view of these almost universal sentiments regarding dissection at this time, it is puzzling that these four skeletons at St Luke's church had undergone autopsy. All four skeletons had been buried within the crypt in lead-lined coffins, and hence, they were highly unlikely to have been executed felons. Nor would they have died on the parish in a friendless, impecunious state. It is possible that the adults and the parents of skeleton 360 (the 5 year old Emma Gardiner) had consented to the procedure, possibly because they held unusually progressive views on medicine and the academic necessity for dissection. A less probable alternative explanation is that these craniotomies were performed on the sly without the consent of the deceased or their relatives. Such craniotomies are fairly easy to hide from the incurious if the dissection of the skin is concealed beneath the hair. It is possible that their families may have interred them remaining none the wiser of these interventions.

Table 5.41 Burial location of the skeletons that had undergone autopsy (n = 4)

Skeleton number	**Burial location**	**Date of death**	**Name**	**Age at death**
360	Crypt	1825	Emma Gardiner	5 years, 11 months
469	Crypt	1842	Thomas Tribe	53 years
923	Crypt	1823	Thomas Roberts	20 years
986	Crypt	1850	George Walford	51 years

Medical curiosity may have prompted the dissection of Thomas Tribe (skeleton 469). He had suffered a facially disfiguring cancer (possibly an osteolytic metastatic carcinoma), which had left a large lytic lesion in his left eye orbit, and had caused considerable bony destruction of the orbit and nasal cavity (Plate 5.2). George Walford (skeleton 986) had active rib lesions at death, suggesting chronic respiratory infection (possibly TB). His corpse had undergone a craniotomy and also a sternotomy (an inverted y-shaped incision through the sternum). Sternotomies are performed when the soft tissue of the thorax (lungs and heart) is to be investigated. It is possible that the medical practicioners who undertook this autopsy were particularly interested in the nature of George Walford's respiratory disease.

Table 5.42 Summary of autopsy prevalence six post-medieval burial populations in England

Site	Precentage of population
St.Luke's, Islington (named)	**1.66%** (4/241)
St.Luke's, Islington (unnamed)	**0.31%** (2/655)
St Bartholomew's, Penn	**0.81%** (3/372)
Cross Bones, Southwark, London	**0.67%** (1/148)
Newcastle Infirmary, Newcastle	**1.59%** (3/189)
St Bride's lower churchyard, Fleet Street, London	**3.38%** (18/533)

Conclusion

The burial location within the church crypt, extramural vaults and brick-lined shaft graves of the majority of the named skeletons of St Luke's church strongly suggests that this population was composed principally of the middle classes resident in Islington. Where osteological comparisons could be made between the named and unnamed burial assemblages, differences did exist between the populations. However, these were not as extreme as postulated. For example, there was no difference in either male or female stature between these groups (usually a fairly sensitive indicator

of stress in the growing years). However, the general age distribution within the adult populations did differ, with a far smaller proportion of the unnamed reaching old age (16.56% compared to 61.83% in the named group's 50+ age bracket). Although a higher proportion of named individuals did die in young adulthood (9.12% versus 5.52% of the unnamed group), it was apparent that far more unnamed individuals died in the prime to mature age brackets, indicating overall a shorter general lifespan within this population. However, the unnamed assemblage of St Luke's church do not appear as deprived as the destitute working classes of other parts of London, such as those interred in the Cross Bones burial ground, Southwark.

Islington of the late Georgian/early Victorian period was a gracious suburb, described by Goldsmith (in Porter 2000, 148) as 'pretty neat town, mostly built of brick, with a church and bells', celebrated for its well or spa of health- giving waters, its fine air and its high location with a magnificent panarama of the city. It was a far cry from the tangle of warehouses and slums of Southwark, and had more in common with the new modern urban developments of the West End, such as Bloomsbury. The working classes of Islington appeared to have benefited from the cleaner air and removed location from the factories and slums of the East End. Although certainly not living off the fat of the land, overall the working classes in Islington do appeared to have enjoyed a better quality of life than experienced elsewhere in the metropolis.

The named assemblage of St Luke's church have much more in common with the crypt burials of Christ Church, Spitalfields, St George's church, Bloomsbury, and St Nicholas' church, Sevenoaks. They appear to reflect the middle classes of this genteel suburb, who did experienced some deleterious effects on health that accompany affluence and excess, but which more importantly shielded them from the most damaging effects of living in the mushrooming, overcrowded, polluted, industrial metropolis that was London of the eighteenth and nineteenth centuries.

Table 5.43 Summary of the skeletal pathology noted in the named assemblage (n = 241)

Coffin Number	Osteological Age	Osteological Sex	Forename	Surname	Pathology	Comments
Congenital disorders						
970	young adult	female	Matilda	Gibson	congenital dislocation of the hip	Bilateral. Resulted in ankylosis of right hip joint. Left still mobile
congenital dislocation of the hip	**1**					
888	mature adult	male	Charles		club foot	Right foot: all tarsals fused, malaligment superior-inferior row rather than mediolateral, causing anterior part of foot to be inverted.
Club foot	**1**					
619	aging adult	male	Charles	Cole	developmental defect	Bipartite maxillary sinous cavity, right side
1078	prime adult	male	Thomas	Roberts	developmental defect	Left and right 1st metatarsal, proximal joint surface. Left and right proximal phalanx for the metatarsals.
1131	aging adult	female	Ester	Taylor	developmental defect	Open neural canal on C1
777	prime adult	male	John	Russell	developmental defect	T2, underdeveloped transverse process. Abnormal inferior articular facet, split and 2 articular surfaces.
developmental defect	**4**					
355	mature adult	male	Charles	Cuerton	os acromiale	Left scapula
1203	ageing adult	male	William	Farmer	os acromiale	Left and right scapulae
os acromiale	**2**					
723	adult	female	Elizth (Elizabeth)	Treson	scoliosis	Likely to have been congenital in origin; T3-9 affected
860	ageing adult	female	Mary	Lockin	scoliosis	Spinal scoliosis, spine deviates to the right in L2 region. Second curvature occurs in T12 to the left. T3-4, L1-2, L3-4 are ankylosed. Ribs have been modified on the right side due to compression on the ribs. The aetiology is unknown.
scoliosis	**2**					
Trauma						
114	prime adult	male	John	Bailey	compression fracture	T11, Degenerative.

343	mature adult	male	Charles	Stokes	compression fracture	L4. Differential diagnosis. New bone formation on the ribs + collaps of L4 (tuberculosis?)
compression fracture	**2**					
117	aging adult	male	Samuel	Roberts	depressed fracture	Circular lesion to cranum
538	young adult	male	Thos (Thomas)	Giles	depressed fracture	Frontal bone
920	aging adult	female	Sarah	Fuller	depressed fracture	Left parietal, healed.
967	mature adult	male	John	Farmer	depressed fracture	Frontal bone
depressed fracture	**4**					
281	aging adult	male	Noah	Nicholls	fracture	Left rib
355	mature adult	male	Charles	Cuerton	fracture	Nasal fracture. exostoses also present on the alveolar margin of left maxilla. Related trauma?
364	prime adult	female	Sarah	Hathorn	fracture	Right 3rd metacarpal
393	aging adult	male	John	Sheppard	fracture	Right 10th and 11th and left 10th rib
469	aging adult	male	Thomas	Tribe	fracture	Right 2nd metacarpal
479	aging adult	female	Mary	Hooker	fracture	Collies fracture, right radius
513	aging adult	male	Thos (Thomas)	Dennis	fracture	Rib and right fibula (upper 1/3 midshaft) both healed
538	young adult	male	Thos (Thomas)	Giles	fracture	?? Right ulna, inferior to the coronoid process, posterior side. OR periostitis, lesion active.
614	mature adult	female	Elizabeth	Egner	fracture	2 ribs, unsided
616	aging adult	male	George	Girsewood	fracture	1 unsided rib
697	aging adult	female	Elizth (Elizabeth)	Sewell	fracture	1 right rib, middle of rib cage.
707	mature adult	male	Andrew	Egner	fracture	Right foot, distal phalanx
788	mature adult	male	George	Wright	fracture	Left clavicle, longstanding and healed
845	aging adult	male	John	Wright	fracture	2 right ribs, transverse and oblique fractures
856	aging adult	female	Margaret	Lovell	fracture	2 right ribs
908	mature adult	female?	Ann	Lucas	fracture	Proximal phalanx of the feet.
910	aging adult	male	William	Rone	fracture	Left rib situated towards the middle of the rib cage. Healed.
936	aging adult	male	James	Allan	fracture	Distal end of shaft of left humerus.
961	mature adult	male	Edward	Keat	fracture	1 left rib, healed and longstanding.
967	mature adult	male	John	Farmer	fracture	Left rib number 11

1009	aging adult	female?	Mary	Clark	fracture	1 right rib, mid chest region. Healed
1145	mature adult	female?	Mary	Lan	fracture	Left tibia, articular surface
1147	prime adult	male	Michael	Lan	fracture	1 left rib
1203	aging adult	male	William	Farmer	fracture	2 right ribs, partly healed
fracture	**24**					
162	adult	female?	Thomas	Brown	oblique fracture	Left fibula, distal end of shaft
522	aging adult	male	Laurance	Sidney	oblique fracture	Distal end of the shaft of left tibia. Caused by trauma from behind.
845	aging adult	male	John	Wright	oblique fracture	Proximal fibula
859	young adult	male	James	Lumley	oblique fracture	Distal third of left humeral shaft.
1065	prime adult	male	William	Bukridge	oblique fracture	Proximal end of right femoral shaft.
1145	mature adult	female?	Mary	Lan	oblique fracture	Left distal fibula
1177	aging adult	female	Celia	Boyle	oblique fracture	Distal left radius, Collies fracture. Healed
1208	aging adult	male	Sarah	Willcox	oblique fracture	Left tibia, distal shaft. Left fibula, proximal shaft. Healed.
oblique fracture	**8**					
468	prime adult	female	Susannah	Joselyn	soft tissue trauma	Enthesopathy at proximal right fibula. Insertion point for *biceps femoris*. Muscle tear at the ligament insertion point.
619	aging adult	male	Charles	Cole	soft tissue trauma	Right distal femur, insertion of *adductor magnus*, large enthesophyte.
705	aging adult	male	Thomas	Willet	soft tissue trauma	Left femur, linea aspera. Entheopathy present at the insertion point for *Adductor brevis* or *magnus*. Healed.
845	aging adult	male	John	Wright	soft tissue trauma	Enthesophyte formation associated with the fracture at insertion point for *Vastus intermedius*
862	adult	female?	Elizth (Elizabeth)	Baillie	soft tissue trauma	Enthesophyte present left distal humerus shaft. Attachment for the brachio-radius muscle.
1078	prime adult	male	Thomas	Roberts	soft tissue trauma	Enthesopathy on left fibula, proximal end.
soft tissue trauma	**6**					
1170	prime adult	female	Mary	Porter	transverse fracture	2 proximal phalanges of foot. Healed.
transverse fracture	**1**					
701	aging adult	male	Thos (Thomas)	Moor	osteochondritis dissecans	Left femur, lateral condyle
1078	prime adult	male	Thomas	Roberts	osteochondritis dissecans	Right humerus, distal end

1223	prime adult	male	Rouland	Wilkes	osteochondritis dissecans	Right and left distal articular surfaces of the tibiae.
osteochondritis dissecans	**3**					
890	aging adult	male	Samuel Austin	Fuller	subluxation	Inferior dislocation of left humerus. Longstanding, new socket has been formed.
subluxation	**1**					
Neoplasm						
122	aging adult	female	Ann	Webb	button osteoma	Left side on frontal bone
772	mature adult	male	John	Amburger	button osteoma	Left frontal
777	prime adult	male	John	Russell	button osteoma	Right parietal
846	aging adult	female	Elizabeth	Lorimer	button osteoma	Right side, occipital bone
1145	mature adult	female?	Mary	Lan	button osteoma	Right parietal and frontal bone (x 2)
button osteoma	**5**					
469	aging adult	male	Thomas	Tribe	malign neoplasms	Possibly osteolytic metastatic carcinoma. Large lytic lesion present in left orbit. Considerable destruction of the orbit and nasal cavity
973	mature adult	female	Mary	Robinson	malign neoplasms	Multiple myeloma or osteolytic metastatic carcinoma. The latter being more probable.
malign neoplasms	**2**					
Metabolic disorders						
967	mature adult	male	John	Farmer	acromegaly	
acromegaly	**1**					
360	infant 2	subadult	Emma	Gardner	cribia orbitalia	Grade 3, right and left orbits
361	aging adult	male	Thomas	Sowter	cribia orbitalia	Grade 1, healed
363	juvenile	unknown	Keith	Stewart	cribia orbitalia	Grade 1, bilateral
467	young adult	male	John	Pugh	cribia orbitalia	Bilateral
468	prime adult	female	Susannah	Joselyn	cribia orbitalia	Grade 3, active lesions
537	mature adult	female	Susannah	Smith	cribia orbitalia	Bilateral, Grade 3, active
538	young adult	male	Thos (Thomas)	Giles	cribia orbitalia	Grade 3, bilateral, active
540	infant 1	subadult	Elizabeth	Giles	cribia orbitalia	Bilateral, grade 2
602	infant 2	subadult	Louisa	Goxall	cribia orbitalia	Grade 3, active
609	mature adult	female	Susanna	Rogers	cribia orbitalia	Grade 1, bilateral
618	aging adult	female	Ann	Seward	cribia orbitalia	Grade 3, active lesions

724	mature adult	female	Ann	Hooker	cribia orbitalia	Grade 3, healed.
782	mature adult	female	Catherine	Bailey	cribia orbitalia	Grade 2, healed.
922	prime adult	female	Sarah	Palmer	cribia orbitalia	Bilateral, Grade1
966	aging adult	male	Andrew	MacKenzie	cribia orbitalia	Left orbit, grade 2. Lesion healed
967	mature adult	male	John	Farmer	cribia orbitalia	Bilateral. Grade 2, active.
970	young adult	female	Matilda	Gibson	cribia orbitalia	Grade 1, healed.
973	mature adult	female	Mary	Robinson	cribia orbitalia	Grade 1, healed
977	prime adult	male	George	Nightingale	cribia orbitalia	Bilateral, Grade 2, active.
985	aging adult	female	Ann	Bateman	cribia orbitalia	Grade 1, healed
986	aging adult	male	George	Walford	cribia orbitalia	Left grade 4, right grade1, both active
1086	mature adult	male	Thomas	Fisher	cribia orbitalia	Bilateral, active
1142	young adult	male	Charles Frederick	Wellsted	cribia orbitalia	Grade 3, active, bilateral
Cribra orbitalia	**23**					
538	young adult	male	Thos (Thomas)	Giles	porotic hyperostosis	Parietals, active
628	mature adult	male	Thomas	Moore	porotic hyperostosis	Parietals and occipital, healed.
708	aging adult	male	John	Horton	porotic hyperostosis	Parietals and frontal bone, healed
709	young adult	male	John	Horlor	porotic hyperostosis	Parietals
905	prime adult	male	Fred	Gibson	porotic hyperostosis	Parietala, healed.
973	mature adult	female	Mary	Robinson	porotic hyperostosis	Parietals and frontal, healed
977	prime adult	male	George	Nightingale	porotic hyperostosis	Parietals, active
991	neonate	subadult	James	Lumley	porotic hyperostosis	
1142	young adult	male	Charles Fredk (Fredrick)	Wellsted	porotic hyperostosis	Parietals, healed
1223	prime adult	male	Rouland	Wilkes	porotic hyperostosis	Parietals and frontal bones, healed.
porotic hyperostosis	**10**					
1157	aging adult	male	Peter	Clarke	osteoporosis	Very light bones. T12 and L5, collapse of the vertebral bodies, no healing evident. Trabecular structure very much reduced.
osteoporosis	**1**					
475	mature adult	female	Elizabeth	Ainge	rickets	Anterior bowing of the femora, healed.

538	young adult	male	Thos (Thomas)	Giles	rickets	Lateral bowing of the tibiae. Healed
539	aging adult	male	James	Jones	rickets	Anterior bowing of both femora
704	aging adult	female	Elizabeth	Willet	rickets	Anteror bowing of the femora, healed.
778	mature adult	female?	Elizth (Elizabeth)	Seward	rickets	Anterior bowing of both femoral shafts, healed.
779	aging adult	male?	Joseph	Seward	rickets	Anterior bowing of femora, lateral bowing of tibiae, healed.
862	adult	female?	Elizth (Elizabeth)	Baillie	rickets	Bowing of the femora and tibiae, healed.
922	prime adult	female	Sarah	Palmer	rickets	Lateral bowing of the tibiae and fibulae. Healed.
927	neonate	subadult	Isabella	Fuller	rickets	Active
935	prime adult	female	Elizth (Elizabeth)	Richardson	rickets	Bilateral anterior bowing of the femora. Healed.
975	prime adult	male			rickets	Slight lateral bowing of tibiae and humerii.
990	aging adult	female	Elizabeth	Hewlett	rickets	Lateral bowing of the tibiae, healed.
1086	mature adult	male	Thomas	Fisher	rickets	Anterior bowing of the femoral shafts. Healed.
1203	aging adult	male	William	Farmer	rickets	Anterior bowing of right and left femoral shafts. Lateral bowing of both tibiae. Healed.
1215	infant 1	subadult	Alfred	Matthews	rickets	Anterior bowing of the femoral shafts.
1218	neonate	subadult	Sarah	Hyde Clarke	rickets	Active infantile rickets
1261	neonate	subadult	Alfred	Clarke	rickets	Infantile rickets, active.
rickets	**17**					
Joint disease						
114	prime adult	male	John	Bailey	ankylosing spondylitis	Fusion of R side of sacrum to auricular surface and osteophytic projections from L auricular surface. Fusion of L1- 2, T10 to T5 (1/2 kyphosis) and T4 and T3. Osteophytic projections at other muscle insertion points suggest DISH but spinal fusion more typically AS.
1208	aging adult	male	Sarah	Willcox	ankylosing spondylitis	
ankylosing spondylitis	**2**					
254	aging adult	female	Cath	Wood	DISH	Osteophyte formation on ligament and muscle insertion points. Spine fused, "candle wax" apperance, T2-T11.
616	aging adult	male	George	Girsewood	DISH	Enthesophytes and canlde wax apperance of osteophytes on spine. T4-5, T6-8, T9-10 fused
778	mature adult	female?	Elizth (Elizabeth)	Seward	DISH	Fusion of spinal elements C2-3, T5-10 and T11-12.
920	aging adult	female	Sarah	Fuller	DISH	Fused vertebral segments and enthesophytes.
951	aging adult	male	John	Stubbs	DISH	Post-mortem damage extensive, obscures secure diagnosis

DISH	**5**					
616	aging adult	male	George	Girsewood	rheumatoid arthritis	6 proximal phalanges of the hands with eburnation - possible lytic lesions. Possibly just osteoarthritis
860	aging adult	female	Mary	Lockin	rheumatoid arthritis	Proximal interphalangeal joint, digit 3, right hand and left hand. Erosive lesions present.
rheumatoid arthritis	**2**					
364	prime adult	female	Sarah	Hathorn	ankylosis	C4 and 5 ankylosed. Anterior displacement of C4, possibly trauma
537	mature adult	female	Susannah	Smith	ankylosis	Left femoral head, partial superior dislocation resulting in ankylosis
619	aging adult	male	Charles	Cole	ankylosis	Right sacroilliac joint. Degenerative
629	aging adult	male	Thos (Thomas)	Coventry	ankylosis	Left sacro-illiac joint (possibly degenerative)
775	adult	male?	William	Feast	ankylosis	Sacro-illiac joint. (possibly degenerative)
921	adult	unknown	Thomas	Young	ankylosis	Sacro-illiac joint, possibly degenerative
1062	aging adult	male	Richard	Sumption	ankylosis	Distal interproximal joint of a hand digit
1176	adult	male?	Thomas	Boyle	ankylosis	Post-traumatic fusion of a proximal and intermediate phalanx of the foot.
ankylosis	**8**					
113	aging adult	female	Mary	Bailey	degenerative joint disease	Right distal femur and patella, Right and left acromial facets
162	adult	female?	Thomas	Brown	degenerative joint disease	Left fibula, distal joint surface. Left tibia, distal joint surface
194	adult	male	James	Eltham	degenerative joint disease	Left and right distal femora. Left and right 1st metatarsals
262	aging adult	female	Sarah	Hathorn	degenerative joint disease	Acromial ends of the clavicles
303	aging adult	female	Re__cca (prob. Rebecca)	Sowter	degenerative joint disease	Left 1st metacarpal, proximal joint surface
343	mature adult	male	Charles	Stokes	degenerative joint disease	Left and right distal femora and patellae. Right acetabulum
361	aging adult	male	Thomas	Sowter	degenerative joint disease	Right and left clavicles, both ends. Right and left femora, distal ends. Right and left tibiae, proximal ends.
362	mature adult	unknown	Ann	Brown	degenerative joint disease	Left patella
469	aging adult	male	Thomas	Tribe	degenerative joint disease	Osteophytes present at 1st metatarsals, both patella, right clavicle and scapula (glenoid fossa), right and left proximal fibulae, right and left acetabulae, right and left illiac crests
475	mature adult	female	Elizabeth	Ainge	degenerative joint disease	Right femur, osteophyte formation on the margins of the condyles
478	aging adult	female	Mary	Tilford	degenerative joint disease	Acromio-clavicular joints, bilateral. Left acetabulum
513	aging adult	male	Thos (Thomas)	Dennis	degenerative joint disease	Right calcaleus, talus, navicular and diistal 1st metatarsal. Left distal metatarsal

537	mature adult	female	Susannah	Smith	degenerative joint disease	Right femoral condyles and patellar surface
539	aging adult	male	James	Jones	degenerative joint disease	Both acetabulae, right talus and cuboid, left cuboid, 2nd and 3rd cuneiforms
542	mature adult	male?	?	Nash	degenerative joint disease	Acetabulae (L+R), Condyles of left femur, articular surface of left tibia
600	mature adult	female	Catherine	Lowe	degenerative joint disease	Proximal articular surfsce of left tibia
603	aging adult	female	Mary	Deer	degenerative joint disease	Right and left glenoid fossae, scapulae. Right and left acromio-clavicular joints, sternal end of both clavicles
616	aging adult	male	George	Girsewood	degenerative joint disease	6 proximal hand phalanges (RA?, Right and left capitates, Right lunate, right and left trapezia, left triquetral. 2 proximal foot phalanges, left and right 1st metatarsals (heads), left metacarpals 1-4. Right and left clavicles (both ends)
617	aging adult	female	Lydia	Prosser	degenerative joint disease	Right and left acromio-clavicular joints, Right and left acetabulae, Right and left distal femora.
618	aging adult	female	Ann	Seward	degenerative joint disease	Right and left distal femora, right and left proximal tibiae
619	aging adult	male	Charles	Cole	degenerative joint disease	Right prox humerus, right acetabulum and femoral head.
620	aging adult	female	Sophia	Cole	degenerative joint disease	Left glenoid fossa, manubrium. Right and left distal femora, patellae and proximal tibiae. Right and left clavicles, both ends. Right acetabulum and femoral head. Right and left hand; 1st metacarpal and proximal and distal phalanx. Right capitate
626	aging adult	female	Sophia	Louch	degenerative joint disease	Right acromio-clavicular joint. Right and left distal femora. Left 1st metatarsal, distalend.
655	mature adult	male	Ann	Davidson	degenerative joint disease	Right and left distal femora
656	aging adult	female	Mary	Williamson	degenerative joint disease	Sacro-illiac joint, right and left. Right and left femora, distal ends.
657	aging adult	male	Cuthbert	Wilkinson	degenerative joint disease	left and right acromio-clavicular joints. Left distal femur and patella
697	aging adult	female	Elizth (Elizabeth)	Sewell	degenerative joint disease	Left and right head of femora. Right and left sterno-clavicular joint. Manubrium. Left distal radius.
699	aging adult	male	Thomas	Willet	degenerative joint disease	Right and left patellae
701	aging adult	male	Thos (Thomas)	Moor	degenerative joint disease	Left and right distal femora and proximal tibiae.
704	aging adult	female	Elizabeth	Willet	degenerative joint disease	Right patella.
705	aging adult	male	Thomas	Willet	degenerative joint disease	Right hand, 3 intermediate phalanges (distal end). Left hand 1 intermediate phalanx, digit 3.

708	aging adult	male	John	Horton	degenerative joint disease	Right and left acromio-clavicular joints. Right and left humeral heads. Right and left proximal ulnae. Right and left 1st-3rd and 5th metacarpals. Proximal phalanges of digit 2, 3 and 5, both hands. Distal interphalangeal joint of digit 2 and 3. Rig
719	mature adult	female?	Elizabeth	Jones	degenerative joint disease	Left calcaneus, talus
724	mature adult	female	Ann	Hooker	degenerative joint disease	Left glenoid fossa. Right and left acetabulae. Left and right distal femora and both patellae
764	aging adult	male	John	Gardner	degenerative joint disease	Right calcaneus, talus and medial cuneiform, 1st metatarsal and proximal phalanx. Left calcaneus and talus, fusion of medial and intermediate cuneiforms. Medial end of clavicles. Both glenoid fossae. Right and left distal ends of both femora.
779	aging adult	male?	Joseph	Seward	degenerative joint disease	Left acromio-clavicular joint
788	mature adult	male	George	Wright	degenerative joint disease	Right humeral head
831	aging adult	female	Mary	Monk	degenerative joint disease	Right and left glenoid fossae, right and left patellae, left and right 1st metatarsals, distal end. Left ulna, proximal. Sacro-illiac joints. Right and left calcanei
846	aging adult	female	Elizabeth	Lorimer	degenerative joint disease	Medial end of right and left clavicles. Manubrium. Right and left acetabulae. Right and left radii, distal ends.
851	mature adult	female	Elizth (Elizabeth)	Maxwell	degenerative joint disease	Right and left patellae
855	aging adult	male	Trefusis	Lovell	degenerative joint disease	Left and right acromio-clavicular joints. Right and left distal femora and both patellae
858	aging adult	male	Thoms (Thomas)	Dallison	degenerative joint disease	Right and left acetabulae, right and left glenoid fossae. Left and right acromio-clavicular joint.
859	young adult	male	James	Lumley	degenerative joint disease	Right 1st metatarsal, distal end.
861	aging adult	male?	Alex	Bailly	degenerative joint disease	
862	adult	female?	Elizth (Elizabeth)	Baillie	degenerative joint disease	Right femoral head. Right and left distal femora. Right and left patellae. Right and left proximal tibiae.
888	mature adult	male	Charles		degenerative joint disease	Right 1st-3rd metatarsals. Left calcaneus, anterior facet.
890	aging adult	male	Samuel Austin	Fuller	degenerative joint disease	Left sterno-clavicular joint. Right glenoid fossa
895	aging adult	female	Hannah	Hickin	degenerative joint disease	Left trapezium. Left and right digit 1, metacarpo-phalangeal joints. Right scaphoid. Right and left acetabulae
925	mature adult	female	Christina	Lanton	degenerative joint disease	Both patellae
935	prime adult	female	Elizth (Elizabeth)	Richardson	degenerative joint disease	Right and left calcanei. Left and right 1st metatarsals, heads. Left and right femora, distal end.
936	aging adult	male	James	Allan	degenerative joint disease	Left glenoid fossa. Head of right radius.
946	mature adult	female	Lydia	Batty	degenerative joint disease	Right and left humeral heads. Right and left distal femora Left patella and articular surface of left tibia.

961	mature adult	male	Edward	Keat	degenerative joint disease	Left and right distal femora, both patellae and tibiae, proximal end. Right and left naviculars cuboids, calcanei and talus. All cuneiforms, both feet, proximal articular surfaces of metatarsal 1-5, both feet.
966	aging adult	male	Andrew	MacKenzie	degenerative joint disease	Left acromio-clavicular joint. Left and right acetabulae and femoral heads. Left 1st metacarpal, head. Left and right 1-3 metatarsal.
967	mature adult	male	John	Farmer	degenerative joint disease	Right and left femoral heads. Right and left distal femora.
968	aging adult	male?	Jane	Colchett	degenerative joint disease	Left acromio-clavicular joint
973	mature adult	female	Mary	Robinson	degenerative joint disease	Right and left distal femora
976	aging adult	male	George	Nightingale	degenerative joint disease	Right 1-5 metacarpals, left 1st metacarpal. 7 proximal, 4 middle and 3 distal hand phalanges. Right 1-5 and left 2-5 metatarsals. 9 proximal, 4 middle and 2 distal foot phalanges. Proximal right fibula. Right and left patellae.
980	mature adult	male	George	Lowe	degenerative joint disease	Right proximal phalanx, digit 1 of the foot
981	mature adult	male	Foy	Walford	degenerative joint disease	Left and right glenoid fossae. Right and left metatarsals, heads.
985	aging adult	female	Ann	Bateman	degenerative joint disease	Both glenoid fossae. Right acetabulum. Left and right distal femora, patellae and proximal tibiae
1008	aging adult	male	George	Scott	degenerative joint disease	Left sterno-clavicular joint.
1009	aging adult	female?	Mary	Clark	degenerative joint disease	Left and right acromio-clavicular joints. Left and right glenoid fossae. Left acetabulum. Right and left distal femora and patellae.
1068	mature adult	female	Elizabeth	Simpson	degenerative joint disease	Right auricular surface
1069	prime adult	male	Ann	Nightingale	degenerative joint disease	Right and left patellae. Right calcaneus, navicular and head of 1st metatarsal.
1071	aging adult	male?	Andrew	Duff	degenerative joint disease	Right and left glenoid fossae. Head of both humeri. Right proximal ulna. Distal left humerus, proximal left ulna.
1078	prime adult	male	Thomas	Roberts	degenerative joint disease	Right and left proximal ulnae. Left 1st metatarsal and proximal phlalanx
1128	aging adult	male	William	Moore	degenerative joint disease	Right glenoid fossa. Left and right calcaneus. Left and right head of 1st metatarsal
1141	aging adult	male	William	Patch	degenerative joint disease	S1
1144	mature adult	female?	Mary	Millward	degenerative joint disease	Left glenoid fossa
1145	mature adult	female?	Mary	Lan	degenerative joint disease	Right and left humeral heads and glenoid fossae. Right proximal and distal interphalangeal joints of digit 2-4 (hand). Left distal interphalangeal joint of digit 2 (hand). Left distal femur, patella and proximal tibia. Left talus. Left distal fibula
1147	prime adult	male	Michael	Lan	degenerative joint disease	Left glenoid fossa

1153	prime adult	male	William	Moir	degenerative joint disease	Right patella
1155	mature adult	male	John	Smith	degenerative joint disease	Right and left sterno-clavicular joints and acromio-clavicular joints. Right and left distal femora and patellae. Left glenoid fossa. Left 2nd metatarsal, proximal end. Right and left distal phalanges of digit 1, feet.
1156	mature adult	female	Elizabeth	Farmer	degenerative joint disease	Left and right acetabulae. Left and right distal humeri. Left acromio-clavicular joint. Right sterno-clavicular joint. Left and right patellae.
1157	aging adult	male	Peter	Clarke	degenerative joint disease	Left and right acromio-clavicular joints. Left 1st metacarpal, distal end. Right and left acetabulae. Left distal femur.
1170	prime adult	female	Mary	Porter	degenerative joint disease	Heads of left and right 1st metatarsals, head of right 2nd metatarsal and head of right 2nd metacarpal.
1203	aging adult	male	William	Farmer	degenerative joint disease	Left acromion. Left and right distal femora, proximal tibiae. Right and left glenoid fossae and humeral heads. Right and left proximal ulnae. Left and right acetabuluae and femoral heads
1219	aging adult	female	Martha	Burton	degenerative joint disease	Right and left sterno-clavicular joints. Right acetabulum. Left and right distal femora and patellae.
1225	mature adult	male?	Anthony	Falder	degenerative joint disease	Left glenoid fossa
degenerative joint disease	**78**					
113	aging adult	female	Mary	Bailey	osteoarthritis	Right distal femur
114	prime adult	male	John	Bailey	osteoarthritis	L5
122	aging adult	female	Ann	Webb	osteoarthritis	Right talus, right calcaneus, right cuboid
162	adult	female?	Thomas	Brown	osteoarthritis	C1 and C2. Left talus, calcaneus and 1st metatarsal
262	aging adult	female	Sarah	Hathorn	osteoarthritis	Right distal femur, Right and left acetabulae, C1 (dens facet), articular facets of L4-5, T2, T11.
304	aging adult	female	Sarah	Stockall	osteoarthritis	C1 (dens facet), C2 (dens).
343	mature adult	male	Charles	Stokes	osteoarthritis	Left and right radii, distal end. Right and left scaphoids. Left and right 1st metacarpals, proximal surface. Left and right trapezia. Left capitate, head. Left 1st metatarsal, distal end. Intermediate right cuneiform. C1 (dens facet), C2 (dens), C6
361	aging adult	male	Thomas	Sowter	osteoarthritis	Head of right femur. Right acetabulum. Proximal phalnges of digit 1 (right and left). Distal end of right metatarsal. C1 (dens facet), C2 (dens), C3-T2
362	mature adult	unknown	Ann	Brown	osteoarthritis	C3-C7, T1-L5, Head of 1st metatarsal
454	aging adult	female	Elizth (Elizabeth)	mith (Smith?)	osteoarthritis	Left distal radius
477	aging adult	female	Ann	Turner	osteoarthritis	C1 (dens facet), C2 (dens), C5-T1, T3-T4.
478	aging adult	female	Mary	Tilford	osteoarthritis	T3-T7, T10-T11
488	mature adult	female	Eliz (Elizabeth)	Rider	osteoarthritis	C7, T1, T7, T12, L5

522	aging adult	male	Laurance	Sidney	osteoarthritis	C2-C3
539	aging adult	male	James	Jones	osteoarthritis	Medial condyles of right and left femora. Proximal surfaces of right and left tibiae. Proximal phalanx of digits 1, both feet, heads of both 1st metatarsals, Right 4th metatarsal, left 1st cuneiform
600	mature adult	female	Catherine	Lowe	osteoarthritis	Left distal femur, left patella, Right femur, Right acetabulum
603	aging adult	female	Mary	Deer	osteoarthritis	Right capitulum, right metacarpo-phalangeal joint and proximal interphalangeal joint 1st digit. Left trapezium and left 1st metacarpal, proximal end. T3, T9-T12.
616	aging adult	male	George	Girsewood	osteoarthritis	Both hands, 5 proximal phalanges, 7 intermediate phalanges, 2 distal phalanges. Left and right scaphoids. Right trapezoid. 1 proximal foot phalanges. Right and left distal phalanges for digit 1, Right and left 5th metacarpal. Distal end of right humeri
619	aging adult	male	Charles	Cole	osteoarthritis	C6-C7, L4-5.
620	aging adult	female	Sophia	Cole	osteoarthritis	C1-2, C5-6.
621	aging adult	male	Thomas	Cole	osteoarthritis	L4-5
626	aging adult	female	Sophia	Louch	osteoarthritis	T6-7, L4-5
655	mature adult	male	Ann	Davidson	osteoarthritis	Left distal humerus
656	aging adult	female	Mary	Williamson	osteoarthritis	Right 1st metacarpal, distal end. Right 1st metatarsal, distal end. L4 and L5
657	aging adult	male	Cuthbert	Wilkinson	osteoarthritis	Right distal interphalangeal joint, 1st digit. Right distal femur and patella. T10-11.
704	aging adult	female	Elizabeth	Willet	osteoarthritis	Left 2nd and 3rd metacarpal. 1 proximal phalanx and 2 intermediate phalanges of the hands.
705	aging adult	male	Thomas	Willet	osteoarthritis	Right 1st metatarsal, distal end.
708	aging adult	male	John	Horton	osteoarthritis	Right pisiform, triquentrum, scaphoid.
713	aging adult	male	William	Prosser	osteoarthritis	Left distal femur, Right distal femur and patella.
724	mature adult	female	Ann	Hooker	osteoarthritis	Right radius, head. Right humerus, capitulum. Right trapezium. Right 1st metacarpal, proximal end. C1-2
771	aging adult	male	Thomas	Dalton	osteoarthritis	C6 and L5
782	mature adult	female	Cathe (Catherine)	Bailey	osteoarthritis	Right and left femoral heads and acetabulae
788	mature adult	male	George	Wright	osteoarthritis	C2 (dens), C3, C5 -T1
812	aging adult	female	Mary	Combers	osteoarthritis	Left distal femur and patella.
831	aging adult	female	Mary	Monk	osteoarthritis	T5
846	aging adult	female	Elizabeth	Lorimer	osteoarthritis	Right trapezoid (scaphoid facet), T3
855	aging adult	male	Trefusis	Lovell	osteoarthritis	Right trapezoid (scaphoid facet). Right scaphoid (trapezoid facet). Distal interphalangeal joints of digit3 and 5, right hand. Joint of left 1st metacarpal and proximal phalanx. C2-6. T3-T7

858	aging adult	male	Thoms (Thomas)	Dallison	osteoarthritis	C1 (dens facet), C2 (dens), C3-T1, T3-4, T6-12, L5. Sacral superior articular process.
860	aging adult	female	Mary	Lockin	osteoarthritis	Proximal interphalangeal joint of digit 2, 4 and 5, right hand. Distal interphalangeal joint, digit 2 and 5, right hand. Proximal interphalangeal joint, digit 2 and 5, left hand. Distal end of right femur, patellar surface and patella. C1 (dens facet)
861	aging adult	male?	Alex	Bailly	osteoarthritis	C1 (dens facet)
862	adult	female?	Elizth (Elizabeth)	Baillie	osteoarthritis	Distal right femur and proximal right tibia
888	mature adult	male	Charles		osteoarthritis	Right glenoid fossa and humeral head.
890	aging adult	male	Samuel Austin	Fuller	osteoarthritis	Left head of humerus, and articulating area of "new" articulation formed due to subluxation on the scapula.
895	aging adult	female	Hannah	Hickin	osteoarthritis	Left 1st digit, interphalangeal joint. Right trapezium. Right metacarpo-phalangeal joint.
910	aging adult	male	William	Rone	osteoarthritis	T1
920	aging adult	female	Sarah	Fuller	osteoarthritis	C1 (dens facet), C2 (dens), L5
934	aging adult	female	Cathe (Catherine)	Allan	osteoarthritis	C5-6
946	mature adult	female	Lydia	Batty	osteoarthritis	Left 1st metatarsal, head.
951	aging adult	male	John	Stubbs	osteoarthritis	Right and left 1st metatarsals, distal ends.
961	mature adult	male	Edward	Keat	osteoarthritis	Left acromio-clavicular joint. Right and left 1st metatarsal. Proximal phalanges of digit 1, lower limb. C1(dens facet), C2 (dens)
968	aging adult	male?	Jane	Colchett	osteoarthritis	Right acromio-clavicular joint. C4 and C5.
976	aging adult	male	George	Nightingale	osteoarthritis	Head of left 1st metatarsal
980	mature adult	male	George	Lowe	osteoarthritis	Left and right 1st metatarsals. Left proximal phalanx, digit 1 of the foot
985	aging adult	female	Ann	Bateman	osteoarthritis	T1, L5
990	aging adult	female	Elizabeth	Hewlett	osteoarthritis	L5
1009	aging adult	female?	Mary	Clark	osteoarthritis	Left trapezium, articular facet for MC1. Left MC5, articular facet for the MC4. Interphalangeal joint of left and right MC1. 5 proximal phalanges from digit 2 and 3 (left) and 2-4 (right) of hands. 3 intermediate phalanges from the hands.
1062	aging adult	male	Richard	Sumption	osteoarthritis	Right femoral head and acetabulum
1086	mature adult	male	Thomas	Fisher	osteoarthritis	Right acetabulum, left and right proximal tibiae, left distal femur.
1130	mature adult	male	James	Roe	osteoarthritis	Left 1st metatarsal, distal end
1141	aging adult	male	William	Patch	osteoarthritis	C2, C6
1142	young adult	male	Charles Fredk (Fredrick)	Wellsted	osteoarthritis	Right and left ulnae, olecranon fossae.

1145	mature adult	female?	Mary	Lan	osteoarthritis	Right and left femoral heads and acetabulae. Right distal femur and patella. C6, C7
1155	mature adult	male	John	Smith	osteoarthritis	Right rib number 9, C2 (dens), C4-C6, T2-T6, T8-T12.
1156	mature adult	female	Elizabeth	Farmer	osteoarthritis	Left scaphoid (trapezoid facet). Left triquetral (lunate facet),
1157	aging adult	male	Peter	Clarke	osteoarthritis	C1 (dens facet), C2 (dens), C5-C7, T5-T7, T12-L1.
1203	aging adult	male	William	Farmer	osteoarthritis	Left and right heads of 1st metatarsals and articulating proximal phalanges. C3
1219	aging adult	female	Martha	Burton	osteoarthritis	Left 1st metacarpal, proximal and distal end.
Osteoarthritis	**66**					
114	prime adult	male	John	Bailey	Schmorl's nodes	L2-L4
338	young adult	male	Henry	Stevens	Schmorl's nodes	T7, T9 and L2
361	aging adult	male	Thomas	Sowter	Schmorl's nodes	T8-T10, T12-L4
469	aging adult	male	Thomas	Tribe	Schmorl's nodes	T3-4, T7-10
477	aging adult	female	Ann	Turner	Schmorl's nodes	T8-9, T11-12, L2-4.
492	aging adult	male	John	Capion	Schmorl's nodes	T10-11
494	prime adult	male	Willm (William)	Wood	Schmorl's nodes	T5-11, L2-5
497	aging adult	male?	John	Lowe	Schmorl's nodes	T8-10, T 12-L1, L3
532	mature adult	male	John	Markham	Schmorl's nodes	T6, T7
539	aging adult	male	James	Jones	Schmorl's nodes	T7-10
563	young adult	male	William	Craghill	Schmorl's nodes	T7, T9-T11
600	mature adult	female	Catherine	Lowe	Schmorl's nodes	T9, T11, T12
616	aging adult	male	George	Girsewood	Schmorl's nodes	T6, L2-3
619	aging adult	male	Charles	Cole	Schmorl's nodes	T7
623	prime adult	female	Sarah	Lars	Schmorl's nodes	T8-9
628	mature adult	male	Thomas	Moore	Schmorl's nodes	T6-8
704	aging adult	female	Elizabeth	Willet	Schmorl's nodes	T10
705	aging adult	male	Thomas	Willet	Schmorl's nodes	T6, T7, T9, T11, T12
708	aging adult	male	John	Horton	Schmorl's nodes	T6-12, L2-5.
709	young adult	male	John	Horlor	Schmorl's nodes	T7-L3
713	aging adult	male	William	Prosser	Schmorl's nodes	T11, L4
764	aging adult	male	John	Gardner	Schmorl's nodes	T6, T8-12
775	adult	male?	William	Feast	Schmorl's nodes	T9-10
779	aging adult	male?	Joseph	Seward	Schmorl's nodes	T8, T10, L3
782	mature adult	female	Cathe (Catherine)	Bailey	Schmorl's nodes	T7-8, T10

845	aging adult	male	John	Wright	Schmorl's nodes	T4, T6-12, L1.
846	aging adult	female	Elizabeth	Lorimer	Schmorl's nodes	T11
852	mature adult	male	Willem	Spier	Schmorl's nodes	T8-12
856	aging adult	female	Margaret	Lovell	Schmorl's nodes	T10
858	aging adult	male	Thoms (Thomas)	Dallison	Schmorl's nodes	T9, T11
862	adult	female?	Elizth (Elizabeth)	Baillie	Schmorl's nodes	T8, T10-11
888	mature adult	male	Charles		Schmorl's nodes	T9-10, L1-3
890	aging adult	male	Samuel Austin	Fuller	Schmorl's nodes	L2, L5
910	aging adult	male	William	Rone	Schmorl's nodes	T9-12
916	mature adult	female	Susanna	Stanley	Schmorl's nodes	T7-10
925	mature adult	female	Christina	Lanton	Schmorl's nodes	L1
928	prime adult	male?	James	Fuller	Schmorl's nodes	T6-T10
936	aging adult	male	James	Allan	Schmorl's nodes	T2, T9
966	aging adult	male	Andrew	MacKenzie	Schmorl's nodes	T5-L1
976	aging adult	male	George	Nightingale	Schmorl's nodes	T10, L1-3
977	prime adult	male	George	Nightingale	Schmorl's nodes	T4-L5
981	mature adult	male	Foy	Walford	Schmorl's nodes	L3-4
994	mature adult	male	Thomas	Ramsbottom	Schmorl's nodes	T12
1008	aging adult	male	George	Scott	Schmorl's nodes	T6-T12.
1009	aging adult	female?	Mary	Clark	Schmorl's nodes	T6-7
1057	mature adult	male	Willm (William)	Graham	Schmorl's nodes	T8-T11
1065	prime adult	male	William	Bukridge	Schmorl's nodes	T8-9
1069	prime adult	male	Ann	Nightingale	Schmorl's nodes	T6-8
1141	aging adult	male	William	Patch	Schmorl's nodes	T9-L1
1142	young adult	male	Charles Fredk (Fredrick)	Wellsted	Schmorl's nodes	T7-L3
1146	prime adult	male	Thomas	Lan	Schmorl's nodes	T8-T11
1147	prime adult	male	Michael	Lan	Schmorl's nodes	T6-T9
1156	mature adult	female	Elizabeth	Farmer	Schmorl's nodes	T7-T8, T11-T12.
1170	prime adult	female	Mary	Porter	Schmorl's nodes	T7-L1
1193	prime adult	male	Jonathan	Bateman	Schmorl's nodes	T8-T12, L2-L4
1203	aging adult	male	William	Farmer	Schmorl's nodes	T5, T6, T9, T11

1223	prime adult	male	Rouland	Wilkes	Schmorl's nodes	T4-T8, T10-L3.
Schmorl's nodes	**58**					
113	aging adult	female	Mary	Bailey	spinal joint disease	C4-5, T1-L4 (osteophytes, slight)
114	prime adult	male	John	Bailey	spinal joint disease	T2-L5, osteophytes and porosity
122	aging adult	female	Ann	Webb	spinal joint disease	Slight on C4-C7 and L4-L5
254	aging adult	female	Cath	Wood	spinal joint disease	Osteophytes present on all unfused vertebral bodies.
262	aging adult	female	Sarah	Hathorn	spinal joint disease	Degenerative changes C3-T2, T7-T12, L3
264	aging adult	male	George	Hathorn	spinal joint disease	Degenerative changes to vertebral segments, C1, C5-C7, T9-10, L1-5. C2-5 are fused.
303	aging adult	female	Re__cca (prob. Rebecca)	Sowter	spinal joint disease	Degenerative changes to T5-L2 and L4. C3-4 and T8-9 fused.
304	aging adult	female	Sarah	Stockall	spinal joint disease	C1-7, T2-6, T8-L5, porosity and osteophyte formation on bodies
343	mature adult	male	Charles	Stokes	spinal joint disease	C3, C5-L6 osteophytes. T4-6 fused. Degenerative changes.
361	aging adult	male	Thomas	Sowter	spinal joint disease	Degenerative changes T2-L5
467	young adult	male	John	Pugh	spinal joint disease	Degenerative changes to T4, T6-T12
468	prime adult	female	Susannah	Joselyn	spinal joint disease	Degenerative changes to T3-T11
475	mature adult	female	Elizabeth	Ainge	spinal joint disease	Degenerative changes to C2-6
477	aging adult	female	Ann	Turner	spinal joint disease	Degenerative changes C3-4, T2, T5-L5. T4-6 are also fused
478	aging adult	female	Mary	Tilford	spinal joint disease	Degenerative changes C1, C3-T2, T8-9, T12-L5
488	mature adult	female	Eliz (Elizabeth)	Rider	spinal joint disease	C3-4, C6, T2-T6, T8-T11, L1-4
492	aging adult	male	John	Capion	spinal joint disease	C2-C6, T5-L5
497	aging adult	male?	John	Lowe	spinal joint disease	C6, T2-L5
513	aging adult	male	Thos (Thomas)	Dennis	spinal joint disease	C3-C6, T2-L5
532	mature adult	male	John	Markham	spinal joint disease	C5-7, T3-L5
537	mature adult	female	Susannah	Smith	spinal joint disease	C3-C6, T2-L5
539	aging adult	male	James	Jones	spinal joint disease	C4-C7, T2-T11, L1-L6
542	mature adult	male?		Nash	spinal joint disease	C6, T2, T5-T6, T8, T10, L5

600	mature adult	female	Catherine	Lowe	spinal joint disease	C3-C5, C7, T2, T5, T8-T12, L3-L5
603	aging adult	female	Mary	Deer	spinal joint disease	C1-C4, C6-T2, T4-T8, L2-L5
609	mature adult	female	Susanna	Rogers	spinal joint disease	C6-T1, T4-T10, T12, L1, L3
614	mature adult	female	Elizabeth	Egner	spinal joint disease	C6-7, T6-T9, L3
616	aging adult	male	George	Girsewood	spinal joint disease	C3-4, T2-T9, T11-L4. C3-4 fused
617	aging adult	female	Lydia	Prosser	spinal joint disease	C3-L5. C6-7, T3-6, T7-10 are all fused (degenerative changes)
618	aging adult	female	Ann	Seward	spinal joint disease	L3-5
619	aging adult	male	Charles	Cole	spinal joint disease	C1-C5, T1-L3
620	aging adult	female	Sophia	Cole	spinal joint disease	C3-4, C7-L5.
621	aging adult	male	Thomas	Cole	spinal joint disease	T11, L2-3
622	mature adult	male		Cole	spinal joint disease	T8, T11-12, L5 (osteophytes)
623	prime adult	female	Sarah	Lars	spinal joint disease	T2
626	aging adult	female	Sophia	Louch	spinal joint disease	C1-2, T1-5, T7-9, T12-L3
629	aging adult	male	Thos (Thomas)	Coventry	spinal joint disease	C6, T7, T10-L2, L4-5 (osteophytes)
655	mature adult	male	Ann	Davidson	spinal joint disease	T2-4, T6-10. (opsteophytes)
656	aging adult	female	Mary	Williamson	spinal joint disease	C3-4, C6-L3
657	aging adult	male	Cuthbert	Wilkinson	spinal joint disease	C7-T9, L2-L6 (osteophytes and porosity)
697	aging adult	female	Elizth (Elizabeth)	Sewell	spinal joint disease	C2-T10. L1-L5. (osteophytes)
699	aging adult	male	Thomas	Willet	spinal joint disease	T1-L5 (osteophytes)
704	aging adult	female	Elizabeth	Willet	spinal joint disease	C3, C6-L5. T4-6 fused.
705	aging adult	male	Thomas	Willet	spinal joint disease	C6-L5 (osteophytes). Ankylosis of T3-5, T7-8, T9-11.
707	mature adult	male	Andrew	Egner	spinal joint disease	T3-8 (oteophytes)
708	aging adult	male	John	Horton	spinal joint disease	C2-L5 (porosity and osteophytes)
709	young adult	male	John	Horlor	spinal joint disease	T8-12 (osteophytes)
712	adult	female?	Anne	Higgins	spinal joint disease	L4-5 (osteophytes)
713	aging adult	male	William	Prosser	spinal joint disease	C2-C7, T3-T12, L3-5

724	mature adult	female	Ann	Hooker	spinal joint disease	C3-11, L1-5 (porosity and osteophytes)
764	aging adult	male	John	Gardner	spinal joint disease	C1-2, C5-T1, T5-L5
771	aging adult	male	Thomas	Dalton	spinal joint disease	C2-L5 (osteophytes and porosity) Ankylosis of segments C6-7
777	prime adult	male	John	Russell	spinal joint disease	T2, due to malformation??
778	mature adult	female?	Elizth (Elizabeth)	Seward	spinal joint disease	C2-C7, T5-L5
779	aging adult	male?	Joseph	Seward	spinal joint disease	C2-C5, C7, T2-T12, L2-5
782	mature adult	female	Cathe (Catherine)	Bailey	spinal joint disease	C3, C5, T2, T4-10, L5
788	mature adult	male	George	Wright	spinal joint disease	C1, C4
789	prime adult	male	Mary	Feast	spinal joint disease	L5 (osteophyte)
807	adult	male	Charles	Triggs	spinal joint disease	C4-7. C4-5 ankylosed.
812	aging adult	female	Mary	Combers	spinal joint disease	C3-C7. L5. C4-5 ankylosed
821	prime adult	female	Sarah?	Cheswell?	spinal joint disease	T6-9
831	aging adult	female	Mary	Monk	spinal joint disease	C5-L5 (osteophytes)
837	aging adult	male	Lewis	Willet	spinal joint disease	C6 (osteophytes and porosity)
845	aging adult	male	John	Wright	spinal joint disease	C3-L5
846	aging adult	female	Elizabeth	Lorimer	spinal joint disease	C2-T2, T6-L5. (opsteophytes and porosity)
851	mature adult	female	Elizth (Elizabeth)	Maxwell	spinal joint disease	C2-3, C5, C7-L5
852	mature adult	male	Willem	Spier	spinal joint disease	C2, C4-6, T3-4, T8-12, L3
855	aging adult	male	Trefusis	Lovell	spinal joint disease	C1, C7-T2, (osteophytes and porosity)
856	aging adult	female	Margaret	Lovell	spinal joint disease	C4-L5 (porosity and osteophytes
858	aging adult	male	Thoms (Thomas)	Dallison	spinal joint disease	T2, T5, L1-4 (osteophytes and porosity)
860	aging adult	female	Mary	Lockin	spinal joint disease	C4-6, T2-7, T9-L4
861	aging adult	male?	Alex	Bailly	spinal joint disease	C4-T4 (porosity and osteophytes)
862	adult	female?	Elizth (Elizabeth)	Baillie	spinal joint disease	C6, T3-12, L1-5 (osteophytes)
868	aging adult	female	Mary	Aston	spinal joint disease	L4-5 (porosity and osteophytes)

888	mature adult	male	Charles		spinal joint disease	C2-T2, T9-L4 (porosity and osteophytes). C7-T1 ankylosed.
890	aging adult	male	Samuel Austin	Fuller	spinal joint disease	C2-L5 (porosity and osteophytes)
895	aging adult	female	Hannah	Hickin	spinal joint disease	C1, C6-L5 (osteophytes and porosity)
898	mature adult	male	Henry	Bryant	spinal joint disease	C3-L5 (porosity)
908	mature adult	female?	Ann	Lucas	spinal joint disease	C4-5, T2-6. T4-6 fused due to large osteophytes.
910	aging adult	male	William	Rone	spinal joint disease	T3-T12 (porosity)
916	mature adult	female	Susanna	Stanley	spinal joint disease	T2, T11-12. (porosity)
920	aging adult	female	Sarah	Fuller	spinal joint disease	C3-L4 (osteophytes)
925	mature adult	female	Christina	Lanton	spinal joint disease	T1-L2 (osteophytes)
928	prime adult	male?	James	Fuller	spinal joint disease	C4-7, T3-4, T6-10, T12, L2-5 (osteophytes, porosity)
934	aging adult	female	Cathe (Catherine)	Allan	spinal joint disease	C1-C4, T4-T11, L1-2.
935	prime adult	female	Elizth (Elizabeth)	Richardson	spinal joint disease	T8-L5
936	aging adult	male	James	Allan	spinal joint disease	C3, C5-C7, T3-T5, T8-L1. T3 and T4 ankylosed. (osteophytes)
946	mature adult	female	Lydia	Batty	spinal joint disease	C4-T11, L4-L5. (porosity and osteophytes, slight)
961	mature adult	male	Edward	Keat	spinal joint disease	C5-T1, T4-L5 (osteophytes, slight)
966	aging adult	male	Andrew	MacKenzie	spinal joint disease	C2-L5 (porosity and osteophytes, slight)
968	aging adult	male?	Jane	Colchett	spinal joint disease	C2-C3, C6-C7, T2-L3, L5. C5 and 6 ankylosed. Osteophytes and porosity, considerable cervicals, slight elsewhere.
970	young adult	female	Matilda	Gibson	spinal joint disease	C6, T3-T5 (porosity)
976	aging adult	male	George	Nightingale	spinal joint disease	C3-L5 (osteophytes and porosity)
977	prime adult	male	George	Nightingale	spinal joint disease	T11 and L5 (porosity)
981	mature adult	male	Foy	Walford	spinal joint disease	C7, T2, L3-L5.
985	aging adult	female	Ann	Bateman	spinal joint disease	T3-L4
986	aging adult	male	George	Walford	spinal joint disease	T12-L5 (osteophytes and porosity, slight)
990	aging adult	female	Elizabeth	Hewlett	spinal joint disease	T4-T11, L10L4 (osteophytes and porosity, slight)
994	mature adult	male	Thomas	Ramsbottom	spinal joint disease	C1, T11
1008	aging adult	male	George	Scott	spinal joint disease	C3-C5, T1-T4, T6-T10 (osteophytes, slight)

1009	aging adult	female?	Mary	Clark	spinal joint disease	C6, T2-L2. (porosity and osteophytes)
1062	aging adult	male	Richard	Sumption	spinal joint disease	C3, C4, T1-T12, L2 (osteophytes)
1065	prime adult	male	William	Bukridge	spinal joint disease	T6-T11
1068	mature adult	female	Elizabeth	Simpson	spinal joint disease	T4-5, T7, T8, T11, L5 (osteophytes, slight)
1069	prime adult	male	Ann	Nightingale	spinal joint disease	T4-L5
1078	prime adult	male	Thomas	Roberts	spinal joint disease	T10, L1-3 (porosity and osteophytes, slight)
1087	aging adult	female?	Joan	Wilson	spinal joint disease	C3-T12, (osteophytes and porosity, moderate-severe)
1088	prime adult	female	Ann	Fisher	spinal joint disease	C5-T3, T6-L1, L4 (osteophytes)
1128	aging adult	male	William	Moore	spinal joint disease	C1-2, T1-9, L1-5 (osteophytes, slight-moderate)
1131	aging adult	female	Ester	Taylor	spinal joint disease	C3, C4, C6, C7, T3-T5 (osteophytes and porosity, slight)
1135	aging adult	female?	Susannah	Wright	spinal joint disease	L1-L3 (osteophytes, slight)
1141	aging adult	male	William	Patch	spinal joint disease	C4, C5, C7-L5 (porosity and osteophytes
1142	young adult	male	Charles Fredk (Fredrick)	Wellsted	spinal joint disease	T1, T5-T6. Porosity
1144	mature adult	female?	Mary	Millward	spinal joint disease	T4-T9, (osteophyres, slight)
1145	mature adult	female?	Mary	Lan	spinal joint disease	C2-C5, T5, T8, T11-L5
1146	prime adult	male	Thomas	Lan	spinal joint disease	C3-C5, T3-T11
1147	prime adult	male	Michael	Lan	spinal joint disease	T6-T9 (osteophytes)
1155	mature adult	male	John	Smith	spinal joint disease	C3, C7-T1, L1-L5, (osteophytes)
1156	mature adult	female	Elizabeth	Farmer	spinal joint disease	C2-L5 (osteophytes and porosity)
1157	aging adult	male	Peter	Clarke	spinal joint disease	C3-C4, T1-T4, T8-T11, L2-L5 (osteophytes and porosity, slight)
1170	prime adult	female	Mary	Porter	spinal joint disease	C2-C5, T1, T4-T6, T10-T12 (osteophytes, slight)
1203	aging adult	male	William	Farmer	spinal joint disease	C1-C2, C4-L5 (osteophytes and porosity, severe in T7-9, slight elsewhere)
1219	aging adult	female	Martha	Burton	spinal joint disease	C2-L5 (osteophytes)
1223	prime adult	male	Rouland	Wilkes	spinal joint disease	T8-T9, T11-T12, L2-L4 (porosity, slight)
spinal joint disease	**124**					
860	aging adult	female	Mary	Lockin	Temporo-mandibular joint disease	osteophytosis of joint surfaces

934	aging adult	female	Cathe (Catherine)	Allan	Temporo-mandibular joint disease	Osteophytosis of joint surfaces
Temporo-mandibular joint disease	**2**					
Infection						
522	aging adult	male	Laurance	Sidney	maxillary sinusitus	Bilateral
628	mature adult	male	Thomas	Moore	maxillary sinusitus	bilateral
916	mature adult	female	Susanna	Stanley	maxillary sinusitus	Bilateral, plaque formation and porosity.
977	prime adult	male	George	Nightingale	maxillary sinusitus	Bilateral, spicules
maxillary sinusitus	**4**					
1218	neonate	subadult	Sarah	Hyde Clarke	middle ear infection	New bone formation on the malleus, stapes and inca bone, active.
middle ear infection	**1**					
831	aging adult	female	Mary	Monk	osteitis	Left femur, midshaft, anterior side.
895	aging adult	female	Hannah	Hickin	osteitis	or periostitis (see periostitis for location)
916	mature adult	female	Susanna	Stanley	osteitis	Right distal end of tibial shaft. Thickend shaft. Lamellar bone.
1069	prime adult	male	Ann	Nightingale	osteitis	osteoid osteoma?? Left femoral shaft
1078	prime adult	male	Thomas	Roberts	osteitis	Right Ulna, proximal shaft.
osteitis	**5**					
812	aging adult	female	Mary	Combers	osteomyelitis	Right tibia, proximal end
1071	aging adult	male?	Andrew	Duff	osteomyelitis	Left 1st metatarsal
1086	mature adult	male	Thomas	Fisher	osteomyelitis	Mandible, left side
osteomyelitis	**3**					
281	aging adult	male	Noah	Nicholls	periostitis	Shaft of left tibia, lamellar bone (healed), left fibula, lamellar bone (healed)
343	mature adult	male	Charles	Stokes	periostitis	5 right and 6 ribs, lamellar bone on visceral surface (healed)
477	aging adult	female	Ann	Turner	periostitis	New bone formation on the visceral surfaces of 5 right and 3 left ribs. Both active and healed (mixed)
495	young adult	male	William	Wood	periostitis	Plaque formation on proximal right femur, anterior surface.
522	aging adult	male	Laurance	Sidney	periostitis	Distal end of shaft of tibia. Healed lamellar and plaque formation. Non-specific infection associated with the fracture
538	young adult	male	Thos (Thomas)	Giles	periostitis	5 ribs central to rib cage on the left side, healed. Right tibia, all of the shaft, mixed lesion.

539	aging adult	male	James	Jones	periostitis	Supra-orbital ridges
603	aging adult	female	Mary	Deer	periostitis	Shaft of right tibia. Mixed lesion.
621	aging adult	male	Thomas	Cole	periostitis	Left illium and ischium. Active, wove and spicules. Chronic bladder infection?? Or Neoplastic disorder??
622	mature adult	male	?	Cole	periostitis	Left femur shaft; lamellar bone, Left tibia shaft; lamellar bone. Right femur shaft; mixed. Right tibia shaft; lamellar bone. Alternative diagnosis: Osteitis
626	aging adult	female	Sophia	Louch	periostitis	2 right and 2 left ribs, healed. Shaft of left and right tibia, healed.
628	mature adult	male	Thomas	Moore	periostitis	Left tibia, midshaft, healed.
629	aging adult	male	Thos (Thomas)	Coventry	periostitis	Prox end of left fibula
657	aging adult	male	Cuthbert	Wilkinson	periostitis	4 left and 3 right ribs, healed.
708	aging adult	male	John	Horton	periostitis	Right side, mid rib cage; 2 ribs. Lesions healed.
821	prime adult	female	Sarah?	Cheswell?	periostitis	Left femur, Left tibia and right tibia. Lamellar bone. 2 left ribs and 1 right rib, visceral surfaces, lesions healed.
851	mature adult	female	Elizth (Elizabeth)	Maxwell	periostitis	Left tibia, proximal half of shaft, medial surface. Healed lamellar bone
856	aging adult	female	Margaret	Lovell	periostitis	Right femur, distal end
859	young adult	male	James	Lumley	periostitis	Left and right tibiae, proximal end. Healed lamellar bone.
862	adult	female?	Elizth (Elizabeth)	Baillie	periostitis	Left distal fibula, distal tibia. Supra-orbital ridges. Endocranial surface of the frontal bone, superior to the orbits, lamellar bone, healed.
895	aging adult	female	Hannah	Hickin	periostitis	Right fibula, midshaft, lesion mixed. Right tibia, distal end of shaft, mixed lesion
920	aging adult	female	Sarah	Fuller	periostitis	Right and left tibia shafts, medial side. Lamellar bone, healed.
934	aging adult	female	Cathe (Catherine)	Allan	periostitis	5 left ribs. Lamellar bone on the visceral surace of the ribs. Healed.
936	aging adult	male	James	Allan	periostitis	Distal left radius, lamellar bone, healed.
961	mature adult	male	Edward	Keat	periostitis	Left tibia, midshaft medial side. Lamellar bone, healed.
970	young adult	female	Matilda	Gibson	periostitis	Right and left tibial shafts. Lamellar bone, healed.
977	prime adult	male	George	Nightingale	periostitis	Medial side of femoral shafts. Lamellar bone, healed
986	aging adult	male	George	Walford	periostitis	Visceral surfaces of 6 unsided ribs from the mid chest region.
1009	aging adult	female?	Mary	Clark	periostitis	Shaft of left tibia, lamellar bone. Healed.
1065	prime adult	male	William	Bukridge	periostitis	1 right and 8 left ribs, lamellar bone, healed
1071	aging adult	male?	Andrew	Duff	periostitis	Distal third of both tibial shafts.

1078	prime adult	male	Thomas	Roberts	periostitis	Right and left tibiae, shafts. Lamellar bone, healed
1142	young adult	male	Charles Fredk (Fredrick)	Wellsted	periostitis	6 left 10 right ribs. Mixed lesions, active and healed.
1145	mature adult	female?	Mary	Lan	periostitis	Left tibia and fibula, lesions mixed woven and lamellar bone. Active lesion.
1146	prime adult	male	Thomas	Lan	periostitis	Right tibia, lamellar bone, healed.
1156	mature adult	female	Elizabeth	Farmer	periostitis	Left femur, midshaft, lamellar bone, healed. Left tibia, shaft, lamellar bone, healed. 9 left and 7 right ribs, lamellar bone on the visceral surfaces. Healed.
1169	juvenile	female	Emily	Porter	periostitis	Left proximal shaft of tibia, lamellar bone, healed.
1170	prime adult	female	Mary	Porter	periostitis	Shaft of right femur, lamellar, healed.
periostitis	**37**					
363	juvenile	unknown	Keith	Stewart	congenital syphilis	Dental malformation
975	prime adult	male			congenital syphilis	Mulberry molars and severe enamel hypoplasia
997	neonate	subadult	James	MacCallum	congenital syphilis	?? Malformation of the enamel matrix of developing molars
1072	neonate	subadult	Edna	Coleman	congenital syphilis	Dental lesions
1258	young adult	female?	William	Clarke	congenital syphilis	Mulberry molars and Hutchinson's incisors
congenital syphilis	**5**					
538	young adult	male	Thos (Thomas)	Giles	tuberculosis	Lytic spinal lesions on T5-8, L1
1142	young adult	male	Charles Fredk (Fredrick)	Wellsted	Possible tuberculosis	T11-L1. Subcircular lytic lesions on the superior and inferior articular surfaces of the vertebral bodies. Traubecular structure exposed. Diameter 5-7 mm, depth 4-6 mm. Are not schmorls nodes. Vertebral manifestations of Tuberculosis??
tuberculosis	**2**					
Other pathologies						
898	mature adult	male	Henry	Bryant	Paget's disease	Thickened cranial vaults bones
Paget's disease	**1**					
Autopies						
360	infant 2	subadult	Emma	Gardner	craniotomy	Horizontal craniotomy
469	aging adult	male	Thomas	Tribe	craniotomy	Horizontal craniotomy
923	young adult	male	Thomas	Roberts	craniotomy	Horizontal craniotomy
986	aging adult	male	George	Walford	craniotomy	Horizontal craniotomy and sternotomy (inverted Y-shaped incision)

autopsy	**4**					
lesions of unknown aetiology						
477	aging adult	female	Ann	Turner	benign neoplasms	Cyst? Present on right orbital roof, anterio-lateral portion.
620	aging adult	female	Sophia	Cole	benign neoplasms	Ossified ovarian/uterine tumour??, Ossified fibroid (very likely)
967	mature adult	male	John	Farmer	benign neoplasms	Perforation of palate, edges sharp and well defined. Tumor/cyst? (Plate 5.4)
467	young adult	male	John	Pugh	lytic lesion	Left scaphoid. Unknown aetiology
782	mature adult	female	Cathe (Catherine)	Bailey	lytic lesion	Right lunate. Likely to be a cyst
788	mature adult	male	George	Wright	lytic lesion	1st right metatarsal, head. Cyst or developmental defect
839	aging adult	female	Sarh (Sarah)	Coventry	lytic lesion	Circular lesion on the saggital suture. Developmental??, Abscess or ulcer?? Healing
966	aging adult	male	Andrew	MacKenzie	lytic lesion	Proximal end, right ulna, superior to the olecranon process
1071	aging adult	male?	Andrew	Duff	lytic lesion	Medial surface, proximal right 1st metatarsal
1141	aging adult	male	William	Patch	lytic lesion	Lateral end of right clavicle, anterior surface
lytic lesion	**7**					
Congenital anomalies						
117	aging adult	male	Samuel	Roberts	spina bifida occulta	S1 to S5, neural canal open
122	aging adult	female	Ann	Webb	spina bifida occulta	S1 and 2, neural canal open
364	prime adult	female	Sarah	Hathorn	spina bifida occulta	Neural canal open S1-5. Also mal union of spinous process of T12.
spina bifida occulta	**3**					
117	aging adult	male	Samuel	Roberts	sacralisation	L5 and 6 fused
609	mature adult	female	Susanna	Rogers	sacralisation	L6
772	mature adult	male	John	Amburger	sacralisation	L5
888	mature adult	male	Charles		sacralisation	L5
sacralisation	**4**					

CHAPTER 6 DISCUSSION AND CONCLUSIONS

by Angela Boyle

The archaeological proposals for mitigating the impact of the proposed works on the surviving archaeology at St Luke's were outlined in a detailed Written Scheme of Investigation (Boyle 2000) which ran to 10,000 words. Although post-medieval funerary deposits in general have the potential to yield a wide range of archaeological and historical information it was thought that the resource at St Luke's was likely to be both incomplete and in poor condition. In addition the structural condition of the crypt was very poor. For these reasons it was decided that the resource did not merit full archaeological excavation although it was recognised that it would still be possible to answer questions relating specifically to the group at St Luke's. It was also acknowledged that the resource was likely to further our understanding of the taphonomy of crypts and churchyards and to contribute to the development of techniques for the scientific analysis of human remains from funerary deposits. Therefore it was decided that an archaeological watching brief would be undertaken on the clearance of the human remains by a commercial undertaker with specific objectives relating to the potential outlined above.

An archaeological watching brief had previously been undertaken by MoLAS on five test pits excavated against the exterior walls of the church in order to assess the composition and state of repair of the foundations to the church and the material in which they were constructed. It was not clear from the test pits whether the foundations of the church were constructed in a trench or whether the surrounding material was dumped later. No archaeological levels earlier than the church were revealed. This investigation also suggested that there were likely to be few inhumations in the immediate vicinity of the church. Inhumations were encountered in test pits 1 and 2 and those in the former at a depth of only 0.8 m. Burial vaults were identified in test pits 2 and 3.

A desk based assessment (MoLAS 1996) detailed all existing documentary sources. This was followed by an assessment of the archaeological potential of the site, particularly in relation to the study of post-medieval human remains, and the development of recommendations for archaeological mitigation. (Cox 1997; 1998a). A conservation plan was prepared by Purcell, Millar and Tritton.

Research issues in post-medieval burial archaeology were defined in some detail in a recent monograph dedicated to post-medieval burial (Reeve 1998, 222) and are worth repeating here. It is clear that the relationship between the historical documentation and the condition of the material (both skeletal and artefactual) is a critical one.

- *Funerary archaeology*. Sub-headings include charnel pits, mass graves, artefact developments, taxonomies, social and gender archaeology, the English funeral, ownership and choice of vaults, burials as entities, graveyard methodology, location of interments to memorials
- *Osteoarchaeology*. Sub-headings include palaeodemography and demography, biological anthropology, pathology, epidemiology, osteological methodology (pathology, age and sex, stature), forensic science, clinical medicine, genealogy
- *Archaeological methodology*. Theory and practice, curation procedures and environments
- *Evidence for known historical events*, eg epidemics

Nonetheless there is still no official recognised research agenda for post-medieval burial within London. This is an omission which is currently begin addressed by the Archaeological Advisor for the London Diocese (John Schofield pers. comm.) Limited systematic recording of crypt populations or indeed post-medieval graveyards has taken place. Although several clearances have been carried out at London churches only Christ Church, Spitalfields has been subject to detailed archaeological and osteological recording in conjunction with extensive documentary research.

The archaeological resource at St Luke's was assessed according to a series of criteria prior to commencement of work: the criteria were completeness, condition, rarity, historical documentation and group value. The results of the assessment can be summarised as follows:

- Completeness. The completeness and integrity of the human skeletal assemblage has been affected by disturbance to the crypt by vandals and grave robbers, thus the potential for detailed population studies is severely limited. Furthermore the

construction work in the churchyard will involve only partial exhumation of the burials there.

- Condition. Conditions within the crypt are very damp and this is likely to have caused the decay of wood, textiles and other materials. Both the coffins and the human remains will have been affected by the activities of rodents, insects, bacteria and fungi. The successive layering of coffins one on top of another may well have crushed earlier burials. It is likely that successive burial in the churchyard has led to intercutting and disturbance to all but the latest burials. The digging of drainage ditches and landscaping will also have affected the integrity of the deposits.
- Rarity. It is clear that other similar assemblages survive in London. Nonetheless the anticipated size of the sample combined with the existing documentary evidence do enhance the rarity and potential of the group.
- Historical documentation. A wide range of documentary evidence exists and this will enhance and complement the archaeological information.
- Group value. The value of the group is likely to be moderate due to the incomplete nature and poor preservation of the assemblage. However, the evidence for this is unclear and remains to be demonstrated by the proposed archaeological intervention. If preservation is as poor as is anticipated it will still be possible to determine basic demographic parameters by employing low-resolution osteological recording. This will facilitate comparisons with similar groups from London and elsewhere.

It is fair to say that a number of assumptions were made regarding the nature of the archaeological resource at St Luke's. It was believed that very few of the coffins would be sealed and that therefore a significant proportion of the interments would survive largely intact but without soft tissue or other organic remains such as textiles. It was also expected that a significant number of the interments would have biographical data in the form of coffin plates. With this in mind it was argued that the resource would have the potential to address a limited number of research objectives as follows:

- Development of the crypt and graveyard through time by discussion of stratigraphy and formation processes on site
- Enhancement of our understanding of post-medieval funerary contexts and the archaeological techniques employed
- Enhancement of osteological techniques through the study of individuals of known age and sex
- Development of our knowledge of funerary rites and the treatment of the dead
- Analysis of the construction, use and modification of the crypt structure.

With the above in mind the aim of the archaeological work was to record and interpret as much detail as possible within the parameters of a relatively rapid exhumation and reinterment exercise. It was expected that the archaeological data collected would contribute to the study of the history and development of funeral trends, the demography of the population of the crypt and that part of the graveyard which was being disturbed.

The objectives of the archaeological work were to record the preservation conditions within the crypt and churchyard, the inscriptions on coffin plates, and recording of the human remains and limited sampling of human skeletal remains with biographical data.

The reburial debate

At the time of the Enabling Works the London Diocesan Fund held the freehold for St Luke's Church and surrounding burial ground. As the church was redundant, the exhumations did not require a Faculty, rather, section 65 of the Pastoral Measure applied. For reasons of decency and dignity, the Church Diocesan Fund stipulated that sealed coffins should not be opened and that such coffins should be sleeved on site and removed for reburial. In addition Home Office directions are required for the removal of buried human remains thus a Home Office order was granted for the exhumation at the church. The Home Office order relating to the exhumation works (dated 21 January 1999) stipulated that the removal be subject to agreement with the Chief Environmental Scientist for the London Borough of Islington.

St Luke's is not alone in having a requirement for relatively rapid reburial of human remains. One of the conditions attached to the Faculty for the crypt clearance at St George's Bloomsbury stated that 'All coffins, caskets or other burial containers recovered intact, that is to say not opened, even if damaged externally, shall remain intact and unopened if reasonably practicable and be reinterred after appropriate recording and at all material times shall be treated with appropriate respect and dignity' and also that 'Disturbed human remains shall be listed, examined and reinterred in accordance with the said specifications and archaeological assessment and at all material times shall be treated with appropriate respect and dignity.'

At St Luke's skeletons were exhumed and then recorded osteologically on site as soon as possible thereafter. Thus reburial actually took place over a period of approximately six months.

Recent relevant developments

Guidelines relating to crypt clearance were recently produced by the IFA (Cox 2001). Although the IFA had previously produced guidelines for the excavation of human remains (McKinley and Roberts 1993), these relate primarily to the excavation of skeletons from earth-cut graves and prior to the publication in 2001 no guidelines or protocols existed for the excavation of crypt material or where soft tissue survived. The aim of Cox's paper (*ibid.* , 14) was to 'set out a protocol that seems appropriate in light of the Spitalfields experience and that experienced by archaeologists involved with the recent dead elsewhere (eg Bashford and Pollard 1998; Boyle and Keevill 1998) .

The most recent version of the Archaeology Policy of the London DAC was issued in January 2005 and took account of the report produced by the Human Remains Working Group (Mays 2005). Archaeological contractors are now required to frame their WSIs within this policy. In its executive summary the Working Group states 'If burial grounds, or areas within burial grounds, which may contain interments more than 100 years old have to be disturbed, whether for minor building work or larger scale development, to a depth that is likely to disturb burials, the relevant areas should be archaeologically evaluated. Any subsequent exhumations should be monitored, and if necessary carried out by archaeologists. In the DAC view, there should be archaeological recording in a crypt clearance. A crypt often contains

hundreds [if not thousands] of coffins and skeletons. The health and safety issues are significant and affect the nature and extent of archaeological work. National guidelines are available and continue to be developed. The archaeological project which excavated 18th-and 19th-century coffins in the crypt of Christ Church, Spitalfields in the 1980s has become a national standard of what can be achieved (Reeve and Adams 1993). Early consultation with the DAC, English Heritage and the local planning authority is recommended if crypt clearance is contemplated.

The following recommendations made by the Working Party are particularly significant.

- If living close family members are known and request it, excavated human remains should be reburied
- Excavated human remains shown after due assessment to have limited research potential should be studied and then reburied
- Reburial should normally be by inhumation rather than by cremation
- When excavated human remains are more than 100 years old and have significant future research potential, deposition in a suitable holding institution should be arranged. Redundant churches or crypts (as already done in some cases) provide an acceptable compromise between the desirability of deposition in a consecrated place and the desirability of continued research access. A working party, to succeed the Human Remains Working Group, should be set up to pursue this, looking in particular at funding and at establishing proper working practices.

At the annual conference of the Institute of Field Archaeologists in Winchester in 2005 a session entitled 'The excavation of post-medieval cemeteries: why, when and how? (but not necessarily in that order)' was organised by Jacqueline McKinley of Wessex Archaeology and Simon Mays of English Heritage. The writer was asked to contribute because of her involvement in the St Luke's project as well as a number of other similar jobs in London and elsewhere (for example Boyle 2004).

Archaeological excavation of post-medieval cemeteries is a relatively new phenomenon: until *c* 20 years ago most burials of this date were subject to removal by cemetery clearance companies with no archaeological involvement. This changed with the work at Christ Church, Spitalfields in the 1980s as archaeologists and

osteologists demonstrated the immense wealth of information that which could be recovered (relating to all aspects of the burials), particularly where the archaeological data could be linked to written records.

There are a large number of post-medieval cemeteries containing an immense number of burials and with ever increasing pressure on land and the need to update church buildings to the needs of the 21st century, growing numbers of such cemeteries (and crypts) are being totally or partially cleared. Archaeologists are commonly being asked to undertake such work, but the levels of recording and analysis required may vary from cemetery to cemetery and archaeologists need to ensure that they are not simply a more 'politically correct' method of clearance. Archaeologists who took part in the session considered what types of information might be obtained and what constitutes an appropriate level of investigation and recording. It was recognised that we need to ensure that our methodologies for on-site archaeological recording not only accommodate the practical demands imposed by exhumation works but also generate datasets of real analytical value.

Conclusion

The St Luke's project was an extremely challenging one both for the archaeologists who took part and indeed for Necropolis who were the exhumation company. The logistics were complex and it took effort from both parties to achieve an acceptable method of working together. The approach to the archaeology had previously been employed with success at St Nicholas, Sevenoaks, (Boyle and Keevill 1998), the Quaker cemetery at London Road, Kingston-upon-Thames (Bashford and Pollard 1998; Start and Kirk 1998), St Bartholomew's church, Penn (Boyle 2004) and subsequently at St George's, Bloomsbury (Boyle *et al* in prep). The osteological and artefactual analysis of the material from St Luke's has yielded an enormous amount of valuable information on both burial practice and the population who were buried in the church.

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