

# Dangerous dissections: the hazard from bodies supplied to Edinburgh anatomists, winter session, 1848–9

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**ABSTRACT** After the 1832 Anatomy Act, all bodies that were to be used by medical students for dissection were supplied to Schools of Anatomy based on their needs. During the Winter Session of 1848–9, a high proportion of the bodies supplied to the University of Edinburgh, and the majority of those supplied to the Argyle Square School had died of an infectious disease. Most had died from cholera, while others had died of typhus, tuberculosis or other infectious diseases. These bodies were not embalmed before dissection. Therefore, both medical students and their teachers in Departments of Anatomy, in addition to those in the hospitals in which they had died, would have been at risk of becoming infected or even dying as a consequence of exposure to these infected individuals.

**KEYWORDS** Infected bodies, Schools of Anatomy, cholera, typhus, tuberculosis, bodies not embalmed, risk of infection

**LIST OF ABBREVIATIONS** Creutzfeldt Jacob Disease (CJD), Gerstmann-Straussler-Scheinker syndrome (GSS)

**DECLARATION OF INTEREST** No conflict of interests declared.

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Shortly after the implementation of the 1832 Anatomy Act,<sup>1</sup> there was considerable concern in the various extra-mural schools in Edinburgh, all of which were associated with Surgeons' Hall, that there would not be an equitable supply of bodies to all that required them for their teaching needs.<sup>2</sup> From about 1826, as a consequence of the views expressed by the Royal Commissioners to the Scottish universities, when they visited each of the Scottish universities, all medical students were thenceforth required to undertake the dissection of at least one body during their training.<sup>3</sup> The recommendations of the Royal Commissioners were implemented by the Edinburgh extra-mural schools almost immediately afterwards, and during the following year by the university authorities. In some establishments, sufficient bodies were available to allow those students who wished to dissect all regions of the body to have access to a number of bodies for this purpose.

Because the total number of bodies available under the conditions of the 1752 Act<sup>4</sup> was so limited, it was often the case that during the eighteenth and early decades of the nineteenth centuries insufficient bodies were available even to allow students to see material dissected by their teachers. Once it became obligatory for all students to dissect the body, it then became essential that large numbers of bodies were made available to the various Schools of Anatomy for this purpose. While some teachers, such as Robert Knox, had excellent connections

and therefore had relatively little difficulty in obtaining an adequate number for this purpose, this tended to be the exception rather than the rule. While he was prepared to pay his suppliers substantial sums of money, both in Edinburgh and elsewhere, such as in Ireland, and to others in London, he obtained an adequate supply from his various sources. His financial outgoings were, however, often very considerable.<sup>5</sup> A number of the extra-mural teachers, had considerable difficulties in maintaining adequate numbers of bodies. As a consequence, some of the extra-mural schools were forced to close, because their supplies were often inadequate for their needs.<sup>6</sup>

John Aitken, for example, in the 1780s complained that if he or his pupils required access to cadavers to allow them to undertake anatomical dissections, they had to travel elsewhere.<sup>7</sup> Adequate legal supplies were at that time only available in Paris, as the system then in force in that city allowed all unclaimed bodies to be transferred rapidly from the hospital mortuaries to Schools of Anatomy. As this arrangement did not involve the intervention of resurrectionists or 'body snatchers,' and the number of unclaimed bodies was more than adequate for those who wished to dissect cadavers as part of their anatomical studies, no legal difficulties were encountered. By contrast, in Edinburgh and elsewhere in Britain at that time, and during the first few decades of the nineteenth century, with very few exceptions all other bodies had to be obtained by non-legal means. While a considerable

number of bodies were transferred from Ireland,<sup>8</sup> not infrequently packages containing rotting cadavers failed to reach their destination, and were opened by either the police or the port authorities because of the terrible smell emanating from them.

In Edinburgh during the late 1820s, and shortly afterwards in London and possibly elsewhere, individuals were even murdered in order to supply the needs of the anatomists, some of whom were less than meticulous about checking the source of their supply. It was principally for this reason that it was felt essential that the 1832 Anatomy Act should be introduced and this was clearly stated in its preamble.<sup>9</sup>

The bodies were almost exclusively obtained from the poor who either possessed no relatives, or if they did, they would not have been able to afford the cost of a proper burial. In Edinburgh, it was considered appropriate that the bodies that were to be used for dissection should be transferred from the place of their death to a neutral dispersal point. This was termed the funeratorium, and its activities were also regulated by the 1832 Act. The aim of this exercise was to allow an equitable distribution of bodies to all of the Schools of Anatomy, based on their needs. While this, at least in principle, should have provided an adequate number of bodies to all of those that required cadavers for their teaching, much concern was expressed, particularly by many in the extra-mural schools, that this was usually far from the case. Indeed, a number of letters were published in the contemporary medical journals emphasising that a disproportionate number of bodies, almost all of which were either 'entire' or 'intact', rather than 'opened',<sup>10</sup> were being transferred to the university. More importantly it was stressed that the number of bodies that were transferred to the University was frequently more than the University could cope with and a number were disposed of despite the fact that they had not been dissected.<sup>11</sup>

### BODIES SUPPLIED TO SCHOOLS OF ANATOMY

The Returns of the University's Anatomy School are available in the Special Collections Section of Edinburgh University Library for most of the period between 1832 and 1840, and at less frequent intervals between then and the beginning of the Spring Session of 1849. Each record contains the name of the individual transferred to the University, where known. It also contains the name of the hospital or location from where the body was transferred e.g. the Royal Infirmary (mostly), the Royal Edinburgh Asylum, one of the various workhouses in Edinburgh, the Cholera or Fever Hospital, or the individual's private address if that was where they had died. The Returns also carried the nominal cause of death, the name of the individual who had signed the death certificate, and the exact date

when the individual had died, if known, and the date and time that they were transferred to the University. In a few cases, if the individual had died in prison, or was drowned, then the exact date of death might not be known. The other information given was when the dissected body was finally 'interred', and where.<sup>12</sup> The Returns of the Inspector of Anatomy for Scotland covering the period from about 1840 are available in the National Archives for Scotland, at West Register House, Charlotte Square, Edinburgh. These records contain similar information to those in the University Library, although they do not indicate whether the bodies were 'intact' or 'opened' before they were transferred to the funeratorium.

### HAZARD OF INFECTION

In 1819, Benjamin Welsh, who was the first Superintendent of the Edinburgh Fever Hospital based at Queensberry House, drew attention to the potential hazard to his staff of exposure to his patients who had been admitted with infectious diseases. While the mortality within the hospital from these conditions was relatively low, at just over 4% during the first year after this hospital opened, some of the staff became infected following exposure to these patients, and a number even died as a result. Thus, both of the physician-clerks, Messrs Stephenson and Christison, the Matron, two apothecaries in succession, the shop boy, the washerwoman and 38 of the nurses became infected, and four of the nursing staff died as a consequence. He also reported that four of the doctors, the shop boy, and nine of the nurses had two attacks of fever, while three of the nurses had three attacks. At the same time, a number of the medical students became infected following exposure to these patients.<sup>13</sup>

Many other instances are known where medical and nursing staff became infected, and occasionally even died from catching infectious diseases from these or similar patients. For example, Dr John Gordon died in June 1818 after catching an infection from a patient in the Infirmary, as did Professor James Gregory in April 1821. What is of particular interest is that the deaths of neither of these individuals were recorded in the Minute Books of the Managers of the Royal Infirmary, despite the fact that both of them were on the staff of that Institution. When Daniel Ellis wrote John Gordon's biography,<sup>14</sup> he noted that one of the doctors from Aberdeen who had written to Dr John Thomson,<sup>15</sup> to express his condolences regarding Gordon's death himself died of typhus fever contracted from a patient in Aberdeen during the interim period. In a contemporary volume of the Minute Books of the Managers of the Royal Infirmary it was noted that 'the Matron of the Fever Hospital had contracted an infectious disease from which she was not expected to recover, while acting as Matron in that Institution.' This risk to the medical staff of death following exposure to

an infectious disease was clearly a known hazard during that period but less appears to have been recorded of medical students catching infectious diseases from cadavers obtained from individuals who died of an infectious disease.

During the Winter Session of 1848–9, for example, a very high proportion of the bodies transferred to both the University and to the extra-mural schools had died from infectious diseases, such as cholera, typhus, typhoid fever, tuberculosis and other unspecified 'fevers' (see Table 1).<sup>16</sup> These bodies were transferred to schools of anatomy before information was known about the transfer of infection from one individual to another. It is nevertheless still surprising that such large numbers were transferred to schools of anatomy, without any suspicion that some at least of them might have posed a health hazard to those that either taught or studied practical anatomy. The Returns of the Inspector of Anatomy<sup>17</sup> indicate that these infected bodies were equitably distributed to the university and to the extra-mural schools during this period. Between 1842 and the end of the nineteenth century, the distribution of bodies was approximately based on the number of students who were studying practical anatomy in the University of Edinburgh and in the various extra-mural schools in the city. The two principal extra-mural establishments that flourished in Edinburgh during this period were located at 11 Argyle Square (Dr Struthers: 1840s) and Nicolson Street (Dr Handyside: 1850s, 1860s and 1870s).

## SUPPLY OF BODIES TO ANATOMICAL CLASSROOMS IN EDINBURGH, 1848–9

The Returns covering the period between 28 September 1848 and 31 December 1848,<sup>18</sup> indicate that a total of 54 bodies were transferred to the University's Anatomy Classroom, and a further eight bodies were transferred to the Argyle Square Anatomy Classroom.<sup>19</sup> These bodies had been transferred from the Edinburgh funeratorium, having been sent there from the Infirmary, the Cholera Hospital, the Royal Edinburgh Asylum and from several of the various Workhouses in Edinburgh. The causes of death and the sources of these bodies are indicated in Table 1. Fifty out of 54 of the bodies that had been transferred to the University's Anatomy Classroom had died of a contagious disease, while seven out of eight of those transferred to the Argyle Square School had also died of an infectious disease.

It appears that during this period a number of these bodies could have posed a potential risk to the health of the students of Anatomy and their teachers. The Returns from the University's Anatomy Classroom<sup>20</sup> indicate how many of the bodies that were transferred to them were 'entire', although this information is not recorded in the Inspectors Returns at West Register House. The sex ratio and average age at the time of death of these individuals was as follows: cholera (Males 19: Females 23; 40.2 years), typhus fever (Males 6: Females 2; 44.3 years), tuberculosis (Males 2: Females 1; 28.7 years), other

**TABLE 1** Causes of death of bodies from various sources delivered to Edinburgh University's Anatomy Classroom and to the Argyle Square Anatomy Classroom during the Winter Session of 1848–49. Key: (a) bronchitis x1, relapsing fever x1; (b) bronchitis x1; (c) bronchitis x1.

Anatomy School	Source of body	Cholera	Typhus	TB	Other infectious disease	Other non-infectious disease	Total
University	Royal Infirmary of Edinburgh	5	7	1	2(a)	1	16
	Edinburgh Cholera Hospital	33	-	-	-	-	33
	Royal Edinburgh Asylum	-	-	1	-	-	1
	City Workhouse	-	-	-	-	1	1
	Edinburgh Charity Workhouse	-	-	-	-	1	1
	West Kirk Workhouse	-	-	-	1(b)	-	1
	Unknown	-	-	-	-	1	1
	<i>Total bodies</i>	38	7	2	3	4	54
11 Argyle Square	Royal Infirmary of Edinburgh	3	1	1	1(c)	1	7
	Edinburgh Cholera Hospital	1	-	-	-	-	1
	<i>Total bodies</i>	4	1	1	1	1	8

infectious diseases (Males 2: Female 2; 51.5 years), deaths from other non-infectious diseases (Males 3: Females 2; 36.6 years).

Clearly the risk of catching cholera or tuberculosis from these bodies depended to a considerable degree on the duration between their death and their transfer to the various Anatomical Schools. With regard to those bodies where the cause of death was from 'other infectious diseases', such as bronchitis, it is unlikely that these would have posed a particular hazard to those that cared for these patients while they were alive or the students who dissected them after their death. In any case, these constituted only a very small proportion of the bodies that had been transferred to either the University or elsewhere. In the case of typhus, it is particularly relevant that infection is not usually acquired by the louse bite, rather by scarification of the skin bite sites containing infected live or dead lice (or fleas) or their faeces.<sup>21</sup>

### FEVER HOSPITALS IN EDINBURGH

Before the opening of Queensberry House in 1818, there was no specifically designated Fever Hospital in Edinburgh, and all patients with, for example, typhus, relapsing fever and cholera had to be admitted to the Infirmary. After an epidemic of typhus in 1817, the managers of the Infirmary obtained permission from the Government to use Queensberry House in the Canongate for this purpose. Queensberry House had since 1801 been used as a barracks, but in 1818 had been unoccupied for some years. It was initially used as a fever hospital with 150 beds from 1818 until the autumn of 1823. Between 1 March 1818 and 28 February 1819, 1676 fever patients were admitted, of whom 1605 recovered and 71 died.<sup>22</sup>

The managers of the Infirmary fortunately obtained a ten-year lease on the building, and it was again used for this purpose when another epidemic occurred between 1826–9. It was closed temporarily in 1829. When an outbreak of cholera occurred in 1831 and 1832, there were over 600 deaths from this condition in the city. These individuals were housed in a number of temporary Fever Hospitals, including Queensberry House, and the latter remained in use as a Fever Hospital until 1834. As the Government had disposed of Queensberry House shortly afterwards, when another epidemic occurred in 1837 these patients had to be accommodated in nine wards in the Infirmary with a total of about 140 beds.

Because fevers occurred intermittently in the city from that time, for example in 1842–3 and again in 1846–8, additional accommodation had to be found, and on these occasions beds needed to be set up in the Infirmary's Chapel, and in tents pitched in the grounds of the Infirmary<sup>23</sup>. Old Surgeons' Hall was one of the buildings requisitioned as an additional Fever Hospital, being

termed the 'Drummond Street Cholera Hospital'. By 1848, and during another epidemic of cholera, this building was again used to accommodate these patients.<sup>24</sup> In Edinburgh, unlike many cities in Britain, no special provision was made until 1881 for a dedicated fever hospital.

### MORTALITY FROM CERTAIN INFECTIOUS DISEASES IN EDINBURGH AND LEITH, 1847–48

An article by Dr J Stark in a contemporary edition of the *Edinburgh Medical and Surgical Journal*<sup>25</sup> provided detailed information on the mortality of individuals living in Edinburgh and Leith during 1848. This article also provided useful background information on the principal conditions that led to the deaths of individuals according to their age and sex and class of disease during 1848, as well as during the previous several years. When the incidence of deaths from epidemic, endemic and contagious diseases in Edinburgh and Leith during 1848 was determined, it amounted to almost 47% of the total mortality that year. In 1846, these conditions resulted in about 24% of the total mortality. It was stated that this dramatic increase in the mortality from these conditions resulted principally from typhus fever, scarlet fever and cholera.

During 1848, 1,092 individuals in Edinburgh and Leith died of typhus fever. In 1847, typhus fever was largely considered to have been an imported disease, principally limiting its attacks to the immigrant Irish population, and in October of that year it assumed the form of a regular epidemic. In 1848, instead of limiting its attacks to the immigrant Irish, and the few native Scots with whom they came in contact, it attacked 'a large proportion of the lowest resident Scottish population'.<sup>26</sup> Of 473 fever patients in the Royal Infirmary on 10 June 1847, no fewer than 379 were natives of Ireland, but only 87 of Scotland and seven of England. On 28 September 1848, of 94 fever cases in that institution, 55 were natives of Scotland, only 35 of Ireland and four of England. Information was also provided on the mortality during the various typhus epidemics that occurred earlier during the nineteenth century (Table 2). With regard to the possible cause of these epidemics, it has been noted that, in 1817, work on the Union Canal began drawing large numbers of labourers and their families from Ireland, most of whom took up residence in Edinburgh.

The second epidemic that involved large numbers of individuals in Edinburgh and Leith was scarlet fever. According to the associated text, '... in Edinburgh, the deaths from scarlet fever during June [1848] amounted only to 24, in August to 44, and in September to 78. It attained its height during October, when the deaths amounted to 130. From this period, the disease began to decline, the deaths falling to 105 in November and to 79 in December.'<sup>28</sup> No comparable mortality from scarlet

**TABLE 2** Number of fever cases admitted into the fever wards of the Royal Infirmary during the various epidemics of typhus fever during the first half of the nineteenth century.<sup>27</sup>

	Fever cases admitted (total)	Monthly average (fever cases)
Nov 1817 to Nov 1820, 3 years	3090	83
Nov 1826 to Nov 1829, 3 years	4318	119
Oct 1836 to Oct 1839, 3 years	4850	134
March 1843 to May 1844, 1 year	4568	380
March 1847 to Sept 1848, 18 months	7960	420

fever had been seen in Edinburgh and Leith since the epidemic that occurred during the autumn and winter of 1835–6. In addition, apart from 12 of these individuals, all were under the age of ten years at the time of their death.

Epidemic cholera was the third fatal disease noted in 1848, and was only the second great epidemic of this disease in Edinburgh during the nineteenth century. The first epidemic of this condition occurred in 1832, and it occurred on various occasions since then, but involving smaller numbers of individuals. In the epidemic of cholera in 1833–34, the cases were almost entirely confined to the 'lowest class of the population'.<sup>29</sup> In 1848, the cases of cholera for the most part occurred 'in those districts of the town which were in the worst sanitary condition as to crowding, ventilation and cleanliness'.<sup>30</sup> In summary, Dr Stark noted that 'these diseases ... typhus, scarlet fever and cholera were the chief agents in raising the mortality of the past year [1848] so much beyond the average mortality of former years'.<sup>31</sup> He continued '... since the advent of the low Irish and their increase among us, typhus fever and other epidemics are on the increase...'<sup>32</sup> In Glasgow, 'during November and December 1848, when cholera raged, the total mortality amounted to 3,374 deaths, of which number 1,420 were attributed to cholera...'<sup>33</sup>

According to Stark, consumption (or tuberculosis) was a much more fatal disease during the eighteenth than the nineteenth century. This was believed to be due to the much poorer sanitation and ventilation of the houses and increased degree of crowding in which the population lived during the previous century. Between 1740–60 about 19% of the population died from this condition. This rose to just over 20% from 1760–70 and over 26% from 1780–90, while between 1846–48 it accounted for just over 11% of total deaths in Edinburgh, and just under 10% in Leith. Between 1780–90 it proved fatal in one out of 125 of the population, while in 1845–47 it accounted for only one out of 213 inhabitants. It was believed that this improvement was due to the great improvements that had been achieved in public health measures during this period.<sup>34</sup>

## EMBALMING OF BODIES DURING THE NINETEENTH CENTURY

During the late 1840s none of the bodies that were transferred from the funeratorium, or after their arrival in the Anatomical Schools, would have been embalmed before dissection was undertaken. The fact that William Sharpey, in University College, London, had experimented with a variety of means of embalming the bodies he received during the 1830s was well known to many in Edinburgh. This included Allen Thomson, one of the extramural lecturers in Anatomy,<sup>35</sup> but embalming was not normally carried out in Edinburgh at that time.

The various methods employed by Sharpey in London were also effective, although he tended to use toxic substances such as arsenic, lead, mercury, zinc and other chemicals for this purpose, and some of these substances were said to have had an antiseptic effect. Almost all of these chemicals would have posed substantial problems to the students and others who undertook their anatomical examination. It was only towards the end of the nineteenth and early part of the twentieth century, with the introduction of formalin fixation, that the bodies posed less of a hazard to those who undertook their anatomical examination.<sup>36</sup>

Robert Knox, for example, embalmed the body of Mary Paterson in alcohol when he wished to retain her body to display it to his class some months after he received it from Burke and Hare.<sup>37</sup> Similarly, Nelson's body was embalmed in rum immediately after his death at Trafalgar, in order that it should be in a reasonable state when it was received at Portsmouth, and later transferred to London for his State Funeral. After the implementation of the 1832 Act, however, bodies had to be disposed of within a relatively short time after their receipt in Schools of Anatomy.

Relatively recently, a paper was published in the *Anatomical Record* that emphasised the potential hazard of exposure to certain infectious agents.<sup>38</sup> It was explained that the agents in fixed cadavers that still posed a hazard included mycobacterium tuberculosis, hepatitis B and C, the AIDS virus, HIV and the prions that cause

transmissible spongiform encephalopathies, such as CJD and GSS. This paper also emphasises the safety precautions necessary to avoid accidental disease transmission from cadavers both during their fixation and during their dissection, and discusses the means of decontaminating the local environment afterwards. How much more infective would have been the unfixed bodies transferred to anatomy schools of the late eighteenth and nineteenth centuries. This clearly applied to all of those bodies where the cause of death was an infective disease.

## CONCLUSIONS

It has not been possible to provide any figures of the number of medical students or their teachers who died or became infected following exposure to infective cadavers during the eighteenth and nineteenth centuries. It is clear, however, that some of these individuals are likely to have become infected following exposure to some of these bodies, and probably a smaller number may even have died as a result. A considerable number of examples are known where medical, nursing and allied staff as well as medical students died during their medical studies including, in Edinburgh, at least one President of the Royal Medical Society.<sup>39</sup> While it is likely that some died as a result of exposure to patients with infective conditions in the wards of the various hospitals that they attended, it is

equally likely that some died while undertaking Practical Anatomy classes when they were exposed to unfixed 'infected' bodies.

Attempts were made to determine the number of medical students or their teachers who died as a result of diseases transferred to them from exposure to the infective bodies that their Schools had received, particularly during the Winter Session of 1848–49. This, however, proved impossible, because this was before the time that all deaths had to be registered. This first occurred in 1858. Despite this, there can be little doubt that some, at least, of these bodies posed a real risk to both the students who dissected them, and to their teachers. Analysis of the Returns located both in the University Library and at West Register House covering the Sessions between 1832 and 1900 demonstrated that by far the highest incidence of potentially infected bodies were transferred to Anatomical Schools during the Winter Session of 1848–49.

## ACKNOWLEDGEMENTS

The author thanks Dr Morrice McCrae and Dr James Gray for their helpful observations during the preparation of this manuscript.

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- 2 See, for example: Edinensis. *Study of Anatomy in Edinburgh. The Lancet* 1837–38; **1**:589–90 [letter to Editor].
- 3 Anon. *Evidence, Oral and Documentary, Taken and Received By The Commissioners Appointed by His Majesty George IV. July 23rd, 1826; And Re-appointed by His Majesty William IV., October 12th, 1830; For Visiting The Universities of Scotland. Volume 1.* University of Edinburgh. Presented to both Houses of Parliament by Command of His Majesty. London: W Clowes & Sons; 1837; 508.
- 4 Anon. *The Statutes at Large from the twelfth year of the reign of King George the Second to the thirtieth year of the reign of King George the Second. Cap. XXXVII. An Act for better preventing the horrid Crime of Murder.* London: Mark Basket, Robert Basket, Henry Woodfall & William Strahan; 1764; **7**:440–1.
- 5 According to Lonsdale, writing of Dr Knox 'If the ordinary price was 10l [i.e. £10 sterling], Knox in need would give 15l., and on one occasion actually paid 25 guineas rather than see his class disappointed. ... in one session he lost the almost incredible sum of 700l. or 800l. by "subjects" alone, – a loss vastly surpassing some anatomical lecturers' entire gains.' See: Lonsdale H. *A Sketch of the Life and Writings of Robert Knox the Anatomist. By His Pupil and Colleague.* London: Macmillan & Co; 1870; 92.
- 6 James Syme encountered considerable difficulties in obtaining an adequate supply of bodies to supply his extra-mural teaching rooms. In the summer of 1826 he went to Dublin to secure a more steady supply of bodies, but by the time he returned to Edinburgh he had already decided to withdraw from the teaching of Anatomy, although he continued to teach Surgery. See: Kaufman MH. *Medical Teaching in Edinburgh during the 18th and 19th centuries.* Edinburgh: Royal College of Surgeons of Edinburgh; 2003; 119.
- 7 Kaufman MH. John Aitken (d 1790) – grinder or scholar? *J Med Biog* 2003; **11**:199–205.
- 8 Tea chests or other substantial packages were usually shipped to Liverpool or to Glasgow, and then transferred by stagecoach to Edinburgh or elsewhere.
- 9 Kaufman MH. Transfer of bodies to the University of Edinburgh after the 1832 Anatomy Act. *J R Coll Phys Edinb* 2004; **34**:228–36.
- 10 'Intact' or 'entire' bodies were those where no preliminary exploration had been made in the Infirmary or elsewhere, usually by the Clinical Clerks, to either establish or confirm the cause of death. Thus if the patient had a chest complaint, on some occasions the thoracic cavity would be 'opened' to study the appearance of the lungs. Information relating to whether the individual was 'entire' or 'opened' when they left the hospital or workhouse was only provided in the University's Returns, not in those available in West Register House.
- 11 Edinensis, *op. cit.* ref. 2.
- 12 During the 1830s, bodies from the University were interred in Greyfriar's Churchyard. In the late 1840s and 1850s they were interred in Newington Necropolis, while in the late 1860s they were interred in Newington Cemetery.
- 13 Welsh B. *A Practical Treatise on the Efficacy of Bloodletting in the Epidemic fever in Edinburgh, Illustrated by Numerous Cases and Tables, Extracted from the Journals of the Queensberry House Fever Hospital.* Edinburgh: Bell & Blackfute; **1819**:44–47. For additional information on the early hospital provision for Edinburgh's fever patients, see Gray JA. *The Edinburgh City Hospital.* Edinburgh: Tuckwell Press; 1999:37–81.
- 14 Ellis D. *Memoir of the Life and Writings of John Gordon, M.D., F.R.S.E., late Lecturer on Anatomy and Physiology in Edinburgh.* Edinburgh: A Constable & Company; London: Hurst, Robinson & Company; 1823.

- 15 Gordon had been an apprentice and favourite pupil of Thomson. For five years from 1807, until he married in June 1812, he lived with the Thomson family. Despite the fact that Gordon's family had intended that he should enter the medical service of the Honourable East India Company, it was Thomson who had suggested that Gordon should become a teacher of Anatomy in Edinburgh.
- 16 Analysis of the Returns indicates that during the Winter Session of 1847–8, a higher proportion of bodies that had died from an infectious disease were transferred to Schools of Anatomy than during any other Session for which records are available.
- 17 The Returns of the Inspector of Anatomy for Scotland are available for inspection in the National Archives for Scotland, at West Register House, Charlotte Square, Edinburgh, Scotland.
- 18 At this time, John Goodsir was Professor of Anatomy in the University of Edinburgh, and held this post from 1846. On Professor John Goodsir's death in 1867, William Turner succeeded him. See: Turner W (editor). *The Anatomical Memoirs of John Goodsir F.R.S. with a Biographical Memoir by Henry Lonsdale, M.D.* 2 Volumes. Edinburgh: Adam & Charles Black; 1868 [Goodsir's Biography, 1:1–203].
- 19 A number of volumes, or Returns, from the University's Anatomy Classroom to the Home Office covering the complete period between December 1832 until 16 December 1837 are available. There is a gap in the records between then and March 1840. The record is then available between then and June 1842. A very incomplete series of Returns are available between then and about 1850. See the 'special collections' section, Edinburgh University Library, Reference Number Att. 50. See also ref.16 for information about the Returns available in the National Archives for Scotland, at West Register House, Charlotte Square, Edinburgh, Scotland.
- 20 This only refers to 30 of the 54 bodies transferred to the University during this session.
- 21 According to Weiss 'If the patient is infected with lice, transmission to other humans readily occurs ... the lice are invariably killed by the infection, but survive long enough (one to three weeks) to carry the infection to other individuals. Migration of the lice from one person to another is stimulated by the patient's fever, or by his or her death.' The text continues 'Death of the patient is usually due to terminal shock due to collapse of the blood vascular system. ... The invertebrate vector is usually, but not exclusively, the human body louse, *Pediculus humanus corporis*, while the infective organism is *Rickettsia prowazekii*.' See: Weiss E. Rickettsias, in: Lederberg J (editor-in-chief). *Encyclopedia of Microbiology*. San Diego: Academic Press; 3:1992; 585–610.
- 22 Turner AL. *Story of a Great Hospital: The Royal Infirmary of Edinburgh 1729–1929*. Edinburgh & London: Oliver & Boyd; 1937; 157–8.
- 23 *Ibid.*, 159.
- 24 The Managers of the Infirmary had purchased Old Surgeons' Hall from the Royal College of Surgeons of Edinburgh in a very dilapidated state in June 1833. It needed to be completely refurbished, and was then used by the Managers for a number of purposes over the years, depending on the needs of the Infirmary at these various times. See *ibid.*, 184; Kaufman, *op. cit.* ref.6, 21–3.
- 25 Stark J. On the Mortality of Edinburgh and Leith for the year 1848, with Remarks on the Mortality prevailing in the chief Towns of Scotland during that period. *Edinb Med Surg J* 1849; **71**:380–409.
- 26 *Ibid.*, 385–6.
- 27 *Ibid.*, 386. The author noted: '... it is at once seen that typhus fever on every succeeding epidemic is becoming a more formidable and prevalent disease.'
- 28 *Ibid.*, 388.
- 29 *Ibid.*, 389.
- 30 *Ibid.*, 390.
- 31 *Ibid.*, 392.
- 32 *Ibid.*, 394.
- 33 *Ibid.*, 392.
- 34 *Ibid.*, 395–6.
- 35 The correspondence between William Sharpey and Allen Thomson between 1836 and 1880 is held in the Library of the University of Glasgow. It has been edited by Jacyna, and published by the Wellcome Institute for the History of Medicine. See Jacyna LS (editor). *A Tale of Three Cities: the correspondence of William Sharpey and Allen Thomson*. London: Wellcome Institute for the History of Medicine; 1989.
- 36 Polson CJ, Brittain RP, Marshall TK. *The Disposal of the Dead*. London: English Universities Press Ltd; 1953; 24–9.
- 37 Roughead W. *Burke and Hare*. Edinburgh: William Hodge & Co. Ltd; 1921. Kaufman MH. Another look at Burke and Hare: the last day of Mary Paterson – a medical cover up? *Proc R Coll Phys Edinb* 1997 **27**:78–88.
- 38 Demiryürek D, Bayramoglu A, Ustaçelebi S. Infective agents in fixed human cadavers: a brief review and suggested guidelines. *Anat Rec* 2002; **269**:194–7.
- 39 One of these individuals was Robert Newbigging. He died while in office as Third Junior President of the Royal Medical Society during their 1832–33 session. See: Kaufman MH. Sir William Newbigging (1772–1852) and Patrick Newbigging (1813–1864) – father and son Presidents of the Royal College of Surgeons of Edinburgh. *J Med Biog* 2004; **12**:189–195.