

TRANSFER OF BODIES TO THE UNIVERSITY OF EDINBURGH AFTER THE 1832 ANATOMY ACT

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FACTORS THAT LED TO THE INTRODUCTION OF THE 1832 ANATOMY ACT

During the eighteenth century, the number of bodies ('subjects' or cadavers) that were legally transferred to named Anatomists or Surgeons in Edinburgh during any particular year was usually extremely small, depending on the number of individuals who were sentenced by the courts and executed by hanging. Accordingly, additional bodies often had to be purchased from professional grave robbers or resurrectionists, or obtained by enthusiastic medical students who occasionally went out on night forays to graveyards to obtain the bodies of recently buried individuals. Other bodies, usually of individuals with abnormal skeletons, such as giants, dwarfs, individuals with hydrocephalus or skeletal deformities were also much sought after for displaying in anatomical museums.¹

The situation changed dramatically after 1826, when the Royal Commissioners supported the view of many Anatomists and Clinicians that it would be advantageous if medical students were required to undertake Practical Anatomy, during which they would be expected to dissect one or more cadavers.² This became a requirement for those wishing to take the LRCS Edin Diploma in 1826, and those taking the Edinburgh MD degree during the following year. In order to cater for the enormous increase in the number of cadavers required by Schools of Anatomy, an increased load was put on the resurrectionists, as well as on the enthusiastic medical students. However, the need in all of the Anatomical Schools in Edinburgh was far greater than could be supplied from these sources, and considerable numbers of additional bodies were transported to the city from suppliers in London and particularly from Ireland. In Edinburgh, individuals such as Burke and Hare also flourished, although they murdered individuals to obtain fresh cadavers to supply the Anatomists, rather than obtaining them by grave robbing. During the late 1820s, Dr Robert Knox, for example, required large numbers of 'subjects' per year to satisfy the needs of his Anatomical Class,³ and other teachers both of Anatomy and Surgery also needed to be supplied.

Not surprisingly, measures were taken by the public to reduce the number of bodies of recently deceased individuals who were grave robbed, and there was considerable alarm in the community when evidence of grave robbing was reported to the authorities. Despite this, little was done until the authorities in London realised

the scale of the activities of individuals such as Burke and Hare in Edinburgh who are believed to have supplied Dr Knox with at least 15 or 16 bodies of murdered victims during 1827–28. While Burke and his common-law wife were put on trial, it was only because his accomplice Hare turned King's Evidence that Burke could be convicted of murder and was subsequently executed on 28 January 1829.⁴ Due to similar events in London, the authorities brought in an appropriate Act of Parliament to replace the 1752 Act.⁵ It was formerly believed that this would be an adequate deterrent, but this was clearly not the case. It was therefore replaced by the Anatomy Act of 1832.⁶ The preamble to this Act gives an indication as to why it was considered necessary to introduce such an Act before Parliament. It stated:

And whereas the legal Supply of Human Bodies for such Anatomical Examination is insufficient fully to provide the Means of such Knowledge: And whereas, in order further to supply Human Bodies for such Purposes, divers great and grievous Crimes have been committed, and lately Murder, for the single Object of selling for such Purposes the Bodies of the Persons so murdered: And whereas therefore it is highly expedient to give Protection, under certain Regulations, to the Study and Practice of Anatomy, and to prevent, as far as may be, such great and grievous Crimes and Murder as aforesaid . . .

After considerable difficulties and delays, Henry Warburton's Anatomy Act was eventually given the Royal Assent on 1st August 1832.⁷ According to Section XX, the Anatomy Act states 'And be it enacted, That this Act shall commence and take effect from and after the first Day of August in the present Year [1832].' This Act⁸ therefore replaced the 1752 Act entitled 'An Act for better preventing the horrid Crime of Murder.'⁹

According to Section II of the 1832 Act, the Secretary of State was to appoint

not fewer than Three Persons to be Inspectors of Places where Anatomy is carried on, and at any time after such first Appointment to appoint, if they shall see fit, One or more other Person or Persons to be an Inspector or Inspectors as aforesaid . . .

The Secretary of State appointed Dr James C Somerville as His Majesty's Inspector for London and the Provinces in 1832. Shortly after his dismissal from this post in

August 1842 for complicity in contraventions of the Act,¹⁰ Mr Rutherford (later Sir Rutherford) Alcock¹¹ was appointed to succeed him as Her Majesty's Inspector for London, Mr John Bacot¹² as Her Majesty's Inspector for the Provinces, and possibly Dr A Wood as Inspector of Anatomy for Scotland.¹³ Dr David Craigie was appointed the first Inspector for Scotland in 1832. Dr Somerville and the other Inspectors had difficulties with the implementation of the Act, and Rutherford Alcock resigned from this post just over a year after his appointment to it principally because of the numerous difficulties he had encountered in its implementation.

According to Michie, in his biography of Sir Rutherford Alcock:

Like many other Acts of legislature in this country, it was a compromise by which difficulties were sought to be evaded by cunningly devised phrases whereby the thing that was meant was so disguised as to appear to be something else. The Act failed in two most important points; it failed in honesty, and was wanting in the extent of the powers conferred . . . after ten years' trial the Act was becoming unworkable, and a reform in its administration was imperatively demanded. It was at that critical moment that Mr Alcock was nominated as one of two inspectors under the Act . . .¹⁴

Before the end of his first year in office, the two Inspectors submitted a Report in which they drew attention to what they perceived to be the principal deficiencies in the Act. They prepared a second Report in 1843, and Alcock submitted a number of other Memoranda on this topic.

DR CRAIGIE, THE FIRST INSPECTOR OF ANATOMY FOR SCOTLAND

Dr Craigie had graduated with the MD degree from the University of Edinburgh in 1816,¹⁵ and shortly afterwards became one of the Resident Physicians in the Royal Infirmary of Edinburgh. In 1818, he was elected a member and in the 1819–20 Session he was elected First Junior President of the Royal Medical Society. Craigie's initial appointment to the Infirmary was on 13 January 1817, when he was elected one of the Clerks to the House in place of John Lamb LRCS Edin 1816, MD Edin 1815, who had previously resigned.¹⁶

In 1818, within only two years of his graduation, Craigie started teaching Anatomy in Number 3 Surgeons' Square. He had followed a Dr Smith in this capacity, but it appears that neither was particularly successful in this regard, although Craigie taught this subject from 1818 until 1822.¹⁷ It can only be assumed that this episode might have been one reason his name had been considered for the post of Inspector of Anatomy for Scotland. He was a distinguished classical scholar and

linguist, and with Robert Christison succeeded Andrew Duncan *junior* as co-editor of the *Edinburgh Medical and Surgical Journal*. He acted as sole editor of this journal from 1832 until 1853 when he was himself succeeded by William Seller. Apart from being a physician to the Royal Infirmary of Edinburgh he was a voluminous writer on both clinical and pathological subjects.¹⁸

Dr Craigie was elected to a Fellowship of the Edinburgh College of Physicians in 1832, and on 4 March 1833 to an ordinary Fellowship of the Royal Society of Edinburgh. He was elected Physician to the Edinburgh Royal Infirmary early in 1833 and held this post for 13 years before he was forced to resign due to ill health. He was also elected the College's Secretary in 1836, and was annually re-elected for the succeeding 12 years, but was compelled by ill health to resign this office in 1848. In December 1861, when his health improved, he was elected President of the Edinburgh College of Physicians, and filled this post with distinction for the following two years.

There appears to be minimal information published to date on his appointment as Inspector of Anatomy for Scotland after the implementation of the 1832 Anatomy Act. For reasons that are unclear, he resigned from this post in 1835. Dr Andrew Wood is believed to have succeeded Dr Craigie as Her Majesty's Inspector of Anatomy for Scotland in 1842.¹⁹ If this was indeed the case, between 1835, when he resigned from this post, until 1842, the Inspector of Anatomy for London must have undertaken the supervision of the Act in Scotland.

In the obituaries of Dr Craigie published in the *Edinburgh Medical Journal*,²⁰ in the *Lancet*,²¹ and in the *Dictionary of National Biography*,²² there is no indication that he ever held this important appointment. Similarly, no mention is made of this appointment in Craigie's tercentenary *History of the Royal College of Physicians of Edinburgh*.²³ In the brief account of Craigie's activities published by Struthers,²⁴ a single line indicates as follows 'In 1832 he was appointed Inspector of Anatomy for Scotland under the Anatomy Act, and held the office for several years.'²⁵ Comrie published a similar statement, confirming that his date of appointment to this post was indeed 1832.²⁶

SITUATION IN EDINBURGH

After the implementation of the 1832 Act the large hospitals and the Poor Law Institutions throughout the country were able to exert a monopoly on the supply of bodies. Initially, at least, they supplied all of their available bodies to schools associated with specific teaching hospitals, and largely excluded all of the smaller (i.e. the Extra-mural) anatomy schools of bodies to which they might have been entitled if a more equitable arrangement had been in place. An indication of the position in Edinburgh in 1838 may be gauged from a section of the letter published by the *Lancet*. This was

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clearly sent to the Editor by one of the Extra-mural lecturers in Anatomy in Edinburgh, and published under the pseudonym of 'Edinensis'. It is dated 24 December 1838, and states:

... Previous to the passing of the Anatomy Bill the number of bodies did not meet the necessary demand for the teachers, and the price of an adult subject varied from £16 to £22. After that Bill came into play, and during Dr. Craigie's inspectorship, they nearly met students' demand, and averaged in price £5. *Since his resignation, at the latter end of 1835* [author's emphasis], there has been an ample supply, in all the rooms, at the low price of £3.

Our students now have every facility, not only of prosecuting their anatomical studies, but also of practically studying operative surgery, and at a cost very little higher than the vaunted economy of foreign schools; and these advantages might be still more improved. And these opportunities still more extended, if the unfair system of monopoly did not still exist in our University. Every unclaimed body which dies in the Infirmary and is unopened, is sent, not to the teachers in turn, or in a ratio corresponding with the number of their students, but to the anatomical rooms of the University, sent there indiscriminately, unwished for, and with the knowledge that they will be wasted ... The unclaimed bodies which are made the subjects of inspection in the Infirmary are, indeed, distributed to the extra-collegiate lecturers, but those bodies are almost always in such a mangled state as to be nearly useless. The College Professor refuses to admit an opened body. Still, however, the voluntarily attended extra-collegiate classes are flourishing, and, through the exertions of the private lecturers, Edinburgh bids fair to resume her ancient pre-eminence.²⁷

One particular difficulty in establishing the exact dates that Craigie was Inspector of Anatomy for Scotland comes from the information provided by Jacyna. He discussed the monopoly in the supply of bodies to the Extra-mural Schools in Edinburgh, and stated that an arrangement was made between the Extra-mural teachers and William Campbell, Director of the Edinburgh Funerary. This was to ensure that an equitable supply of bodies reached both Dr Monro at the University and the Extra-mural teachers.²⁸ It is unclear exactly when this might have occurred. Previously, during the mid-1830s, in a report signed by WP Alison, and dated 6 March 1837 (see below), he drew attention to the fact that an arrangement had been made between the Extra-mural teachers and Mr Waugh,²⁹ to supply 'subjects' to the various Anatomical Schools in Edinburgh.

On 3 March 1842, Campbell wrote to William

Mackenzie, Monro's assistant at that time, in the following terms:

Dr Monro has been in the practice lately of obtaining his supply from other sources without my knowledge and without any communication with or recognising me on the matter, and certainly altogether exclusive of the arrangement alluded to by you, as made some years ago, with the sanction of the Authorities ... Dr Monro ... has stood aloof from its [i.e. the Funerary's] concerns and arrangements – and contributed next to nothing to its support – Has taken his own separate and independent course, in procuring Bodies – and altogether on his own responsibility, without my knowing any thing of the matter, except accidentally.³⁰

This was not the first occasion that problems along similar lines had been encountered in Edinburgh. According to Richardson, a similar situation had arisen in Edinburgh during the latter part of 1833, not long after the introduction of the Anatomy Act. She noted that: 'Inspector Craigie experienced similar obstruction from Monro and Mackenzie in Edinburgh.'³¹

According to Jacyna, 'In 1842, James Somerville, *the new Inspector of Anatomy for Scotland* [author's emphasis] had charged Mr Campbell with ensuring an equitable distribution of bodies to all those who needed them for their teaching activities.'³² Somerville's visit to Edinburgh had occurred some months before the Home Secretary dismissed him (see previously). The following statement appears in the *Minutes of the Managers of the Royal Infirmary of Edinburgh dated 4 July 1842*, and provides information on the reason for Somerville's visit to Edinburgh:

Dr Somerville the Government Inspector of Anatomy was introduced and laid regulations for the Equitable distribution of Dead bodies to the University and schools of Anatomy and Surgery in Edinburgh before the Managers which were ordered till next Meeting.³³

'RETURNS' FROM UNIVERSITY'S ANATOMY PRACTICAL CLASSROOM

A complete list of the 'Returns' supplied initially to the Inspector of Anatomy for Scotland, presumably for subsequent transfer to the Home Office in London, in relation to Dr Monro *tertius's* Practical Class in the University of Edinburgh still exists in the Special Collections Section of Edinburgh University Library.³⁴ This confirms much of what appears in the letter written by 'Edinensis'. No documentation, however, has been located in Edinburgh that provides comparable information on the number and details of the bodies that were transferred to the various Extra-mural Schools of Anatomy that flourished in Edinburgh shortly

after October 1832. While there seems every likelihood that similar 'Returns' must have been prepared by Knox and others, these have yet to be located, but may be in the files of the Public Record Office in London.

While only incomplete records are available, they are nevertheless instructive. The first set of 'Returns' covers the complete period between December 1832, shortly after the implementation of the Anatomy Act, until 16 December 1837. There is a gap in the records between then and March 1840. The record is available between then and June 1842. Even though this information is in some regards incomplete covering the period between 1832 and June 1842, it is still extremely informative, as it supplies the following detailed information:

- the number of bodies supplied each academic year to Monro's Practical Class over the various periods indicated;
- the recorded causes of death of these individuals;
- the names of the physicians or surgeons who signed the death certificates and indicated what in their opinion was the cause of death;
- the sex of the individuals and their age where this was known;
- their previous abode, where known; the majority of the bodies that were transferred to the Anatomy Classroom during this period came from the Royal Infirmary of Edinburgh. This was usually associated with the statement that no information was available on the individual's previous immediate place of abode;
- the fate of the bodies before they were transferred to the University; whether they had been 'opened' or whether they had been 'entire' when they left the Infirmary or elsewhere;
- the dates of the interment of these bodies, thus providing information on the duration that they remained in the Anatomy Department before they were interred;
- very occasionally, information was available to indicate that the bodies were 'rescued' from the Classroom, and 'buried by friends [often] before [but occasionally after] they had been dissected'.

A different style of 'Returns' was employed between March 1840 and about 1850. This series is unfortunately very incomplete and, in addition, contains far less information than in the earlier two volumes.

NUMBER AND CONDITION OF 'SUBJECTS' SUPPLIED EACH YEAR TO THE UNIVERSITY DURING THE PERIODS STUDIED

The total number of bodies transferred to Monro's Anatomy Classroom in the University of Edinburgh during the Winter and Summer Sessions of 1832–33 (20), 1833–34 (28), 1834–35 (31), 1835–36 (35) and during the Winter and Summer Sessions of 1836–37 (61) are indicated in parentheses. Similar information is

also available for the Summer Session of 1840 (19) and Winter and Summer Sessions of 1840–41 (28)

Reference to the *Minutes of the Managers of the Royal Infirmary of Edinburgh* covering approximately the same period was also extremely instructive in certain regards. One of the Reports, dated 6 March 1837, provided information not only on the number of bodies supplied to the University but also to the various Extra-mural lecturers.³⁵ This Report was prepared to investigate a letter dated 16 January 1837 sent to the Managers from students of Practical Anatomy who attended Dr Handyside's Extra-mural Class following information they had received from Mr Waugh, Treasurer to the City Charity Workhouse. Dr WP Alison prepared this Report in his capacity as Convenor of the Managers' Committee. His Report stated:

Your Committee have learned from Mr Waugh that during the present Session [i.e. Winter 1835 and Summer Session 1836] Thirty-five bodies ... have been sent to the University from the Infirmary, of which only fourteen were entire; and that during the same time fifty eight bodies (a much larger proportion of which were entire) have been distributed among the different extra academical schools of which 54 have been distributed among the three teachers who keep dissecting rooms; the average being 18 to each.

Now of the subjects from the Infirmary sent to the University, at least five must before this period of the Session have been assigned to the Public lecturers on Anatomy & Surgery. If the remaining thirty had been added to the fifty four which were distributed among the teachers keeping dissecting rooms out of the University, and the division had taken place among four teachers instead of three, as proposed by the students, the average supply to each of the extra academical teachers would have been 21 instead of 18, and a larger proportion of the subjects supplied would have been mutilated.³⁶

The number of bodies indicated by Alison that were transferred to the University does not appear to be consistent with the numbers in the 'Returns from the University' presented to the Inspector of Anatomy. According to these records the number of bodies transferred to the Infirmary is as indicated previously.

The Secretary of State wrote a letter to the Managers that was reported in their *Minutes* dated 12 June 1837. This stated:

A Letter was read from the Secretary of State for the Home Department to the managers on the subject of the working of the Anatomy Bill, and the supply of Bodies from the Royal Infirmary, which was

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remitted to Dr Alison to report upon.³⁷

On 19 June 1837, the following appeared in the *Minutes*:

Dr Alison read the Draft of an answer to the Letter from the Secretary of State, which he had prepared after enquiring into the facts in the proper quarters. The managers approved of the proposed answer . . .³⁸

SUPPLY OF 'SUBJECTS' IN EDINBURGH AND LONDON

Despite what may appear to be the generous number of 'subjects' that were transferred to the University's Anatomy Classroom over the first five to seven years or so after the implementation of the Anatomy Act, the total number transferred was said to be small compared to that supplied to comparable institutions in London. William Sharpey indicated to Allen Thomson, that 'subjects' from London could readily be made available to supply all of his needs in Edinburgh. Sharpey stated that: 'You can have what you like by paying for the interment. Sections of heads, pelvises, and their contents, ligaments &c. Prepared muscles &c. The only difficulty is the expense of spirits . . .'³⁹ In a subsequent letter, dated 23 February 1839, Sharpey even dispatched a few preparations to Thomson to assist him in providing illustrations for his lecture course.⁴⁰

There had for a long time been a close working relationship between Sharpey, who had moved to London in the summer of 1836 when he became Professor of Anatomy and Physiology at the University of London, later to become University College, London⁴¹ and Allen Thomson. Sharpey had offered his first course of lectures in the Edinburgh Extra-mural School in 1831–32 in partnership with Thomson.⁴² While Sharpey had taught Anatomy, Thomson concentrated on the teaching of Physiology, except during the last few years when he taught with Sharpey, and also lectured on Anatomy. Thomson had also accompanied Sharpey to Germany in 1831 to assist him in the collection of appropriate anatomical preparations. In 1839, Thomson accepted the Chair of Anatomy at Marischal College, Aberdeen, but returned to Edinburgh in 1841 when he reverted to teaching Anatomy in the Extra-mural School in Edinburgh. In the following year, he succeeded William Pulteney Alison as Professor of the Institutes of Medicine. On James Jeffray's death on 28 January 1848,⁴³ he succeeded him in the Regius Chair of Anatomy in the University of Glasgow, and remained there for 29 years.

'OPENED' AND 'ENTIRE' BODIES THAT WERE TRANSFERRED TO THE UNIVERSITY

The term 'opened' first appears in the 'Returns' of the Winter Session of 1835–36, and Summer Session of 1836. In this combined group, there were 35 bodies transferred to the University from the Infirmary, and of these the term 'opened' appears against five, and the possibility exists that this occurred in at least another six cases. In

the following academic year, the term 'opened' appears against 8 of the 26 bodies transferred from the Infirmary in the Winter Session of 1836–37. This term appears against 16 of 35 bodies transferred in the Summer Session of 1837, although in both groups it is likely that additional bodies had been treated in this way before they had been transferred from the Infirmary, although this information does not appear in the 'Returns'.

'Entire' bodies were those where no preliminary exploration had been made in the Infirmary, usually by the 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. The teachers of Anatomy often complained if the body they received had been 'opened,' as it was in their view, 'mutilated' and therefore unsuitable for their needs. In November 1838, for example, Doctor Monro and Sir Charles Bell had complained about the mutilated state of the bodies sent to the University.⁴⁴ In a later example, in March 1843, the Professors of Surgery and Anatomy in a letter addressed from Old College complained to the Managers that:

. . . we are compelled to call the particular attention of the Managers of the Royal Infirmary to the neglect paid to the regulations framed by the Managers regarding the post mortem examinations of morbid Bodies which take place in the Hospital, in consequence of which Bodies are opened without the sanction of the Managers – they are frequently very much mutilated, and rendered unfit for the illustration of our Lectures.

Signed: James Miller, Geo. Ballingall, Alex. Monro – Prof. of Anatomy⁴⁵

This was followed up in the *Minutes* by a short statement that indicated 'that they [i.e. the Managers] had given such directions as would they hoped prevent the recurrence of the irregularities complained of'.⁴⁶

RECORDED CAUSES OF DEATH OF THESE 'SUBJECTS'

About 35% of the bodies transferred to the University between the Winter Session of 1832 and the end of 1837 were listed as having died from one of three conditions: tuberculosis, fever or erysipelas. It is unclear whether any of these bodies may have harboured infective organisms and made the bodies a potential risk to the students of Anatomy who subsequently dissected them. This was more likely to have been the case if these bodies were 'entire' when they were transferred to the University or elsewhere. This would almost certainly have been the case in those bodies that had been transferred within a few days of the death of the individual, as it is most unlikely that they would have been kept under refrigerated conditions during the interim period.

With regard to those individuals where the term 'tuberculosis' (also termed 'consumption' or 'phtthisis') was given as the principal cause of death, it is likely that many others where, for example, the cause of death was given as 'lung disease' or even 'bronchitis' had probably also died from tuberculosis. Where the term 'fever' was exclusively used, it is impossible now to establish what the exact cause of death might have been. As many of the patients in the Infirmary suffered from infectious diseases, it was not uncommon for these to be passed to the medical staff, occasionally with fatal consequences. For example, both Dr John Gordon⁴⁷ and Professor James Gregory⁴⁸ died from 'fever' caught during the course of their clinical duties in the Infirmary. According to Richardson, Oliver Wendell Holmes was drawn to make the connection between puerperal fever and sepsis as the result of the death of an anatomist friend after sustaining a wound in such a dissection.⁴⁹ After an epidemic of typhus in Edinburgh in 1817, the managers of the Infirmary obtained permission from the Government to use Queensberry House in the Canongate as a Fever Hospital. Between 1 March 1818 and 28 February 1819, 1,676 fever patients were admitted there, of whom 1,605 recovered and 71 died.⁵⁰

AGE AND SEX OF 'SUBJECTS' WHERE KNOWN

An analysis of the 169 bodies of individuals over the age of ten years who had been transferred to the University between the Winter Session of 1832 and 16 December 1837 indicated that 89 were males and 80 were females. The average age at death of the males was 43.7 years, while that of the females was 35.4 years. It should be noted, however, that in a considerable number of cases, the age indicated in these 'Returns' was an approximate one that had been provided by the clinician who signed the Death Certificate. The latter also indicated what, in their opinion, was the most likely cause of death.

STORAGE AND TREATMENT OF BODIES AFTER THEY REACHED THE UNIVERSITY

Very little information has been published on the treatment of the bodies once they reached the Department of Anatomy. The bodies that were retained for relatively long periods of time were usually 'fixed' in spirit, such as whisky, in order to prevent them deteriorating to such an extent that they would not be suitable for use by either the lecturers or their students. This was the method used by Dr Knox in the case of Mary Paterson, whose body he wished to retain until he considered it appropriate to display it before his class. Her body was put in spirit for a time, so that when he came to treat of the myological division of his course, a further and daily publicity was given to her remains.⁵¹ According to Roughead: 'the girl Paterson was only four hours dead till she was in Knox's dissecting rooms; but she was not dissected at that time, for she was three months in whisky before she was dissected. She was warm when Burke cut the hair off her head; and Knox brought a Mr [John Oliphant], a painter, to look at her ...'⁵²

It should also be recalled that Nelson's body was returned to Portsmouth in a barrel of brandy after his death at the battle of Trafalgar on 21 October 1805.⁵³

While a number of the 'subjects' transferred to the University had died of an infectious disease, no attempt appears to have been made to preserve them either in spirit or in any other form of fixative. Under the circumstances, some of them probably still carried infective organisms, and would have been a potential hazard to those that were expected to dissect them. This would certainly have applied to the bodies of individuals who died from typhus as occurred in later years.⁵⁴ In these cases, some of the infected lice might have survived on the body, on their faeces and infected the unfortunate dissector.

RESULTS OF INNOVATIVE EMBALMING EXPERIMENTS CARRIED OUT BY SHARPEY IN LONDON

It is clear from Sharpey's correspondence with Thomson, that Sharpey had carried out a number of experiments to investigate the effects of arterial injections with a solution of oxide of arsenic in water; 'prepared by long boiling' of the latter.⁵⁵ He also provided a recipe for the preparation of a red-coloured solution suitable for arterial perfusion. This had the advantage that its consistency could be modified to alter the rapidity with which it hardened. Sharpey apparently used this recipe for the injection of cadavers in his classroom. It contained a mixture of white and red lead, turpentine varnish and boiled oil. The antiseptic effect was also said to be complete, and 'the gentleman who dissected it [i.e. the body] made no complaint [about the condition of the tissues], but I find doubts are entertained how far it is quite safe.' Despite this reservation, he recommended its use for the class subjects, and for the wet preparations that were to be kept in tubs.⁵⁶

MORE MODERN METHODS OF EMBALMING ANATOMICAL 'SUBJECTS'

Relatively few useful sources are available on the more modern methods of embalming the body and the methods now used to achieve this end. According to Polson *et al.*:

When putrefaction is rapid, and especially after death from a septic infection, for example, peritonitis or streptococcal septicemia . . . caution must be used when using sharp instruments, because infection of the operator is liable to follow an accidental injury . . . Most of the body is discoloured by the end of the first week. Blisters then appear in the skin and often reach two or three inches in diameter . . . By the end of the second week the abdomen is distended [being] most evident in those parts of the body where the tissues are loose . . . The internal organs decompose at different rates. The stomach and intestines putrefy rapidly . . . putrefaction is due to two main causes, namely bacterial action and autolysis.

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In order to avoid putrefaction of the body, various techniques of embalming were developed over the years. Safer substances have now replaced the compounds of arsenic, lead, mercury, zinc and other metals that were formerly used for this purpose (see above). From about 1900, fluids containing the chlorides of mercury and zinc were commonly used for embalming, but these were unsatisfactory because they were poisonous. In 1893, Blum discovered the action of formaldehyde and he initially introduced it as a tissue preservative for microscopy. Later it replaced the solutions of these metallic poisons then in common use, and this is now the principal constituent of all embalming fluids. Dehydration is countered by its dilution with water and by the addition of glycerine and other substances such as borax and phenol. For most purposes arterial injections are undertaken with solutions that contain 2% formaldehyde prepared by diluting one part of formalin (this consists of a commercial solution which contains approximately 40% by volume of formaldehyde gas) with 19 parts of cold water.⁵⁷

CONCLUSIONS

In Edinburgh over the last five or more years relatively few of the Anatomy students dissect the body. This activity is only undertaken by a small number of students during the summer vacation to prepare prosected cadavers for the following academic year. In any case, all of the dissected bodies are embalmed by arterial perfusion with a solution containing formalin and other substances that effectively sterilise the body. Such bodies are then retained for about six months in refrigerated conditions before they are dissected. In this way, the risk of infection from exposure to these bodies is probably negligible. For the reasons outlined in this paper, this was clearly not the case during the many years after the introduction of the Anatomy Act. It would be of considerable interest to establish what risk this use of 'unfixed' cadavers posed to the students of Anatomy and the academic staff that spent most of their working days in the Anatomy Classrooms.

REFERENCES

- 1 For example, according to the notes written in the Royal College of Surgeons of Edinburgh's Manuscript Catalogue associated with an articulated skeleton of a woman who died shortly after a Caesarean operation had been performed on her for osteomalacia of pregnancy by John and Charles Bell in 1800: 'A skeleton of great value; in procuring the skeleton I [i.e. Charles Bell] lost myself for two hours and found myself at 2 o'clock in the morning in the court before Pennycuik [sic] House.' See: Kaufman MH and Jaffe SM. An early Caesarean operation (1800) performed by John and Charles Bell. *J R Coll Surg Edinb* 1994; **39**:69–75.
- 2 While the Royal Commissioners in 1826 initially recommended this, the views of Dr Davidson, who gave evidence to them on 15 May 1827, makes the position absolutely clear. He stated as follows: 'Practical Anatomy – ... it is most important, if not quite essential to the proper acquisition of medical knowledge, as a minute acquaintance with the structure of the body, and of the relative position of parts, can be obtained only by dissection. Minute Anatomy is, in truth, the basis of Medicine and Surgery, as the structure and composition of the organs which perform the functions of the healthy body must be known, before we can ascertain the changes which take place in Disease ... no Surgeon should presume to use the knife upon the living and sentient body, who has not acquired confidence and skill by frequent operations on the dead subject ... the Students must be allowed to get Dissection where they best can; and their proficiency might be ascertained ...' See: Anon. *Evidence, Oral and Documentary, Taken and Received By The Commissioners Appointed by His Majesty George IV. July 23d, 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.
- 3 According to Lonsdale, writing of Dr Knox 'If the ordinary price was 10l., 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.
- 4 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.
- 5 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; Vol 7; 440–1.
- 6 Anon. *A Collection of the Public general Statutes, passed in the Second and Third Year of the Reign of His Majesty King William the Fourth: Being the Second Session of the Tenth Parliament of the United Kingdom of Great Britain and Ireland. Cap. LXXV. An Act for Regulating Schools of Anatomy. 1st August 1832.* London: George Eyre & Andrew Spottiswoode; 1832; 713–18.
- 7 Richardson R. *Death, Dissection and the Destitute.* London & New York: Routledge & Kegan Paul; 1987; 291–2.
- 8 Anon, *op. cit.* ref. 6.
- 9 Anon, *op. cit.* ref. 5.
- 10 A Parliamentary commission was allowed access to Somerville's records, much against his will, and reported in August 1842. As a result of their findings, Somerville was sacked shortly afterwards. See: Richardson, *op. cit.* ref. 7, 250.
- 11 Michie A. *The Englishman in China During the Victorian Era as Illustrated in the Career of Sir Rutherford Alcock, K.C.B., D.C.L. Many Years Consul and Minister in China and Japan.* In 2 Volumes. Edinburgh & London: William Blackwood & Sons; 1900. Anon. Sir Rutherford Alcock, K.C.B., D.C.L. *Brit Med J* 1897; **ii**:1377–8. Power D'A. Alcock, Sir Rutherford (1809–1897). In: *Plarr's Lives of the Fellows of the Royal College of Surgeons of England.* In 2 Volumes. Bristol: John Wright & Sons Ltd; 1930; Vol.1; 12–13. Anon. Alcock, Sir Rutherford (1809–1897). *Dict Nat Biogr* 1964–65; 22, Suppl. Oxford: Oxford University Press; 29–30.

- 12 Power D'A. Bacot, John (1781–1870). In: *Plarr's Lives of the Fellows of the Royal College of Surgeons of England*. Bristol: John Wright & Sons Ltd; London: Simpkin Marshall Ltd.; 1930; Vol. 1; 39–40.
- 13 Richardson, *op. cit.* ref. 7, 250, footnote 93.
- 14 Michie, *op. cit.* ref. 11, Volume 1, 25–6.
- 15 Craigie D. *Dissertatio Physiologica Inauguralis Pauca de Rationibus, quae Animalibus cum Temperie Medii in quo Versantur, Intercedunt, Complectens; . . . Pro Gradu Doctoris . . .* Edinburgh: Abernethy & Walker; 1816 [43 pp + Appendix, 45–8].
- 16 There were five other (unsuccessful) candidates considered for this post.
- 17 Kaufman MH. *Medical education in Edinburgh during the eighteenth and nineteenth centuries*. Edinburgh: Royal College of Surgeons of Edinburgh; 2003, 135.
- 18 See, for example: Craigie D. *Elements of General and Pathological Anatomy, Adapted to the Present State of Knowledge in that Science*. Edinburgh: Adam Black; London: Longman, Rees, Orme, Brown, & Green; 1828. Craigie D. *Elements of the Practice of Physic, presenting a view of the present state of Special Pathology and Therapeutics*. Volume 1. Edinburgh: Adam & Charles Black; London: Longman, Rees, Orme, Brown, Green, & Longman [sic]; 1836. Craigie D. *Elements of the Practice of Physic, presenting a view of the present state of Special Pathology and Therapeutics*. Volume 2. Edinburgh: Adam & Charles Black; London: Longman, Orme, Brown, Green, & Longmans; 1840. Craigie D. *Elements of General, Special, and Comparative Anatomy*. Edinburgh: Adam & Charles Black; London: Longman, Orme, Brown, Green & Longmans; 1842, but undated. (Previously published in *The Encyclopaedia Britannica* . . . 7th edition; Vol. 2; 684–828; Plates 24–33; Edinburgh: Adam & Charles Black; 1842.)
- 19 According to Richardson, Dr Wood was appointed an Inspector in 1842. See: Richardson, *op. cit.* ref. 7, 250, footnote 93.
- 20 Anon. Dr David Craigie. *Edinb Med Surg J* 1866; **12**:188–92.
- 21 Anon. James Thomas Alexander, L.R.C.S., and Dr David Craigie. *Lancet* 1866; **ii**:282–3.
- 22 Anon. Craigie, David, M.D. (1793–1866). *Dict Nat Biogr* 1963–64; 4. Oxford: Oxford University Press; 1377.
- 23 Craig WS. *History of the Royal College of Physicians of Edinburgh*. Oxford: Blackwell Scientific Publications; 1976.
- 24 Struthers J. Craigie. In: *Historical Sketch of the Edinburgh Anatomical School*. Edinburgh: Maclachlan & Stewart; 1867; 78.
- 25 This is the only near contemporary source discovered to date where the date of his appointment to this post, of 1832, coincides with the implementation of the Act.
- 26 Comrie JD. *History of Scottish Medicine*. 2 volumes. Second Edition. London: Baillière, Tindall & Cox; 1932; Volume 2; 498.
- 27 See: Edinensis. Study of Anatomy in Edinburgh. *Lancet* 1837–8; **1**:589–90 [letter to Editor]. As will be seen from later sections of this article, many of the points made by the author of this letter to the *Lancet* were incorrect, particularly his assertion that the University was only sent 'intact' bodies.
- 28 Jacyna LS. *Philosophic Whigs: Medicine, Science and Citizenship in Edinburgh, 1789–1848*. London & New York: Routledge; 1994; 162–3.
- 29 Mr Waugh had at that time been Treasurer to the City Charity Workhouse.
- 30 See letter from William Campbell to William Mackenzie dated 3 March 1842. Glasgow University Library, Special Collection, MS Gen 1476, Box 18 [cited by Jacyna, *op. cit.* ref. 28, 163, footnote 61].
- 31 Richardson, *op. cit.* ref. 7, 242.
- 32 Jacyna, *op. cit.* ref. 28, 163.
- 33 *Minutes of the Managers of the Royal Infirmary of Edinburgh*, commencing 17 January 1842 and ending 8 July 1844. Ref No LHB1/1/13, 43.
- 34 See: Edinburgh University Library, Special Collections Reference Number Att. 50. Two slim volumes cover the entire period between the Winter and Summer Sessions of 1832–33 and the period ending with the receipt of a body on 16 December 1837. Several other volumes cover the period up to 1850, but are very incomplete, and contain far less information than was provided in the first two volumes.
- 35 It should be noted that over the years since the implementation of the Anatomy Act, the Managers of the Royal Infirmary of Edinburgh had received a considerable number of complaints from a variety of sources. These principally concerned the apparent lack of an equitable distribution of bodies to the Extra-mural Schools of Anatomy. The lengthiest Report displayed in their *Minutes* was that prepared by Dr Alison, and dated 6 March 1837, a small part of which is shown here. See reference 36.
- 36 *Minutes of the Managers*, 6 March 1837. Ref No LHB1/1/11, November 1831–December 1837, 395–400, see 397–8.
- 37 *Ibid.*, 12 June 1837, 416.
- 38 *Ibid.*, 19 June 1837, 416. Unfortunately, no copy of this letter is available in the *Minutes*.
- 39 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; 16 (in a letter from Sharpey to Thomson dated 30 April 1838).
- 40 *Ibid.*, 22.
- 41 *Op. cit.* ref 39. 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.
- 42 Allen Thomson obtained his MD Edinburgh degree in 1830, and his FRCS Edin diploma in the following year.
- 43 McDonald SW. The life and times of James Jeffray, Regius Professor of Anatomy, University of Glasgow, 1790–1848. *Scot Med J* 1995; **40**:121–4.
- 44 *Minutes of the Managers*, 26 November 1838. Ref. No. LHB1/1/12, 129.
- 45 *Minutes of the Managers*, 13 March 1843. Ref. No. LHB1/1/13, 161.
- 46 *Minutes of the Managers*, 20 March 1843. Ref. No. LHB1/1/13, 163. A copy of this note was sent to the Pathologist.
- 47 John Gordon died in June 1818 after a severe illness that lasted for 14 days. It was believed to have been due to fever of the brain to which he had been exposed and caught during his clinical duties in the Infirmary, and from which he subsequently died. See: 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; 192–3.
- 48 James Gregory, one of the most senior Physicians to the Infirmary, died of fever on 2 April 1821. See: Anon, Gregory, James (1753–1821). *Dict Nat Biogr* 1963–64; 8. Oxford: Oxford University Press; 542–4.
- 49 Richardson, *op. cit.* ref. 7, 362, footnote 86.
- 50 Turner AL. *Story of a Great Hospital: The Royal Infirmary of Edinburgh 1729–1929*. Edinburgh & London: Oliver &

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- Boyd; 1937; 157–8.
- 51 Lonsdale H. *A Sketch of the Life and Writings of Robert Knox the Anatomist. By his Pupil and Colleague.* London: Macmillan & Co.; 1870; 101–2; see also: Kaufman, *op. cit.* ref. 4, 80.
- 52 Roughead, *op. cit.* ref. 4, 28.
- 53 Deuchar S. The Immortal Memory. In: P Van der Merwe, editor. *Nelson: An Illustrated History.* London: Laurence King Publishing; 1995; 144–67; see: 148. Anon. Nelson, Horatio, Viscount Nelson (1758–1805). *Dict Nat Biogr* 14. Oxford: Oxford University Press; 1963–64; 189–207. For a more detailed account of this episode, see: Russell WC. *Horatio Nelson and the Naval Supremacy of England.* New York & London: GP Putnam's Sons; 1890; 306–08.
- 54 For example, during the period between 7 December 1848 and 18 January 1849, a total of 30 bodies were transferred to the University, of which 27 died from an infective disease. Of these, six died from typhus and 17 from cholera.
- 55 Jacyna, *op. cit.* ref. 39, 18–20. In Sharpey's letter to Thomson dated 24 November 1838, he provided him with full details for the preparation of this solution.
- 56 Jacyna, *op. cit.* ref. 39, 18.
- 57 For further details of the methodology involved in the practice of embalming, the reader should in the first instance consult Polson *et al.* This volume also provides information on the law in relation to the embalming of bodies for anatomical dissection, as it then applied before the most recent (1984) revisions to the Anatomy Act. See: Polson CJ, Brittain RP, Marshall TK. *The Disposal of the Dead.* London: English Universities Press Ltd; 1953; 24–9.
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