The Scottish Society Of the History of Medicine

(Founded April, 1948)

REPORT OF PROCEEDINGS

SESSION 2016-17 and 2017-2018

The Scottish Society of the History of Medicine

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Report of Proceedings

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THE SIXTY EIGHTH ANNUAL GENERAL MEETING

The Sixty Eighth Annual General Meeting was held at the Edinburgh Academy on Saturday 19 November 2016. The President, Dr Tony Butler, was in the chair. The Secretary, Mr Andreas Demetriades presented his report and the Treasurer, Dr Malcolm Kinnear, presented the Treasurer's report, which was accepted. Dr Butler then handed over the chain of office to the incoming President, Dr Niall Finlayson.

THE TWO HUNDRED AND SIXTH ORDINARY MEETING

The Two Hundred and Sixth Ordinary Meeting of the Society was held at the Edinburgh Academy, on 19 November 2016, directly following the Sixty Eighth Annual General Meeting. There were two speakers. The first, Mr Roy Miller, talked on "Dr Laënnec and 200 Years of the Stethoscope".
The second speaker, Dr Tony Butler, took as his title "The Invention of Magnetic Resonance Imaging (MRI)".

DR LAËNNEC AND 200 YEARS OF THE STETHOSCOPE

In the rue des Sèvres in Paris stands the Necker Hospital, founded in 1778 by the wife of a minister to King Louis XIV. Although it is now a major paediatric hospital which was amalgamated with the original institution, a plaque on the wall commemorates that here, in 1816, occurred something which was to revolutionise medicine.

It was a time when clinical examination of a chest was limited to listening with the ear against the chest wall. This was known as **immediate** auscultation, a method which dates from Hippocratic times. Percussion of the chest wall was also available. Leopold Auenbrugger, observed that his father, who was an innkeeper, judged the level of liquid in his barrels by percussion. He went on to describe plotting the outline of the heart in this way, in a neglected and almost forgotten leaflet in 1754. However, the French physician

Corvisart knew of it, translated it into French in 1808 and taught percussion to his students.

Dr René Laënnec was consultant physician to the Necker Hospital. Here is the earliest English translation of his record of a visit.

"In 1816 I was consulted by a young woman labouring under general symptoms of diseased heart, and in whose case percussion and the application of the hand were of little avail on account of the great degree of fatness. The other method just mentioned being rendered inadmissible by the age and sex of the patient I happened to recollect a simple and well-known fact in acoustics, and fancied, at the same time, that it might be turned to some use on the present occasion. The fact I allude to is the augmented impression of sound when conveyed through certain solid bodies, as when we hear the scratch of a pin at one end of a piece of wood, on applying our ear to the other end.

Immediately on this suggestion, I rolled up a quire of paper into a kind of cylinder and applied one end of it to the region of the heart and the other to my ear, and was not a little surprised that I could thereby perceive the action of the heart in a manner much more clear and distinct than I had ever been able to do by the immediate application of the ear.

From this moment I imagined that the circumstances might furnish means for enabling us to ascertain the character, not only of the action of the heart, but of every species of sound produced by the motion of all the thoracic viscera."

Laënnec pursued these principles with an acute clinical mind. Firstly, he made his listening tube. Able to turn wood himself, he settled on a cylinder 12 inches long, with an outside diameter of 1½", and a central bore of 3/8". Initially he merely called it *le cylindre,* before almost reluctantly naming it a stethoscope, from *stethos* the chest and *skopein* to examine or explore. The central hole was coned out at one end to listen to the lungs, with a plug containing a central brass tube inserted for heart auscultation.

Using it he gave the first clinical descriptions of pneumonia, bronchiectasis, pleurisy, emphysema and pneumothorax. He used terms still used for chest sounds, such as rales, rhonchi and crepitation. He recognised the sounds of ventricular and atrial systole and described murmurs and thrills. Many of his diagnoses he was able to confirm at autopsy. For over two years he recorded all his findings before publishing, in 1819, his masterly two volume classic, *"De l'Auscultation Mediate, ou Traite de Diagnostic des Maladies des Poumons et du Coeur Fondi Principalement sur ce nouveau moyen d'Exploration."*

René-Théophile-Hyacinthe Laënnec was born in Brittany on 17 February 1781. His father was a civil servant, legally qualified but a spendthrift, and what one might call feckless. When his mother died of consumption the five-year old René and his younger brother Michaud were farmed out, firstly to an uncle who was a priest, then, when he was 12, they went to another uncle, Guillaume, who was Dean of the Faculty of Medicine at Nantes University. René was a highly intelligent student and tried to comply with his father's wishes for academic study by learning Greek and Latin, as well as how to play the flute, but medicine's attraction was too strong. Aged 14, he entered the local Hôtel-Dieu, caring for patients, acting as a surgical dresser and attending classes in anatomy. He became an unqualified assistant surgeon in the local military hospital in 1799 but resigned, deciding to complete his medical education in Paris, and walked there at the age of 19, taking ten days to do so.

He joined the clinical school of the famous *Charité Hôpital* and attended lectures at *l'Ecole de Médecine*. Under Dupuytren he studied dissection and anatomy, and rather cheekily set up his own anatomy classes the following year. He had several papers published in the *Journal de Médecine* when only 21, and he won the chief prizes in Medicine and Surgery awarded by the Institute of France. He graduated MD in 1804. Later that year he became editor of the *Journal de Médecine,* holding the post for seven years.

Laënnec was only 5ft. 3" tall. He was never robust. He was a skilled clinician and was a popular teacher. Probably because he was regarded as an outsider, he was not appointed to either of the great teaching hospitals of the time, the Hôtel-Dieu or the *Charité.* As a result, he seems to have been driven to take on a heavy workload. For instance, he began a course of lectures on pathological anatomy in 1803 while still a student, only stopping in 1806 due to his health being poor. Incidentally, he recognised melanotic lung tumours as being secondary to melanotic primaries elsewhere and coined the term "melanosis" from the Greek meaning black. He also described a finely nodular form of liver cirrhosis, now known as Laënnec's cirrhosis. Frequently he had to take long rests in the country, and was most certainly in denial as to the real cause of his problem, blaming recurring attacks of asthma. His brother, Michaud, died of consumption in 1810.

One rather prestigious part-time post came his way as a result of his staunch Catholicism. He became personal physician to Cardinal Joseph Fesch, an uncle of Napoleon, who was really rather a shady character despite being appointed as Ambassador to the Vatican in 1814. Another temporary appointment was to the *Salpêtrière,* from 1812 to 1814, to care for the wounded soldiers who were mainly from Brittany. He seems to have been the only doctor able to communicate with them in their native Breton. [This huge

hospital has had a varied career, founded on the site of a gunpowder factory – hence the saltpetre, it housed prisoners during the Revolution. Charcot and Sigmund Freud did pioneering work in psychiatry there, and Princess Diana was taken there after her fatal accident.]

In 1819 Laënnec published his book on auscultation. In 1822 he became a Member of the Academy of Medicine and was appointed Professor of Medicine at the College of France. In 1824 he became a *Chevalier du Légion d'Honneur*. In that same year, he married Jacqueline Argou. She was a young widow who had been his housekeeper at one time. To the couple's joy she soon became pregnant, only to miscarry late on.

Laënnec's health continued to be a problem, and he retired to Brittany intending to live as a country squire. In 1826, aged 45, he became very ill. He asked his nephew Meriadec to listen to his chest and relay to him his findings, thus enabling Laënnec to diagnose his own severe tubercular state and forecast his own imminent demise. He died on 13 August that year.

In his will he left Meriadec his watch, his ring, his scientific papers, and, "above all, my stethoscope, which is the best part of my legacy."

THE INVENTION OF MAGNETIC RESONANCE IMAGING (MRI)

For a long time, the diagnosis of a diseased condition depended upon the wisdom of the practitioner. It was often vague and frequently wrong. However, today's doctors have a range of diagnostic procedures that have changed the practice of medicine out of all recognition. One of these is Magnetic Resonance Imaging (MRI). However, that is not its original name and there is a long back story. It began life in 1946 when Felix Bloch and Edward Purcell noted that when solids or liquids containing certain atoms (most notably, hydrogen) are placed in a strong magnetic field and then irradiated with radio frequency power, there is absorption of radiant energy at one particular frequency. In brief, resonance occurs. For this work they were awarded the Nobel Prize in Physics in 1952 as it indicates that energy levels in the nucleus of an atom are quantised, a basic tenet of quantum physics. Further refinement of this work and the massive development of computer technology led to the emergence of Nuclear Magnetic Resonance Spectroscopy (NMR) as the most important technique available for the determination of chemical structures. It is difficult to imagine modern chemistry without NMR Spectroscopy. The idea that this technique could be extended for use in medicine was in the minds of a number of people but there were few significant observations to encourage this view.

The first experimental observation to indicate directly that NMR might be useful in diagnostic medicine was the result of work by the New York physician Raymond Damadian, of whom more will be said later. In 1971 he determined the resonance frequencies of hydrogen atoms (largely those in water) in normal and cancerous tissue and found them to be different. He later claimed that, without this observation, there would be no MRI but I doubt this. Until this difference in resonance frequency could be exploited diagnostically without removing a tissue sample from the patient, the observation remained of only academic interest. At the same time, Paul Lauterbur was working on the use of nuclear resonance on imaging at the Upstate Campus of the State University of New York at Stony Brook. He was a physicist who had been allowed to work on NMR during his military service, not because the US Army thought it was useful in keeping the world safe for democracy, but because there was nothing else that could be found for him to do. As a consequence, he knew much about NMR and, as long as he polished his bench regularly, the Army let him get on with it. After he settled into his post-military career, he thought much about the challenge of using the different resonance frequency of normal and cancerous tissue to locate a cancer in the body of a patient in a nonintrusive way, that is, without a biopsy, but without success. The answer came to him suddenly (a Eureka Moment) while he was eating a Big Boy Hamburger on the evening of September 2nd 1971. Like many problems the answer is obvious with hindsight. In the development of NMR Spectroscopy enormous effort had gone into making the magnetic field, into which the sample is placed, as homogenous as possible. For imaging a patient, Lauterbur argued, you should do the opposite and place the patient in a magnetic field which has a gradient so that each part of the patient is in a slightly different magnetic field strength. As the resonance frequency depends upon the strength of the magnetic field, every hydrogen nucleus in healthy tissue in the various organs of the patient will resonant at a different frequency. We know what that resonance frequency is, as a function of the field strength, because clever physicists have calculated it for us. Thus, the resonance frequency of hydrogen in healthy tissue at every point in the patient's body is known. If you are still following this you are doing well. The patient is then given a scan of radio frequencies covering all the possible resonance frequencies. Should an aberrant resonance frequency be observed it could be due to the presence of cancerous tissue and this, in principle, is correct. Since Lauterbur's Eureka moment there have been countless changes in the way MRI data are collected. How these data are converted into 3D pictures with T1 and T2 weighting to enhance contrast is way beyond the scope of this report. It is the operator's ability to enhance contrast between

different types of tissue that makes MRI one of the cleverest things ever invented.

Lauterbur's ideas on imaging in medicine were taken up enthusiastically by several groups, including those of Raymond Andrews and Peter Mansfield at Nottingham and John Mallard at Aberdeen. Indeed, much of the very difficult quantum science that led to the success of MRI was undertaken by Mansfield, a physicist. The original paper on imaging by Lauterbur was, at first, rejected by the journal Nature but the technique was given considerable publicity when Nature published, on its front cover in 1977, an image of the internal structure of a lemon from Andrews's group.

Finding a name for this new technique was not without challenges. Lauterbur favoured "zeugmatography" but this had few supporters. The obvious name was Nuclear Magnetic Resonance Imaging (NMRI) but the nuclear was dropped and all agreed upon MRI. It has been said that nuclear was dropped so as not to frighten patients who might think it had something to do with atomic bombs but that is not correct as many hospitals have a department of nuclear medicine and most patients emerge looking fairly cheerful. The loss of the word nuclear came as a result of a turf war between Radiology and Nuclear Medicine Departments. Both wanted to appropriate the technique and there was a certain amount of genteel warfare; it was even suggested that NMR stood for "no more radiologists". In the end Radiology won and, to ensure ownership, the word nuclear was dropped.

Around 1993 speculation about a Nobel Prize for the invention of MRI started but so many people had made a contribution that it was very difficult to ascertain to whom it should be awarded; nothing came of the speculation. However, in 2003 the committee in Stockholm decided that the time was right and awarded the Nobel Prize for Physiology or Medicine to Paul Lauterbur and Peter Mansfield. Raymond Damadian was furious that he had not been included and manifested his anger in damaging ways. He attempted to denigrate the work of Lauterbur and Mansfield through a two-page advertisement in several newspapers in both Britain and the USA. It was feared he would stage a demonstration in Stockholm on the day of the Nobel ceremony but this came to nothing. This was not the first time that Damadian had exhibited unbalanced behaviour. He had made the initial observation and did come up with an instrument that used magnetic fields to produce an image of the human body but it was very cumbersome and took an unacceptable time to accomplish this. When invited to address the Royal Society he used the occasion to rant against his peers. In general, he felt he was overlooked for funding because he was an Armenian-American and because he was a

creationist. It is sad that he could not be honoured in some way for his pioneering work.

Lauterbur had a stroke but was well enough to attend the glittering Nobel ceremony. It is generally considered that both he and Mansfield were worthy recipients of the Prize but there were many others without whose work MRI would not be the invaluable aid to diagnosis that it is. It is worth noting that although it is medicine that has benefited so much from MRI, the people who made it possible were almost all physicists.

THE TWO HUNDRED AND SEVENTH ORDINARY MEETING

The Two Hundred and Seventh Ordinary Meeting of the Society was held at the Royal College of Physicians and Surgeons of Glasgow, on Saturday 25 March 2017. There were three speakers. Professor Richard Ramsden, Emeritus Professor of Skull Base Surgery/Neurology at the University of Manchester, talked on Acoustic Neuroma Surgery, the Scottish Connection. Jennifer Brosnan, Guthrie Trust Awardee and PhD candidate at the University of Leicester, talked on "The Sexual education of Medical Students During the mid-Nineteenth Century; Euphemism, Nether Regions and Banter". Esther McNeill, medical student at the University of Edinburgh, took as her title "A Brief Look at the History of the Deaconess Hospital, Edinburgh, 1894-1990" This has been published in the Proceedings of the Journal of the Royal College of Physicians of Edinburgh (2018, vol 48, pp 78-84) https://www.rcpe.ac.uk/sites/default/files/jrcpe_48_1_mcneill.pdf

ACOUSTIC NEUROMA - THE SCOTTISH CONNECTION

Acoustic neuroma is a benign tumour of the vestibular (ie balance) part of the audio-vestibular nerve – the eighth cranial nerve. The cells of origin are the so-called Schwann cells and for that reason the correct name for such a tumour is Vestibular Schwannoma. The term Acoustic Neuroma has however been sanctified by long usage and is likely to remain in perpetuity. These tumours are uncommon, but not rare, with an annual incidence of approximately 1 : 80,000, and account for about 10 % of intracranial tumours. The usual site of origin is within the internal auditory meatus and they grow in a medial direction into the posterior cranial fossa. Eventually compression and displacement of the brainstem may occur, the intracranial pressure may become elevated and death may ensue.

The familial condition of Neurofibromatosis Type 2 is characterised by bilateral acoustic neuromas as well as multiple other intracranial and spinal tumours.

The acoustic neuroma story features many Scottish clinicians but the first postmortem description was that of Eduard Sandifort of Leiden in 1777 in a paper entitled “De duro quodam corpusculo, nervo auditorio adherente” (regarding a certain hard body adherent to the auditory nerve). It was “not only connected to the lower part of the said nerve, but also to the nearest part of the medulla oblongata from which the two seventh nerves emerge, penetrating as far the foramen in the inner part of the petrous section of the temporal bone”. [1]

The tumour was externally hard, like cartilage, but soft inside. He concluded that this cause of deafness was “beyond the reach of medication or surgery” and was thus incurable.

The nineteenth century saw the development of, and approach to, medicine, that attempted to relate pathological findings to clinical symptoms and signs, in particular to the localization of posterior fossa tumours and to cerebellar pathology.

Sir Charles Bell, (Fig 1), in Edinburgh provided one of the most detailed early accounts in the English language in his 1830 description of a young woman who presented to him with total anaesthesia of the second and third divisions of the trigeminal nerve so that “the end of a feather passed three inches into the nostril gives her no sensation and does not produce sneezing” [2]

Fig 1

She went on to develop a hearing loss on the same side, giddiness, headache and vomiting, and eventually died with brain stem failure, with clenching of her teeth, slurred speech, respiratory failure and dysphagia. At

post mortem a tumour “the size of a pigeon’s egg” was found occupying the cerebello-pontine angle and indenting the pons and cerebellum. It was cystic and contained fluid the colour of urine. The solid capsule resembled vitreous humour. The auditory nerve could not be identified and only the most medial quarter inch of the facial nerve and half inch of the trigeminal nerve could be seen to be free of tumour.

His beautiful drawing of the postmortem findings, (Fig 2), is a wonderful example of the surgeon as an artist.

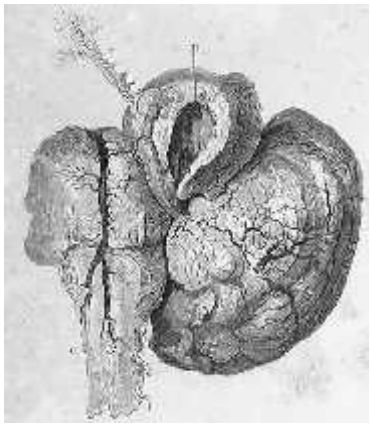

Fig 2

During the 19th century, surgeons in many European and American centres began to venture into the posterior cranial fossa and attempt to remove what were likely to have been acoustic neuromas, but with a singular and total lack of success.

The literature has widely attributed the distinction of the first successful surgical removal of a vestibular schwannoma in 1894 to the London based neurosurgeon Sir Charles Ballance, Harvey Cushing,[3] however disputes this, on the grounds that Ballance’s tumour was broad-based and attached to the posterior surface of the petrous bone and therefore more likely to be a meningioma.

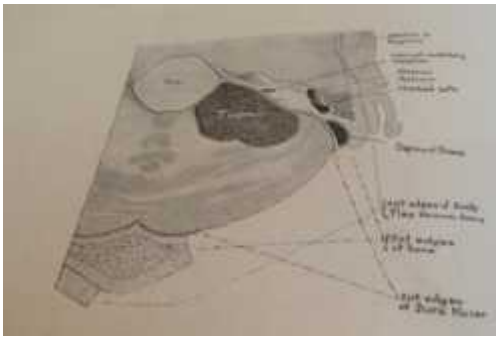

Fig 3

My own research took me to Ballance's operation [4] and drawing (Fig 3), and it is quite clear that this was indeed a petrous ridge meningioma.

In Cushing's view the accolade should go to the Edinburgh surgeon Thomas Annandale in 1895. "a brilliant surgical result the first recorded".
Annandale (Fig 4) was a Geordie, but his name and his long sojourn in Edinburgh were convincing credentials for Scottishness.

Fig 4

He studied medicine in Edinburgh where he eventually succeeded Joseph Lister as Regius Professor in 1877. Like all general surgeons of the day, he could turn his hand to anything, although most of his practice was orthopaedic.
Logan Turner describes him affectionately ;
"Of medium height, sprightly in his walk, neat in his dress with his coloured necktie knotted in a loose bow after the fashion of his old master he was a familiar figure in the streets of Edinburgh, saluted by the policemen on duty and by the "cabbies" on the rank for all of whom he had a cheery greeting. Himself the soul of punctuality, he expected the same from his assistants who in the early morning found him on the doorstep at 34 Charlotte Square ready to start for the nursing home two or three minutes before the pre-arranged hour."

"He was linked with the older school of surgery whose dexterity, rapidity of action, resourcefulness and courage were essentials of their craft, all of which qualities Annandale possessed. "Surgeons are born not made" was a favourite dictum of his which was certainly illustrated in his own person and both as operator and as a teacher of clinical surgery he followed closely the methods he had learnt from Syme". [5]

His famous case, described by Gibson (1896)[6] and by Dr J Purvis Stewart (1895)[7], the resident physician at Edinburgh Royal Infirmary, was Isabella, referred down by her General Practitioner, Dr Laing of 9 Tay Square Dundee (as an interesting but irrelevant aside, this was the practice of my own grandparents at the turn of the 20th century). She was 25 years old and pregnant, with a 10-month history of frontal headache, giddiness and difficulty walking. She was unable to hear the ticking of a watch in her right ear or a tuning fork placed on the vertex. Examination of the eyes revealed optic neuritis (papilloedema) and both horizontal and vertical nystagmus. There was dilation of the left (ie contralateral) pupil, palatal weakness with regurgitation of fluids through the nose and changes in her voice. She had exaggerated tendon reflexes on both sides and ankle clonus. Her gait was broad based and she had a tendency to fall to the right side especially when standing with the feet together and the eyes closed. There was therefore strong clinical evidence of a large posterior fossa lesion, and Stewart made the perspicacious observation "the labyrinthine deafness would be consistent with a lesion either of an auditory pathway in the cerebellum, or in the auditory nucleus or nerve itself". The differential diagnosis was tumour, gumma or tuberculoma, Treatment with inunction of blue ointment and the anitisyphilitic Potassium iodide, (her husband was a sailor "absent for protracted periods in distant parts of the world"), proved ineffective and on 3rd May 1895 Annandale trephined the skull over the right lobe of the cerebellum and removed a semicystic tumour the size of a pigeon's egg from " the lateral lobe of the cerebellum". Microscopic investigation showed it to be of the nature of a fibrosarcoma, at the time a rather imprecise term, but from the clinical description of the case it was most certainly a vestibular schwannoma. Postoperatively progress was "eminently satisfactory". Her headache was immediately better, her sickness ceased and her nystagmus settled almost completely. The swallowing became perfect even for fluids. Her gait improved and her optic neuritis almost disappeared. Surprisingly there is no mention in the clinical record of the postoperative function of the facial nerve. It is hard to imagine that it remained intact and it may just be that in 1895 a facial paralysis was not regarded as much of a price to pay for the successful removal of an intracranial tumour. Five months later Isabella was delivered of a baby girl and the note from the general practitioner makes it clear that both mother and child were in excellent health.

"Dear Dr Gibson 18th November 1895

I have just received your kind note about Mrs K. I delivered her of a healthy child about 3 weeks ago. She made a perfect recovery. Had it not been for this

she would have been across to see you herself. She walks well now, speaks as she used to and has no headache or giddiness. There is still a little nystagmus and over the site of the operation a painless fluctuant swelling still remains. In all respects it has been a most satisfactory result.
With kind regards, believe me, very sincerely yours,
James HW Laing "

The author could find no reference in the literature to any further sorties into the cerebellopontine angle by Annandale. It may well be that he decided to quit while he was ahead!

During the early decades of the 20th century there was an increasing number of attempts at tumour removal. The results were almost always apocalyptically dreadful, with perioperative death rates as high as 85% in some series. Digital enucleation wrought havoc with the brainstem and the lower cranial nerves, and there was little appreciation of the importance of the arterial supply of the stem. At this time the accepted approach to the cerebellopontine angle was via a large unilateral suboccipital craniotomy, with brainstem retraction and often with resection of part of the cerebellum for access, and often as a planned two (or more) stage procedure. Inadequate diagnostics led to missed tumours. Missed tumours resulted in large tumours. Large tumours led to disastrous surgical outcomes, and disastrous surgical outcomes discouraged surgeons from operating. It's a familiar story.

The great Harvey Cushing advanced the cause immensely by advocating subtotal or intracapsular removal, bringing the death rate down to under 5% by the 1930s, but tumour recurrence was common.

Acoustic neuroma surgery benefitted from advances in other fields of medicine, notably anaesthesia, imaging, audio-vestibular medicine and microbiology, but still the prevailing surgical philosophy was to wait until the tumour was large before attempting removal. It was the visionary Otologist Bill House[8] in Los Angeles who in the 1960s turned things around and suggested early removal, minimising risk to the brainstem and the cranial nerves, the facial nerve in particular. Bill House created further shock waves in the surgical fraternity by advocating the translabyrinthine approach to the cerebello-pontine angle, a route that had been advocated as long ago as 1903, but was dismissed out of hand by Ballance as "objectionable for obvious reasons" and thus condemned by the words of the great man to the surgical dustbin. Its great advantages were avoidance of cerebellar retraction and early identification of the facial nerve. As if that was not enough, he further rocked the boat by collaborating with a neurosurgical colleague, Bill Hitselberger, to form the neuro-otological team approach that eventually became the accepted

method of dealing with these tumours. Hitselberger was ostracized by the American neurosurgeons for associating with such a low form of life.

Fig 5

Enter the next great Scot in the story. Andrew Morrison (Fig 5), was born in Spain in 1925, but his parents soon brought him back to his native heath where Andrew attended Stirling High School and Glasgow University. After a short spell as a ship's doctor during which he amputated the leg of a member of the crew on the deck of the ship, he trained as an otolaryngologist. He was appointed as a consultant at the London Hospital in 1964, where he specialised in ear surgery. He visited Bill House in Los Angeles to study translabyrinthine acoustic neuroma surgery and on his return teamed up with the Australian Neurosurgeon Tom King to form the first neuro-otological and skull base team in the UK. Here he developed a very large series of acoustic neuromas and established a model of practice that was emulated in all major centres in the UK. The results of the team approach and the translabyrinthine route to the tumour brought the perioperative death rate right down to close to zero and preservation of the facial nerve with good to excellent function was the norm. Andrew had a lifetime interest in the aetiology, genetics and surgery of Menière's disease and was an inspiring role model for his trainees both as a surgeon and a researcher. Two of his Senior Registrars went on establish highly successful neuro-otology teams, in Manchester and Cambridge, both headed by Scottish otologists. David Moffat in Cambridge teamed up with compatriot neurosurgeon David Hardy, and the present author

established the Manchester unit, with John Dutton as his neurosurgical colleague. Between the 1970s and 2010, the two units together managed in the region of 4000 acoustic neuromas. Andrew died in 2006 after a retirement devoted to working on his Menière's project and his golf swing.

Before the second world was there was very little neurosurgery performed in Scotland but 4 units were established thereafter. In Glasgow a number of acoustic neuromas were operated upon by Professor Graham Teasdale and Rab Hyde, working with the otologists Sandy Doig, and Brian O'Reilly and John Crowther. In Edinburgh Douglas Miller and Brian Dale worked together on acoustic neuromas. Martin Nichols did the occasional case in Aberdeen. In Dundee the author, as a neurosurgical SHO in 1971 encountered his first acoustic neuroma under the care of the inimitable pair of Joe Block and Ivan Jacobson.

If we consider the population of Scotland as being approximately 5.5 million, and the annual incidence of acoustic neuroma as 1:80,000, it means that approximately 65 new cases will be diagnosed each year.

Recent decades have seen changes in the management of acoustic neuromas. Regular surveillance imaging of small tumours has allowed the identification of many that do not grow and never come to surgery. In addition, the advent of stereotactic radiosurgery (SRS) for small-to-medium tumours has again had the result of reducing the number that have to be removed. It is unlikely that more than 30 cases a year would therefore come to surgery.

Acoustic neuroma surgery has been identified by the Society of British Neurological Surgeons (SBNS) as "low volume" surgery that should be concentrated in specialist departments where a small number of surgeons acquire maximum experience.[9] Although this ideal has been recognised in Scotland, the establishment of a single unit has not yet come to fruition.

If we now turn the clock back to 1822, Mr JH Wishart, President of the Royal College of Surgeons of Edinburgh, was the first to report a case of bilateral acoustic neuroma. Wishart's patient, Michael Blair, was 21 years old when he consulted complaining of severe headache, failing vision and of bilateral deafness. He had a peculiarly shaped head from infancy, and blindness in the right eye was discovered at about 4 months after birth. He became completely blind and deaf toward the end of his life. Autopsy revealed hydrocephalus as well as tumors of the dura mater (meningiomas) and brain and a 'tumour of the size of a small nut, and very hard, being attached to each of them (auditory nerves), just where they enter the meatus auditorius internus.' There were also numerous small tumours of the other cranial nerves notably the trigeminal, the facial and the accessory.

Wishart's was the first description in the literature of neurofibromatosis type 2, until fairly recently erroneously described as von Recklinghausen's Disease (NF1). Management of this difficult condition remains challenging and demands the input of a multidisciplinary team. Restoration of the almost inevitable bilateral total hearing loss with the auditory brain stem implant offers some improvement but the results are unpredictable. Manchester and Cambridge are at the moment the only centres in the UK licensed to carry out the surgery and in Manchester the surgeon performing this procedure is the neurosurgeon, Scott Rutherford, who though genetically Scottish has an unmistakable South African accent that he is doing his best to get rid of. He is clearly aware of his heritage!

Illustrations

Fig 1 Sir Charles Bell
Fig 2 Bell's post-mortem drawing of a cystic acoustic neuroma
Fig 3 Ballance's operative drawing
Fig 4 Thomas Annandale
Fig 5 Andrew Morrison

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THE TWENTY SIXTH HALDANE TAIT MEETING

The Twenty Sixth Haldane Tait Lecture was held in the Craiglockhart Campus of Napier University, Edinburgh, on the evening of 24 May 2017. 36 members or guests attended a most interesting lecture, which was followed by an excellent meal. The speaker was Gareth Williams, Emeritus Professor of Medicine, Bristol University and his topic was "Vaccination from Jenner to Wakefield : a War of Disinformation"
Professor Williams's talk was much appreciated and generated a number of questions. He is the author of the book Angel of Death, a History of Smallpox (2010) ISBN 978-0-230-27471-6 and an article on Dr Jenner's house at Berkeley, https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(11)61154-9.pdf

THE TWO HUNDRED AND EIGHTH ORDINARY MEETING

The Two Hundred and Eighth Ordinary Meeting took place at the Black Watch Museum, Balhousie Castle, Hay Street, Perth on Saturday 10 June 2017. After an excellent meal, 31 members or guests listened to two talks, the first by Dr Angela Montford entitled "A Blunt Saw and Gritted Teeth? Medieval Surgery Illustrated" and the second by Dr Iain Macleod "The Many Faces of Robert the Bruce". After the talks, there was tea and an opportunity for a brief tour of the Museum.

A BLUNT SAW AND GRITTED TEETH? – MEDIAEVAL SURGERY IN TEXTS AND ILLUSTRATIONS

The adjective ‘mediaeval’ is often used in the media today to describe circumstances of squalor, backwardness and ignorance. Mediaeval medicine is considered to have consisted of random herbal mixtures, probably both disgusting and ineffective, while mediaeval surgery is considered to have been crude, unsophisticated, closely akin to butchery, and, as my title suggests, involving a blunt saw, gritted teeth and a complete ignorance of, or disregard for hygiene. If you hold this view, I would like to try and change your change mind by describing what might be called the **“**cutting edge” of surgery more than 800 years ago, with particular reference to mediaeval surgery texts, including one written around 1267 by the eminent Italian surgeon and later Dominican friar and bishop, Theodoric of Bologna, who died in 1298*. Whilst remembering that the elaborate operations in the Middle Ages were usually for the rich only, we can find other clues to what was being done not only in medical texts and their illustrations, but also in letters, account books or even law suits.

It may surprise you to know that the first leg transplant apparently took place in 4th century Syria, performed by the twin brothers, Cosmas and Damian, who were both later martyred and canonised. One was a physician, the other a surgeon, and they were purported to have attached the leg of a deceased black patient onto a white recipient. Well, probably not, but did you know that in 10 -11th century Arabia, you could have a tonsillectomy or a tracheotomy, a harelip or a hernia repaired, a colostomy formed or your varicose veins stripped? By the 15th century in Europe if your nose was bitten off by dog, cut off in war or a duel or as a punishment, you could have a form of rhinoplasty. This had been developed by the Brancas, surgical father and son from Sicily who raised a pedicle from arm to nose, the arm then uncomfortably immobilised until the pedicle was seen to be viable and then severed to form the new nose. There would have been no internal cartilage, but there would have been at least some cosmetic improvement. Such surgical successes as there were are difficult to judge as there are so few details of follow-up. There is report of the separation of xiphopagus conjoined twins in AD 945, joined at a small section of abdomen. One died during the operation, but apparently the other one lived for six days postoperatively – an extraordinary result without anaesthetic.

The practitioners

Early medical or surgical apprenticeships were made by training with a medical parent, a local doctor or perhaps travelling to a medical tutor elsewhere. Once trained, what the Victorian physician needed, we are told, was a top hat to give him authority, a paunch to give him dignity, piles to give him an anxious expression and illegible handwriting to impress the patient with the mystique of his prescriptions. What the mediaeval medic needed was a long red gown, trimmed with ermine, knowledge of the theory of humours, a urine flask and the ability to interpret the pulse.

Medical ethics and etiquette were part of both medical and surgical training. The doctor should do no harm, and he should set his fee before treatment. Guides also included advice on his appearance and demeanour: he should have sober decorous clothing, steady hands with clean nails, no halitosis (as it would be embarrassing when talking to noblemen), and a purposeful walk. There should be no flirting with household women and no swearing. A holistic approach was also recommended, including the use of psychology and suggestions that the medic should have a stock of merry tales to cheer his patient up. If a lowly cleric depressed by his illness was told that he'd been made a bishop, he would probably feel better.

Lower down the medical hierarchy was the barber or barber surgeon. He wore a short robe and undertook tasks such as bloodletting, bone setting and dentistry. He would also do shaving and haircuts, including the tonsure of clerics**,** and sometimes perform the evisceration of noble or saintly clients before embalming. Toothache must have been a real and recurrent problem of the age, and extraction was the most common solution, but there was other dental help, such as opium for toothache, antiseptic chewing gum made from mastic resin, or thyme or other herbal mouthwashes.

Theodoric of Bologna's "mission statement" classified surgery as *the joining of broken parts, the separation of unnatural joins and the removal of what is superfluous*. The surgeon dealt with fractures and dislocations, wounds from accidents, dog bites, drunken punch-ups, and encountering the sharp parts of arrows, battle axes, knives, swords and spears. He also dealt with all external manifestations: tumours, ulcers, all sorts of rashes, boils, swellings and infestations such as scabies (called at the time *hand wormes).* Specialisms including cataracts, hernia, lithotomy, and rectal problems and of course, if the doctors did you no good there was always appeal to the saints by prayer or pilgrimage.

Royal, noble and church households usually had their own medical employees, including surgeons for the battlefield. You may recall one example on TV's Channel 4 some years ago recounting how, at the Battle of Shrewsbury in 1405, Prince Henry, aged about 18, received a serious wound to his face when an arrow penetrated about six inches from the right side of his nose downwards at an angle, narrowly missing his brain. A medieval historian from St Andrews wrote her thesis on the text *Philomena*, written by the army surgeon John Bradmore in which he described how he removed the arrow shaft, and then used a succession of probes to clean out the passage to the arrow head. He then designed a special tool which was made for him by the battlefield farrier. This was passed down the wound and screwed into the arrow head, which was able to be carefully withdrawn. For twenty days afterwards, he cleaned the wound with wine and honey, gradually reducing the size of probes, and as history tells us, the patient survived to take the throne as Henry V, but with a permanent facial scar.

Battlefield surgery was also common in Italy. Early on, the self-governing Italian city states, such as Bologna, Florence, and Milan, had quite sophisticated urban conditions. By the thirteenth century public health measures were being taken to keep streets and rivers clean and sales of raw food wholesome. States also began to employ *medici condotti*, who did forensic medicine, an important topic in the Bologna University law faculty. They were also were obliged to treat sick poor and prisoners of the city for nothing, and could also have private patients. The states were constantly at war with each other so these *medici were* also employed as army surgeons and Theodoric's father Ugo was the first recorded, in 1203.

Anatomical knowledge and dissection

While physicians could get by using the physiological theory of the balance of four bodily humours through diet and drugs, the surgeon needed anatomy as well. Cultural and religious prohibitions of human dissection had been current for many centuries. Instead, anatomists used cleaned bones or drawings, and also followed the work of the Greek physician and surgeon Galen in the 1st century AD, who dissected animals such as a pig, as their anatomy was supposed to be very similar to human structure. In the 12th century at the surgical school of Salerno, Galen's book *Anatomia porci* was read out as the master dissected, while the students listened and watched. This practice led to some long-lasting mistakes but also to a number of benefits, for example,

recognising the relationships of structures to each other, the classification of organs by function, and the development of a technical vocabulary.

The medieval University of Bologna, founded in 1088, was different from all the others in being run by a secular organisation, not a religious one, so there was no particular prohibition on dissection. In 1316 Mondino de Luzzi, a surgeon at the University, was able to revive the practice of human anatomy and wrote his own book on it, the *Anathomia Mundini*. There were however, a number of practical limits. During their three years of study, Bologna students were expected to witness three male and two female dissections, and twenty students at once could witness a male (often prisoners), thirty could witness a female, probably because women's corpses were less easy to come by. There was also the weather problem and dissections were done in cool seasons only. In 1446 we find the first mention of wooden anatomical theatres erected and dismantled as needed. The first permanent anatomy theatre was built in 1559 in Padua, while Bologna waited until 1595.

Consultation and ancillary surgical treatments

Physicians' diagnoses could be made remotely, without touching the patient, by examining a sample of urine, but the surgeon - what was he doing at consultation? He was definitely using all five senses as you can see in medical text illustrations. The ENT clinic: problems with ears, nose and throat (probably a goitre being examined by the consultant). The oncology clinic: the surgeon examines a woman's breast. Accident and emergency: a patient with arrow and spear wounds, the weapons still *in situ*, - not likely to be missed by the practitioner. The rectal clinic: the specialist about to make a digital examination.

After examination, the decision had to be made on whether to operate or not. Surgeons knew their own limits, and were unwilling to jeopardise the patient out of concern for the patients' welfare perhaps, or for the sake of their own fees or reputation. Once a procedure had been agreed, the patient had to be obedient to the surgeon's instructions, a fact recognised by both civil and canon law.

Another decision was when to operate, as the auspicious day had to be carefully selected and the 24 Egyptian or inauspicious days avoided with the aid of Zodiac man diagrams, which helped decision-making by showing which signs were aligned to different parts of the body, Aries for the head,

Gemini for the arms, Pisces for the feet, for example. All had to be in the most favourable astronomical alignment.

In addition to procedures we would recognise as operations, one of the most common surgical techniques was bloodletting, related to humoural balance, and the vein-man chart was used to show where to take blood for different diseases. The arm was the most usual site or sometimes the foot for a woman**.** The limb was warmed first, the patient perhaps given a stick to hold, while the surgeon incised or punctured the vein with a specialised lancet or phlebotome.

A gentler treatment for bloodletting was the application of leeches and a mediaeval illustration shows a king (wearing his crown in bed) being treated with leeches on his arms and chest. The leech catcher, who dangled his legs in the water to attract the leeches was still an occupation when Wordsworth wrote a poem about one in 1807:

To these waters he had come
To gather leeches, being old and poor
Employment hazardous and wearisome

While nursing at St Bartholomew's Hospital in London in the early 1960s, I saw leeches being used successfully to relieve large haematomas on the eyelids of a young man with a head injury following a motorcycle crash.

Cupping was another treatment related to humoural theory and often took place at the many bathhouses in medieval Italian cities. A vacuum was created inside a cup made of copper, glass, or horn, creating a swelling which was often first scarified, to bring evil or excessive humours to the surface.

Cautery was yet another surgical treatment. There were two kinds: potential cautery–the application of corrosive substances such as oil of vitriol (H_2SO_4), arsenic sublimate or quicklime to the area to be treated. The other type was actual cautery, which involved burning with specialised hot irons of various shapes. We know that in the 13th century the Dominican cardinal Annibaldo Annibaldi received cautery for the relief of severe pain when he was dying. Francis of Assisi (later the saint) also received actual cautery. Visiting the Sultan of Egypt in 1220 in an unsuccessful attempt to convert him to Christianity, Francis acquired a painful eye infection which resulted in continuous irritation and weeping. He was eventually persuaded to receive cautery to his temple in 1224, in order to draw away the fluids from his eyes to the weeping burn made on his temple.

The pre-operative preparation of the Middle Ages sounds quite familiar today, perhaps starting with confession and absolution, and going on to what was required for the benefit of the operation, from shaving, baths, diet, laxative or catheterisation and of course, no medical lecture would be complete without reference to the enema, the mediaeval version being known as the clyster, used before rectal or bladder surgery. Clyster equipment was usually made from a greased boxwood tube attached to a dried pig's bladder, into which one pint of fluid was put, either water alone or with the addition of soap, oil, herbs, bran or salt for its hygroscopic effect. Violet oil was considered particularly soothing for haemorrhoids Instead of the right lateral position used today, a 14th century illustration shows the patient in a kneeling position described by English surgeon John of Arderne as 'grovelling'. There is also a passing reference in Arderne's work to the use of rectal feeding for those unable to take food by mouth, suggesting that fluids such as goat's milk, almond milk or broth might be used.

Anaesthesia and the operations

The topic of anaesthesia use in the Middle Ages is sufficient for a lecture in itself. It is not clear how often it was used, if at all, although it was certainly known about. In the first century, the Greek physician and surgeon Dioscorides, whose work on *materia medica* was still popular in the mediaeval era, mentioned a number of anaesthetic or soporific herbs. There is also an interesting comment from Hilary of Poitiers, a French cleric in the 4th century who wrote

> *when through some grave necessity some part of the body must be cut away, the soul can be lulled asleep by drugs,….. Then limbs can be cut off without pain, the flesh is dead to all feeling and does not heed the thrust of the knife because the soul within is asleep*

Opium was certainly known about and used for analgesia. Nightshade, henbane, hemlock, mandrake**,** mulberry, bryony, ivy, and even lettuce were noted in various texts. Those of you who recall your "Flopsy Bunnies" story will remember that the lettuce they ate made the little rabbits soporific, although modern investigations have found no active ingredient to cause this. Theodoric gives a recipe for a soporific sponge, in which a marine sponge was soaked in this type of herbal mixture, dried, and then reconstituted for use. However, Theodoric also warns of the dangers of administration, as at the time there was no way to assess the strength of the mixture. He also suggested using fennel in vinegar to wake the patient again. It is much more likely that

the patient would be tied down and had to grin and bear it. Lithotomy instructions suggest appropriate conditions for surgery

> *a strong person sits on a bench, his feet on a stool; the patient sits on his lap, legs bound to his neck with a bandage, or steadied on the shoulders of the assistants'*

Without anaesthesia and with minimal pain relief speed was essential. Bartolomeo di Varignana, a 14th century Bolognese surgeon, was praised for his speed, accuracy, dexterity and marvellous judgment, just like the 19th century surgeon Robert Liston in London who was dubbed "the fastest knife in the West End".

The mediaeval surgeon had a wide repertoire of instruments. They included orthopaedic ones such as chisels, scrapers, mallets, trephines or perforators and the patient's welfare was considered when it was recommended that his ears should be blocked in order that he should not be bothered by *the sound of the scraping or perforation, or by the hammer blow*. Forceps of different kinds were available, large and strong for arrowheads, small ones or specially shaped ones *like a bird's beak*. Hooks and levers allowed the surgeon to grasp and retract, and areas were explored with probes of various sizes made of silver, gold, lead or elder wood. Different cutting instruments, the bistoury, saw, razor, scissors, or lancet were used for a variety of incisions. Theodoric noted that surgical innovations and improvements were constantly being looked for and wrote: *Every day a new instrument or a new method is invented by the surgeon*. Were the instruments blunt? - A contract made at an Italian hospital in Imola in the 14th century for a man to sharpen the surgical instruments suggests that they were not.

So, what problems did medieval surgeons feel competent to deal with? Cranial wounds, common in warfare, might be tackled. Without X-rays, if a fracture was suspected, diagnosis had to be made by observation, by feeling for crepitation with the fingers or by shaving the area and dribbling ink onto the site, to outline any cracks in the bones of the skull. Theodoric was aware of the dangers of involvement of the meninges, and also of symptoms occurring such as aphasia, proptosis, fits or coma. In a compound skull fracture, he advised removing loose bone fragments, cleaning the area with wine and possibly adding a dressing of frankincense, sealing the area with egg white and including a quill drain. Protective dressings might be made from absorbent marine sponge, tow (coarse flax), or silk, with clean linen for a bandage. The patient was laid flat in bed in quiet surroundings – and if there

were builders or carpenters banging next door, they were told to stop the noise.

Cataract treatment was often the province of itinerant Jewish male or female practitioners and the probable method would have been “couching” in which the faulty lens was not excised but displaced by a sharp blow from a specialised instrument**.** Nasal polyps might be removed by incision, forceps, or cautery. Cotton rolls hung underneath the nose caught the blood or the nostrils could be packed with cotton rolls with quills inserted to aid breathing.

At times of a plague epidemic the surgeon might be called upon to treat buboes, in the neck, axilla or groin and the prescribed regime included abstaining from wine, taking a light diet and laxatives, perhaps having a phlebotomy, while emollients such as warm oil were applied to mature the swellings. Once this had happened, it was considered safe to perforate the spot with a round hole in order to evacuate the evil humours. This would be followed by the application of drying powders. Not everyone died from the plague, so survival following a treatment such as this might well have been seen as a successful cure.

A medieval illustration shows the treatment for cervical spine dislocation, described in surgical texts in this way:

> *Put a sling under the jaw, hold each end of the sling firmly; while lifting upward, put one foot on one of the patient’s shoulders, the other on the other, so that pressing down with the feet and pulling hard on the sling with the hands, the vertebrae may be forced to align rightly…**:***

Theodoric also describes the treatment for a dislocated shoulder where the reduction is achieved by placing the arm over a padded stick, and the patient’s hand is pulled sharply downward by an attendant. Dugas’s sign indicating this dislocation was first thought to have been observed in 1857, but Theodoric noted a similar sign in his work of 1267, that the patient with a dislocated shoulder would be unable to use the hand on the affected side to touch the opposite ear. Another picture shows a patient being strapped upside down onto something similar to a ladder, as a treatment for a dislocated spine, while Theodoric mentions an alternative for lower vertebrae:

if it should be necessary to sit upon the patient, do so and fear no ill effects—the work should be done with zeal and ingenuity until all is straight.

Almost a quarter of Theodoric's text is involved with the treatment of fractures. These range from the simple**,** such as a jaw fracture, where gold or silver wire would be attached to the teeth and the jaw supported with a cloth or leather sling, to the fractured femur. In compound fractures there is no mention by Theodoric of amputation, although a number of illustrations show patients with below-knee amputations and wooden legs as well as other aids, such as sticks, crutches, or a *scabella* (a small walking stool). As there was no Plaster of Paris at the time, simple arm or lower leg fractures might be treated by applying a coating of unsalted butter to the skin, positioning the bones and wrapping the limb in a cloth soaked in the white of eight eggs, which, with or without the addition of light wooden splints, would make a covering stiff enough to immobilise the limb. Any plaster would be re-applied as necessary after 20 days.

Theodoric also knew about muscle spasm occurring in a fractured femur and splints, ropes and a peg could be used to apply traction. His text recommended*: always compare the injured side with the normal so that the feet, legs and thighs all match* and, sensibly, he recommended laxative restriction for 12 days. Immobility continued for 28 nights for a fractured wrist; 50 for a femur. Then gentle movement was recommended as well as a diet to strengthen the blood.
Abdominal wounds might need treatment on the battlefield, although other abdominal surgery was not contemplated, apart from Caesarean section, which was most likely to be *post mortem* in order to save the baby. Apparently, there is one reference, not yet verified, in a text by the 14th century Italian surgeon Petrus d'Argellata, in which he boasts that he saved both mother and child with this operation.

For battle field wounds to the abdomen, Theodoric was well aware of the need to avoid contamination*: the first objective is to make sure that faeces making their way through the intestines shall not soil the wound and bring about putrefaction.* The intestines must be kept warm and then washed in hot dark wine. If it had been severed, a repair could be made with an elder wood tube, *shaved to the utmost thinness,* inserted between to the two ends, stitched round with fine catgut. The area should then be dried and replaced, before closing the abdomen with sutures. Other abdominal problems, such as hernia, were

treated conservatively with trusses made of cloth or metal, or for more serious cases, with cautery or by operation, incision and stitching. By the 16th century illustrations show that the operating table would be tipped to allow some relocation of the part.

A particularly difficult but common problem in the Middle Ages was that of rectal fistula or fistula-in-ano. A treatment and the instruments required for it were designed by the English rectal surgeon John of Arderne (1307-1378), who would open the fistula along its length to allow cleaning and subsequent healing. Ointments and oils were also prescribed to treat the wound after surgery. Arderne became well known for his successes, which differed from the previously customary practice of corrosive treatments.

Haemorrhoids, superficial ones only, could also be treated by tying off or excision and Theodoric cheerfully writes that *there is not much to fear because of the shortness of the operation.* The application of leeches was a kinder alternative, the leech attached to a string to prevent it straying where it was not required.

Wound treatment and post-operative care

Diagrams of the techniques of stitching were often enlarged for teaching purposes. Theodoric described the different needles and the suture materials: strong thread for hernia, catgut for the abdomen, fine silk for a hare-lip, and fine hair for an eyelid. The Arabian surgeon Albucasis (936-1013 AD) discussed the use of soldier ants as a suturing method, persuading them to grip each side of the wound or incision, and then twisting their bodies off, leaving the heads intact until union had been achieved. Theodoric expressed his doubts about this method but a 1970's experiment on a pig indicates that with the right sort of ant, this method does work.

The wound debate still goes on today… should healing be by first or second intention, should the wound be kept dry or moist? Theodoric favoured first intention and stated that above all the wound should be kept dry. Cleansing and repair were effected by the use of wine, vinegar, rosewater, or salt water; drying, aligning, suturing with the use of a drain if necessary, applying a dressing soaked in oil of roses to prevent it sticking. The mechanism of post-operative infection was not understood but Theodoric says *apply a clean bandage from inside to outside and from extremity upwards so that air from without cannot enter nor internal heat escape from within.*

After a serious operation was completed, the patient would be carried to bed, although as there were no wheelchairs until the 16th century, a wheelbarrow, table, or sheet might be used as conveyance. The patient's position in bed was considered for his comfort and a 13h century illustration of a patient in bed shows something which could be a foot cradle inserted under the bedclothes. The surgeon would be on call, urinals, and a close stool (commode) provided. Diet was addressed in order to *strengthen nature to heal what is damaged.*…and chicken or chicken broth was a particular recommendation. Theodoric also included many recipes for promoting pain relief and healing and good cosmetic results were also considered important. In his text and in others, ointments, lotions, baths, irrigation, fumigation and hot poultices were all suggested. Most of these had herbal ingredients with occasional unusual ones recommended such as snake broth, oil of weasel, or powdered leeches.

Conclusion

Other useful diagrams of the time included the Wound Man, his body showing the many different types of wounds to be dealt with - not all at once, one would hope. It is interesting to see that the later 16th century diagram included a cannon ball wound to the lower leg. At least some of the surgeons of the later Middle Ages had a repertoire of careful diagnosis, some quite sophisticated treatments and techniques and considerate aftercare, which lessens the usual opinion of surgery of the time as mere butchery. In the absence of anaesthesia there were undoubtedly huge problems from pain, shock and bleeding. The patient most certainly had gritted teeth (if he still had any), but at least the saws were intended to be sharp. Within the boundaries of their knowledge – the mediaeval surgeon's skill and judgement are surely equal to today.

In spite of the surgeon's best efforts there was a recognised struggle between the medical profession and death, graphically shown in some illustrations - but cure is not the only criterion for medical or surgical success, and attention, sympathy, and skill all have their own value. Nevertheless one rather cynical mediaeval medical text reminded the medic that

> *after leaving the patient he should say a few words to members of the household, saying ...that the patient was very sick, so that when he recovered the doctor would be praised all the more for his art: if the patient died, his friends would say that the doctor had already given him up….*

Most surgical patients who subjected themselves to serious operations such as lithotomy or craniotomy in the Middle Ages were probably rich and also in pretty desperate straits. But surgeons were doing best they could: 13th and 14th century Italian surgeons in particular saw themselves as the *moderni* at the top of their profession. We must not forget that today's medical and surgical knowledge and techniques will also undoubtedly be superseded. A final quotation from Theodoric's text sums up his views of the mediaeval surgeon's role:

> *…:it is necessary that the surgeon must be well-read, ….and the one who is to incise must know his anatomy …. the essential thing is the alertness and ingenuity of the practitioner. There is no need to be rash or daring, let the surgeon be foresighted, gentle and circumspect, so that under all circumstances he may operate with great deliberateness and gentleness …[for in this way] I have cured many who have been despaired of.....*

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THE MANY FACES OF ROBERT THE BRUCE

On Tuesday 17 February 1818 a group of workmen working on renovations at Dunfermline Abbey came across a stone tomb while clearing the ground at the site immediately in front of where the high altar would have stood. They immediately stopped work and informed the minister of the Abbey Church, the Rev. Peter Chalmers, who was at the time discussing the renovation in conjunction with the heritors, magistrates and architect William Burn. In their presence the slabs overlying the tomb were carefully moved aside, revealing a shallow vault. Within this lay an open grave and the remains of an oak coffin and a shroud-covered body wrapped in sheets of dull lead. The encasings consisted of two thin layers of lead, each about an eighth of an inch thick, which were in some places corroded, exposing the bones of the person contained within.

As a result of the discovery the renovation work came to a halt and the decision was made to obtain guidance from the authorities on how to proceed. Henry Jardine, His Majesty's Remembrancer in the Exchequer, informed the party that until the matter could be properly considered the tomb should be re-sealed and made secure, as it was almost certain that the remains were those of

a Royal Person, possibly King Robert the Bruce himself. The site of the burial was in a place where chronicles indicated it should be.

It is interesting to reflect that the actual site of Robert the Bruce's burial should have become lost over the passage of time. The reasons for this are unclear, but may have been the result of having been covered over by debris from previous damage to the Abbey, or as a deliberate attempt at concealment during the reformation. Throughout this time, many churches and religious buildings were stripped of their "iconoclastic" furnishings and a number of tombs were destroyed or defaced.

In due course the Court of the Exchequer gave permission for the tomb to be re-opened once the new Choir was completed and roofed over. This was to provide protection for the contents of the tomb and to exclude the general public. The tomb was then to be investigated with "the assistance of gentlemen of science and knowledge of such subjects". The team was duly gathered and it met on Friday 5 November 1819. It included three doctors: Professor A. Munro, Anatomist; Dr Gregory, His Majesty's first physician in Scotland and surgeon, Robert Liston.

As the tomb was opened it was noticed that there had been some deterioration since its original discovery, in particular the gold cloth of the shroud which had badly disintegrated. However, it was still possible to retain a few scraps and they were preserved, sealed between sheets of glass.

Measurements of the body indicated it to be approximately 5 feet 6 inches long, and having made their cursory examination the remains were carefully lifted onto the side of the tomb and the lead casings removed. This revealed the completely skeletalised body of a man, with the most interesting feature being the deliberate cutting of the sternum to allow access to the chest contents. It is known that Robert the Bruce's heart was removed after his death in order that it might be transported in a silver casket to the Holy Lands. This was intended to fulfil his ambition to take part in The Crusades. As documented this undertaking was cut short. The casket, entrusted to his friend James Douglas, only travelled as far as Spain before the party were killed fighting against the Moors. The body of James Douglas was returned, along with the casket which was eventually buried in the grounds of Melrose Abbey. Following its reinternment in 1996, it remains there to this day.

Various members of the examining team wrote their memoirs of the occasion, with a relatively detailed account of the skeleton and skull being produced and eventually published in 1821 by Robert Liston. Professor Munro had brought along with him a young artist, William Scoular, who made a plaster cast of the skull, the original of which is currently housed in the Anatomy Department of the University of Edinburgh. Following their examination, the remains were

carefully replaced in the tomb, along with various documents relating to Robert the Bruce, and the whole was sealed in pitch with the intent of preventing further desecration.

History can do little to diminish the immense achievements of Robert the Bruce, who could variably be described as a patriot, soldier and statesman, and all accounts do little to reduce an admiration for the man. Yet despite his fame, little is really known about him as a person and even descriptions of his appearance are lacking in contemporary records.

Robert the Bruce was probably born in Ayrshire around 1274 and was the sixth to bear the name, with the family holding extensive lands in Annandale and claiming descent from King David 1 of Scotland (1124-53). The family itself was of Norman descent, their ancestors having arrived with William the Conqueror. Initially the Bruces, opposed to their rivals for the throne of Scotland following the sudden death of Alexander 111 (1249-86), sided with Edward 1 of England in the early days of the Scottish wars for independence. What eventually made Robert the Bruce change sides is a little unclear. One record indicates that Edward 1 had instructed the Governor of Carlisle to send his son, Robert the Bruce – then 22 years old – to capture the castle of Sir William Douglas. Bruce on reaching the castle turned to his men and said. "No man holds his flesh and blood in hatred and I am no exception. I must join my own people and the Nation to which I was born. Choose then whether you go with me or return to your homes".

This in many ways was seen as the start of the bitter battle by Robert the Bruce to reject English domination in Scotland, with Bruce in turn being appointed King, without consent, in 1306.

Although no one is able to say with total certainty that the skeleton unearthed in 1818 was that of King Robert the Bruce, circumstantial evidence would certainly suggest it to be so. As a consequence, the plaster cast of the skull represents all we have to tell us about the person of Robert the Bruce.

The Skull

The plaster copy of the skull is beautifully executed – a credit to the capability of William Scoular. Several members of our team examined this skull independently, including an osteo-archaeologist and a senior maxillo-facial surgeon. A most striking feature is the difference in the size of the orbits, with the left being larger than the right. Closer examination revealed an outward deflection of the distal portion of the superior orbital margin and evidence of damage to the lower orbital rim and slight outward and backward movement

of the left zygoma, the latter features possibly indicating a tripod-type fracture of the left cheek bone complex that healed in a mal-united fashion.

Examination of this injury by a forensic pathologist indicated the most likely cause to be the result of a blunt type injury, with the wound possibly being closed. A second more linear groove was present above the left orbit and was possibly made by a sharp implement and would almost certainly have had overlying soft tissue damage and resultant scar. There was no evidence of any osteomyelitic change in the bone around the left orbit, suggesting that healing occurred in a relatively uncomplicated fashion. A suggestion made was that all the damage to this orbit may have left some defect in the lateral vision. More recent investigations have refuted this possibility and concluded it all may just be an anatomical variant.

The nasal margins showed some degree of thickening and the four upper incisor teeth were missing, only remnants of the sockets of the lateral incisors being visible. The anterior area of the upper alveolus was irregularly eroded, which appeared, in our view, to be a genuine feature rather than a casting deformity. Robert Liston in his contempory report described the missing teeth and what he described as a fracture of the upper jaw.

The remainder of the skull showed a robust angular bone structure, in keeping with a muscular male. Although it was not possible to do an accurate assessment of the dentition, the upper right first molar was missing and from what can be seen was obviously lost some time before death. As far as can be assessed, the degree of tooth wear would be in keeping with a person over the age of 45 years.

The eminent Danish osteo-archaeologist Professor Møller-Christensen, visiting the Edinburgh Anatomy Museum in 1968, stated unequivocally that the cast skull showed evidence of “facies leprosa” [the face of leprosy]. Although alternative diagnoses have been offered, such as syphilis, most but not all, bone experts who have examined the skull agree with leprosy as being the most likely explanation.

Historically it is recorded that Robert the Bruce suffered from a chronic but variable illness that at times resulted in him being completely bedridden but making an apparent relative recovery. However, as the years progressed and towards the end of his life, this unremitting illness appears to have taken its toll and left him virtually bed-bound. Contemporary records vary according to which side of the Border they originate. Those reports from England intimate without hesitation that Robert the Bruce suffered from leprosy. Those north of the Border, including John Barbour, author of the epic poem “The Brus”, refer to a severe, chronic illness caused by the hardships that the King suffered during his years lying cold upon the ground. Others records indicate that

Bruce accepted his illness as a divine punishment for his misdeeds. Indeed, towards the end of his life he made a pilgrimage to Whithorn to seek the intercession of St Ninian for his soul. None of the other contemporary Scottish writers mentions leprosy and there appears to have been no attempt to segregate him physically in the manner in which a leper would have been.

Interestingly a French chronicler, Jean le Bel, described the King as having "la grosse malady", a phrase usually taken to indicate leprosy. Other suggestions have been put forward at various times, including sporadic syphilis (Pearson, 1924), although this would have been before syphilis was really acknowledged in the Western World. It has also been indicated by chroniclers that Bruce had many mistresses and as a consequence, if he had been so affected, may well have sparked a local epidemic! Psoriasis has been raised as yet another possibility and, although this could cause disfiguring skin problems, it would not have caused the bone changes seen on the facial skeleton. In addition, excavations by Professor Møller-Christensen do suggest that medieval physicians were capable of diagnosing leprosy with quite a high degree of accuracy and in most cases would almost certainly have made a differential diagnosis from psoriasis. To explain the apparent anomaly of Bruce's lack of segregation from people, one can only assume that if he did indeed have leprosy the matter was kept quiet and we are looking at a rather intriguing medieval cover-up.

However, local legends around South East Scotland seem to indicate acknowledge of his alleged leprosy and in one place in particular, Scotlandwell on the far side of Loch Leven, there is a small health spring where local legend indicates Robert the Bruce was cured of his leprosy by the red friars who occupied a small monastery there. A similar legend also appears in Ayrshire with a small healing spring having developed in a field where Bruce pushed his sword into the ground.

A facial reconstruction based on anatomical considerations was undertaken from a copy of the plaster skull of Bruce by Edinburgh sculptor, C Pilkington-Jackson in 1963. He worked in conjunction with Professor Romanes, then Head of the Anatomy Department of Edinburgh University. Though a degree of artistic licence came into play in this reconstruction, we used it as a comparison to our own work. Unfortunately, there are no details of the exact basis on how the reconstruction was made. Pilkington-Jackson went on to produce the statue of Robert the Bruce at Bannockburn and we can only assume that the same facial features were used.

Current facial reconstruction is based on the premise that soft tissue thicknesses over various points on the skull do not vary much between individuals and using these reference points as guides, it is in effect, applied

anatomy starting with the muscles and ending with the skin. The aim is to produce a likeness of the individual as opposed to a precise replication, as there are details such as nasal structure, ear shape, facial obesity and blemishes that cannot be determined accurately from the skull alone.
We organised three facial reconstructions, with copies of the skull being sent to Brian Hill (Newcastle Dental Hospital) and to Richard Neave (Senior Medical Illustrator at Manchester University). They both undertook their reconstructions using onlaid terracotta, and in the case of Brian Hill his remit was not to add any features that could not be directly verified. Richard Neave, on the other hand, was informed regarding the potential injuries as seen on the skull, and also the possibility of leprosy; he was invited to produce features on the face consistent with these. A third copy of the skull was sent to Professor Peter Vanezis (then Professor of Forensic Medicine, Glasgow University) who, in conjunction with his wife Maria, had developed a computerised facial reconstruction technique. The outcomes were directly compared using a one-to-one computerised overlay technique, the results of which confirmed a marked similarity in facial structure. This part of the project confirmed the reproducibility of the techniques and hopefully provided an insight into the appearance of Robert the Bruce.
As indicated previously; to verify the facial reconstruction of historic characters a contemporary image needs to be available for comparison and this is not always possible.

Rosslyn Chapel

When we started the project, as far as we were aware, there were no contemporary portraits or detailed descriptions of the appearance of Robert the Bruce. However, our attention was drawn to a sculpture within Rosslyn Chapel, the medieval chapel built in 1446 in the village of Roslin some six miles south of Edinburgh. This chapel is world renowned for its carvings and is significant not only in Scottish history but also through its associations with the Knights Templar and later the Masons. Its founder, Henry Sinclair, was acquainted with Robert the Bruce and consequently it is reasonable that there should be a bust of Robert the Bruce within the chapel. The bust itself is described as a death mask, and although it is not feasible to have been taken directly from the King, it may well have been based on the actual death mask or some other image. Unfortunately, details are not available and the only provenance is through word of mouth.
We managed to obtain a copy of this sculpture and were immediately impressed by many of the features revealed. These include enlargements of the left orbit and partial closure of the left eye. There was also a hint of a scar

above the left eye, and the sinking in of the nasal bridge and flattening of the upper lip as seen in someone who had lost their upper front teeth. Again using computerised superimposition, the facial dimensions and overall facial composition were within keeping of our facial reconstructions. This tends to add weight to the sculpture in Rosslyn Chapel possibly being based on a contemporary portrait/bust of Robert the Bruce.
The aim of this project was to try to ascertain as much as possible about King Robert the Bruce from what little remained of him. In this respect, the value of the plaster skull cannot be overestimated and has allowed some insight into his possible appearance.

Leprosy
For years, historians have argued about whether the 14th century Scottish king was infected with leprosy, whilst others suggest he was simply the victim of a smear campaign. Recently, experts at the Robert the Bruce Heritage Centre concluded that it would have been impossible for him to attend mass, hold court, or drink from his local well; all of which he did, if he had suffered from leprosy.

In 2016, a team of experts from Canada and France examined a copy of the skull and photographs of a toe bone allegedly from Bruce and suspected that the plaster-casting process probably resulted in the appearance of the anterior maxilla. They concluded that there were no obvious signs of leprosy. Their analysis enabled a bust to be constructed that showed King Robert as a fierce and battle-scarred warrior but one without the facial afflictions of leprosy.

More recently in 2017, a collaborative project to reconstruct his face by the University of Glasgow and Liverpool John Moores University (LJMU) used state of the art computer technology. They maintained that his skull probably did show the tell-tale signs of leprosy, including a disfigured maxilla and nasal bones.

The project team was led by Dr Martin MacGregor, a senior lecturer at the University of Glasgow and included Professor Caroline Wilkinson, director of the face lab at LJMU. They decided that if he did have leprosy, it may not have manifested strongly on his face.

Certainly, the illness is not specifically mentioned in Scottish documents from the period, nor do contemporaneous historians mention any disfigurement. However, records do recall that Bruce suffered from a mystery ailment which laid him low several times during his reign, for example, in Ulster in 1327, he

was said to be so weak that he could only move his tongue. It is possible that this variable and even intermittent illness either caused or contributed to his death.

The latest reconstruction shows Bruce with a large, squarish head, supported by a muscular neck and stocky frame, suggesting he was a seasoned warrior. Two versions have been produced one showing the possible ravages of leprosy and the other without.

Whatever the truth and no doubt the debate will continue, history cannot underestimate the stature of Robert the Bruce and his achievements and hopefully, all these studies help give further insight into the man and his personal tragedy through illness.

With this meeting in Perth the 2016-2017 session of the Society came to a close.

The Scottish Society of the History of Medicine

REPORT OF PROCEEDINGS
SESSION 2017-2018

THE SIXTY NINTH ANNUAL GENERAL MEETING

The Sixty Ninth Annual General Meeting was held at the Edinburgh Academy, Henderson Row, Edinburgh on Saturday 4 November 2017.
The President, Dr Niall Finlayson, was in the chair. The President and the Secretary, Mr Andreas Demetriades, presented reports. Two new Council members were elected, Laura Dempster and Dr Patricia Whatley.

THE TWO HUNDRED AND NINTH ORDINARY MEETING

The Two Hundred and Eighth Ordinary Meeting followed directly after the Sixty Ninth Annual General Meeting at the Edinburgh Academy, on 4 November 2017. 32 members or guests were present. The first speaker, Professor Malcom Nicolson, the Director of the Centre for the History of Medicine at the School of Social and Political Sciences, University of Glasgow, took as his title "Is There a Distinctively Scottish History of Medicine?" , a paper originally planned for the meeting of the British Society of the History of Medicine (BSHM) in Edinburgh in September 2017.
Professor Nicolson made his talk available to the BSHM and it is available to view as a video on their website at https://bshm.org.uk/keynote-lecture/
The second speaker, Professor Arthur Morris talked on "Scottish Contributions to Burn Care"

SCOTTISH CONTRIBUTIONS TO BURN CARE

This paper defines "Scottish Contributions" to be discoveries made in Scotland by any resident or discoveries by Native Scots resident or serving overseas. This includes the work on antiseptic surgery carried out in Scotland by Lord Lister (though he was English born) and that of Alexander Fleming, (Scots born but whose discoveries were made while working in London and also in Boulogne in the First World War). It is also important to remember that there will have been many unrecorded discoveries contributing to burn

care which did not involve formal medical, nursing or pharmaceutical personnel.

The development of burn care has had a very long gestation. Burns must have been experienced and treated by mankind for 1,000,000 years or more as remains of fires this long ago have been identified.[1] 186,000 years ago, Neanderthals appear to have built the oldest human structures – four stone rings 330 metres into a cave in southern France away from natural light. Analysis of various sites has shown that fires and hearths existed and therefore burn injuries must have occurred.

Scotland itself was only revealed in its modern form at the end of the last ice age when the 2 km thick ice sheet receded from its maximum 30,000 years ago.[2] With the beginning of the Holocene around 9,600 BC hunter-gatherer groups began to colonise Ireland and Britain from the south along the Atlantic seaways and from the east across Doggerland.

At an early hunter-gatherer encampment from 8,500 BC, at Cramond near Edinburgh, numerous carbonised hazelnut shells suggest cooking in a similar way to other Mesolithic sites. Skara Brae in Orkney was occupied for 600 years from 3190 BC and is one a large number of early sites of established human habitation. The houses with central open hearths would have been a source of flame burns to the occupants and also scalds from hot liquids.[3] A bronze age farm at Isbister (1000 BC) had a hot water pool heated by inserting hot stones warmed in the nearby hearth, another probable source of scald injuries.

Herbal treatments must also have been used by Neanderthals and humans since antiquity. The written record goes back only 3,000 years and covered burn care from the outset.[4] Egyptian, Chinese, Ayurvedic and Greek sources indicate a large number of salves of honey, butter, oils and fats. The first application of tea (tannin) for burns and scalds is credited to the Chinese.[5] This and tannic acid has featured prominently in the treatment of burns and scalds over the centuries (see later).

In Scotland there is a strong tradition of herbal treatment. In her book “The Scots Herbal “, Tess Darwin details 16 burn/scald remedies and 37 wound treatments.[6] Two examples are flax seed in the 15th century for poultices for burns and scalds and algae (seaweed). Flax seed also yielded linseed oil covered later. Seaweed was processed into kelp in Stronsay in Orkney in 1722. The same product, refined as alginate, is still used in a large number of products today (for example Sorbsan and Kaltostat), in wound management including burns.[7] Commercial production of alginate continued in Scotland until 1986 and small-scale production still continues, mostly for use in cosmetic preparations.

Lime water and oil in the treatment of burns was used by Cerapion in 300 BC.[8] In 1759 at the Carron Iron Works in Falkirk, a mixture of lime water and linseed oil was used to treat burns. This was introduced by Dr John Roebuck who was the owner of the foundry. It became known as Carron oil and was used extensively up to the time of the first World War when it was re-introduced in the British Navy as a replacement for picric acid. [9]

Burns in Scotland, as elsewhere in the world, were probably mostly domestic injuries (for the most part scalds from cooking or the open fires more common in older buildings). With the development of greater technology there was a steady increase in industrial and chemical burns. The invention of gun powder and other explosives increased the frequency of mass casualties caused by blast and flame. In the late nineteenth and twentieth century the rapid development of engines powered by petroleum products gave an exponential rise in direct flame burns. Warfare has caused greater increase of burn injuries but has also provided significant experience for military medical personnel. In war, front-line staff are often young and recently qualified. They may be less indoctrinated with older methods and, with fresh eyes, can adapt and improve existing treatment. Also, in emergencies, a shortage of dressings or applications may encourage innovation and new developments.

A burn injury can be intimidating for bystanders, relatives and attending staff. This can have a profound effect on observers and even in hospitals can lead to burn patients being banished to far corners of the ward. The rapid onset of infection compounds this problem and may be the reason why burns have been relatively neglected and their care held back until the twentieth century.

The Problems of Burn Care

There are three basic problems in caring for a burn patient. These are 1) the diagnosis of severity in extent and depth, 2) the major complications of systemic shock and infection and their prevention and treatment and 3) healing the burn wound and preventing infection. A very good source of information is Wallace A. F. [10]

1a Burn Estimation – Depth

The Scottish Surgeon, Peter Lowe (1552-1612),[11] (founder of the Royal College of Physicians and Surgeons of Glasgow), working in France in the Six Years War in 1596, recognised three depths of burning, “inflammation”, which may be equated with erythema or the most superficial burn which heals rapidly spontaneously, “vesication” which is the blistering type of superficial burn and “exulceration” which may be equated with the granulations consequent on a full thickness burn. “The superficial are subject to inflammation, the great ones to excoriation and exulceration, those that are mean have little blisters on the skin”. This is a classic description of burn

thickness of the skin: superficial, intermediate and full thickness, which is still in use today. However, many other classifications were devised, the most complicated being that of Baron G Dupuytren, a French surgeon, whose 1832 classification had 6 degrees. However, once his first three degrees similar to Lowe's are considered, the detail of the deeper three is now considered superfluous because once the full thickness of skin is burnt it is really less important to know if the burn extends to fat, muscle or bone.

1b Burn Estimation – Extent

John Thompson, Regius Professor of Military Surgery, Edinburgh observed in 1816 [12] that constitutional symptoms were proportional to the extent of the burn.

2 Burn Shock and Resuscitation

The death rate among patients with large burns was noted to be very high and peaking at 2 days post injury from the beginning of the 19th Century. In 1792 David Cleghorn, who was not medically qualified, had personal experience treating workers injured in his breweries and observed that purgation with resulting dehydration was harmful to burn patients. "*When a patient is costive, I order boiled pot barley and prunes, or some other laxative nourishing food, and sometimes an injection but never any purgatives. It is distressing to a patient with bad sores to be often going to stool. Besides I have remarked that weakness and languor (which never in my opinion, hasten the cure of any sore) are always brought on more or less by purgatives. From the effects too I have felt them have on myself, and to have on others, they do not seem to me to have so much tendency to remove heat and feverishness as is generally imagined; and I suspect that, contrary to the intention of administering them, they carry off useful humours than hurtful ones*".[13] These letters to John Hunter, the Scottish Surgeon based in London, were actually written in 1791 and Cleghorn visited him in London gaining support and encouragement.

In 1823 William Cumin, a Scottish Army surgeon, later the Professor of Obstetrics and Gynaecology in Glasgow, (1834-40) noted increased viscosity of blood in patients who died of burning. He also noted gangrenous spots in the small intestines at post mortem. Curling's Ulcer (described in 1842) is the same phenomenon.

To summarise the position as known by 1823; the burn injury was more serious in proportion to its surface area, those who died had increased viscosity of the blood and purgation with its associated dehydration was harmful. Thus, by then this knowledge could have pointed the way to a rational early treatment of severe burns.

Cholera in Leith 1832

Dr William Brooke O'Shaughnessy (aged 22) a recent Edinburgh graduate, in a lecture to the Westminster Medical Society and in a letter to the Lancet 20th December 1831 stated that "*blood drawn in the worst cases is unchanged in its anatomical structure … It has lost a large proportion of its water … it has also lost a great portion of its neutral saline ingredients …*". His conclusions were "*1st to restore the blood to its natural specific gravity; 2nd to restore its deficient matters … when absorption is entirely suspended in those desperate cases … the author recommends the injection into the veins of tepid water holding a solution of the normal salts of blood*".

Dr Thomas Aitchison Latta was the first to try intravenous treatment in spring 1832 on 6 cholera patients. The results were so dramatic that he continued and of the first 25 cases of patients in extremis 8 recovered. Dr Robert Lewins reported the results. In a letter to the Lancet 18th May 1832 he wrote "*Verily sir this is an astonishing method of medication, and I predict will lead to wonderful changes and improvements in the practice of medicine*".

Although intravenous fluids had such a positive effect their use was not generally accepted until about 100 years later for burns. There are many reasons for this, including variable recipes, lack of sterility and general antipathy to change. Louis Pasteur's observation in a lecture to the University of Lille 7th of December 1854 may be relevant "*in the field of observation chance favours only the mind that is prepared*".

Burn Units

The first burn unit in the world was opened in Edinburgh in 1843. James Syme, Professor of Surgery, already known for his use of dry absorbent dressings for burns, wrote to the managers of the Royal Infirmary "*if under such circumstances I had admitted a woman burnt over nearly the whole body into a ward fully occupied by patients, most of whom had suffered operations, I should have been justly chargeable with the highest degree of culpable recklessness*". The janitor's house for the High School was adapted to form a unit with one room for 4 men and one for 4 women. The unit lasted until 1848 when an unusual number of accidents from railway developments at nearby Edinburgh Waverley Station meant that it was taken over for surgical patients. Those patients suffering from burns were accommodated in a portion of one empty Shed as a temporary measure, but the burn unit was never re-opened.[14] Glasgow opened a separate burn ward in the Royal Infirmary in 1883.

In the Second World War it was anticipated that burns would occur in large numbers and Burn Units were established in EMS Hospitals at Bangour General Hospital, Ballochmyle and Stracathro. The Medical Research Council moved to the Glasgow Burn Unit in 1942.

Lister on Wound Healing and Burns

Joseph Lister was Surgeon to Glasgow Royal Infirmary 1860-69 and was the "Father of Antiseptic Surgery". He returned to Edinburgh Royal Infirmary from 1869-77 as Surgeon before going to King's College, London as Professor of Clinical Surgery. At Edinburgh he had a varied practice treating 2,283 patients including 44 burns.

In "Thoughts on Lister's Time" [15], A B Wallace, Reader in Surgery at Edinburgh University, in a tribute to mark the Centenary of the publication of the first reports on the antiseptic technique, noted that "*the writings of Lister and his younger colleagues – Watson Cheyne (a native of Fetlar) and John Chiene – are fascinating, not in relation to descriptions of plastic surgery procedures but from astute observations of the healing of wounds, skin loss, simple skin grafting and methods in wound care*.". In 1878 Lister observed that granulations form a beautiful living plaster and have a tendency to shrink. He wrote: - "*How instructive was the result obtained by skin grafting! You saw that whereas before this operation was performed cicatrisation took place only at the edge of the sore, a thin superficial layer of integument involving little more than epidermis having been removed with a sharp knife from the inner side of the arm and the shaving having been cut up on the thumb nail into small bits* (These were later known as postage stamp grafts) *which were placed in succession with the raw surface downwards on the granulation, the grafts so planted became each one a centre of epidermic growth on the sore*." His conclusion was that new structures formed in the repair of injuries are composed only of tissues similar to those in the immediate vicinity and the equally fundamental fact in physiology that "*severance of a part from connection with the body is not followed by immediate loss of its vitality.*" … "*no sooner did this piece of living dressing, perfectly unstimulating chemically or mechanically protect the granulations, than pus formation and exudation of liquor sanguinis were alike suspended.*" Lister also used full thickness skin grafts and flaps to reconstruct defects such as those resulting from treatment of burn scar contractures. Another type of graft, pinch grafts, was described by Reverdin[16] of which Watson Cheyne wrote "*they should more properly be termed epidermic grafting*." Interestingly, this type of graft was used many years later and formed the subject of Gibson and Medawar's ground-breaking research in 1942.

Wolfe Grafts

John Reissberg Wolfe (1824-1904), an Aberdeen Ophthalmologist, reported treating a quarrier with facial burns from an explosion. At operation he found severe ectropion which he released and performed a tarsorrhaphy joining the two eyelids together. A full thickness skin graft was cut from the arm. It was

cut in three pieces, one with some areolar tissue and two others with all fat removed. The grafts were applied and covered with a gutta-percha dressing applied next to the skin. The first shrank but the other two were revascularised and pink at 48 hours and well healed.[17]

The First World War

War often brings advances in treatment of injuries. The sudden mobilisation of keen young personnel thrown into action by the emergence of large numbers of casualties is a fertile ground for innovation in a situation where the corporate knowledge from previous conflict has faded. The Royal Naval Hospital, South Queensferry was a prime example of such opportunity. The Grand Fleet was stationed in the Firth of Forth and was dispatched to the battle of Jutland. Temporary Surgeon C P G Wakeley RN was the resident surgeon and he treated 100 cases of burn injury (40 from the Battle of Jutland). All casualties could be returned within 24 hours sailing time. For topical treatment he stopped using picric acid and instituted Carron Oil dressing as advocated by Fleet Surgeon Muir.[18] (Picric Acid was widely used as a first aid application for burns and was carried in first aid kits in the armed services at the start of the First World War.)

Treatment depended on the degree and extent of the burn and its causative factor. Fluid replacement was recommended, with intravenous and subcutaneous injections of normal saline and Fischer's solution. Early grafting with Thiersch grafts was practised, with exposure of the grafts under bed cages, as burns were treated out of doors if possible to limit infection. Continuous saline baths were used for treating extremities.

Sir Alexander Fleming 1881-1955 was posted to a bacteriology laboratory and research centre at Boulogne in Northern France in 1915, as assistant to Professor Almroth Wright, and made numerous observations on effective wound healing and prevention of infection. His first piece of advice to surgeons was to remove all necrotic tissue as soon as possible. [19]

He pointed out the danger to tissues when antiseptics were improperly used. In a Hunterian lecture in 1919 he stated "*all the successes of primary wound treatment have been due to efficient surgery and it seems a pity that a surgeon would wish to share his glory with a chemical antiseptic of more than doubtful utility*".[20] This opinion was extremely relevant to burn treatment and early attempts were being made at that time to perform early excision, (see Wakeley, above). Fleming's discovery of penicillin had to wait until 1928 but it was not put into effective production until 1941 when Florey, Chain, Abraham and Heatley started mass production. Penicillin proved remarkable as a systemic therapy for burns but as a topical preparation it caused too much hypersensitivity.

Inter-war years

After the progress that had been made during the First World War, it was recognised that shock from burns should be treated with fluid both orally and parenterally. The use of picric acid, which was very painful and toxic, for wound treatment, was banished for more bland substances: - Carron oil and triple dye in the Navy, and Ambrine and Tulle Gras in the areas of influence of the army in France. Early grafting of burns pointed the way ahead.

Tannic Acid Again.

It was therefore all the more surprising that in the USA in 1925 Tannic Acid was re-introduced by Davidson.[21] The treatment was supposed to stop fluid loss from the burn, stop absorption of "toxins", stop infection and stop pain. In fact, the hard surface carapace formed had no effect on deeper tissues which still lost fluid and oedema still formed. There was no evidence of toxins, it didn't stop infection and it destroyed skin deeper structures including nerve endings.

In Nature, 21st of December 1940 a leading article stated *"in the past several months opportunities for testing the tannic acid treatment of burns have been only too abundant, and the method highly commended at the start of the War has not emerged from the tests so successfully as had been expected." "The Minister of Health recently stated in the House of Commons that tannic acid is not suitable for certain types of burns." "At a recent meeting in the Royal Society of Medicine … Rear Admiral CPG Wakeley said that no tannic acid preparation must be used on burns of the hands or face and gave ample reasons for this opinion. Mr A H McIndoe said the local treatment of war cases has shown that coagulation treatment, especially by tannic acid has been carried too far*." "*First aid posts have been officially instructed not to use tannic acid in the treatment of them*." In his book "The Last Enemy" Richard Hillary, an RAF fighter pilot, gave a distressing account of his treatment with tannic acid for burns of the hands and face.[22]

Second World War

Alexander (Alister) Burns Wallace 1906 – 1974

During the Second World War Alister served as plastic surgeon at the Scottish Emergency Medical Services Hospital at Bangour. He made a series of contributions to Burn care. He was the author of the Treatment of Burns, an Oxford War Manual published in 1941[23], which was a very comprehensive review of the available methods of burn treatment. It advocated the treatment of shock and its prevention by intravenous injections of plasma (or, if not available, 5% gum saline). A large variety of local treatments were discussed for the burn wound including the tanning method. In chapter 7 on the use and

abuse of tanning methods the EMS Circular of October 1940 was quoted: - "*The treatment of Burns by Tannic Acid. Further experience in the treatment of burns has proved conclusively that the use of tannic acid on the hands, especially the fingers, is followed by disastrous crippling in burns of the second and third degree."* On the hand, the use of tanning gave a hard carapace which did nothing to decrease swelling but caused compression to the underlying tissues leading to atrophy and necrosis of the soft tissues.

Burn Surface Area Estimation and Burn Shock Prevention

The understanding that shock as a result of burn injury was proportional to the total body surface percentage burn was understood fully at the beginning of the Second World War. However, a reliable way of measuring this was slow to materialise. Lund and Browder in 1944 were the first to publish a reliable method which took into account the differing proportions of body parts, which change with age of the patient. The well-known Rule of Nines is often attributed to A B Wallace. However, Wallace advocated it in a publication on Burns in 1948[24] as part of a detailed paper with tables on fluid resuscitation, the Rule of Nines was described by Pulaski and Tennison in the late 1940's but was never published.

Exposure Treatment of Burns

Exposure treatment of burns has probably been used since antiquity. A B Wallace introduced exposure treatment at the Royal Hospital for Sick Children in Edinburgh in 1947. [25,26] In a controlled environment it proved to be a very useful means of treatment particularly in children. It required isolation cubicles and the experienced burn unit staff who were available at RHSC hospital.

Medical Research Council based in Glasgow 1942 – 1944

The onset of war in 1939, with major burns from mechanical weapons and their fuel gave enormous impetus to the study of treatment of burns. The MRC, based in Oxford, studied burns but only 25 cases of greater than 10 percent Body Surface Burns (BSB %) were treated in 1941. The Burns Unit in Glasgow at that time treated 1000 burns per year and 220 of these were classed as serious. The MRC Unit was therefore transferred to Glasgow with Dr Leonard Colebrook as head from 1942 – 44. As the incumbent surgeon Clark did not visit very frequently, Professor Charles Illingworth suggested a more scientific approach and recommended one of his own team. The young man was Mr Tom Gibson.

Tom Gibson (1915-1993) President Royal College of Physicians and Surgeons Glasgow 1976-78

In a reflective publication in the British Journal of Plastic Surgery in 1986[27] Tom Gibson explained the background of the work he performed in Glasgow

with P B Medawar resulting in a publication in the Journal of Anatomy in 1943.[28] In 1941, he was senior resident at the Western Infirmary, Glasgow and his main task was to look after the "Septic Wards". The Hospital managers decided that since all burns went septic, they might as well be admitted straight into the septic wards. This is how he gained his initial interest in burns. "*On the strength of my experience of burns in the Septic Wards I was appointed general surgery dogsbody to the (MRC) Unit in March 1942*" He had never seen split skin grafts cut but pinch grafts were relatively popular. They were easily cut and took well. The use of homografts was easily explained as "*at that time there was an astonishingly widespread belief that they were as good or almost as good as autografts*." A 2-year-old child was admitted on 17 April 1942 with full thickness burns to the abdomen and right thigh. On 13 May (Day 1) the sloughs had separated and she was ready for grafting. Gibson thought that her own skin was hardly adequate to cover the area and he persuaded her father to donate 67 pinch grafts from his thigh. They took readily and by day 10 many were already showing new epithelium growing from the edges. The ungrafted areas were regrafted with another 70 pinch grafts from the father's other leg on Day 13. By day 18 the first set were producing epithelium which coalesced and completely covered the grafted areas. The second set had taken well. "*On Day 23 all the new epithelium from the first set was thick and opaque*" It was doubtful if any growth had occurred from the second set. "*The end came between dressings on Days 23 and 26. All of the homograft epithelium from both sets of grafts had disappeared*." A further case was treated by Gibson, with similar results.

With the arrival of Peter Medawar in Glasgow, a further patient with deep flame burns was treated with two sets of pinch grafts fifteen days apart and serial histology was performed by Medawar. There was no evidence that breakdown of the foreign skin epithelium was brought about by lymphocytes or mesenchymal cells. Their conclusion was that the destruction of foreign epidermis was brought about by a mechanism of active immunization. In fact, precedence should really go to Holman who published a paper in 1924 on first and second set homografts but this did not seem to have been followed up.[29]

In retrospect it was extremely fortuitous that Tom Gibson had not been taught to use a dermatome to cut thin sheets of split skin graft. The pinch graft method gave a much thicker graft with collagen of dermis at the centre. It left a more robust ghost of dermis which made handling the histology much easier.

The establishment of the mechanism for skin graft rejection, which was the result of this experiment, undoubtedly saved a lot of people from inappropriate treatment and also in due course won the Nobel Prize for Peter Medawar.

Tom Gibson was also involved in a large number of developments which helped advance burn care in Glasgow. With Colebrook he investigated the use of the new MRC 400ml standard dried plasma. He was involved in research into the volumes of fluid required in the shock phase of burns and in the development of the Glasgow No 9 cream for burns which contained sulphanilamide.

Tangential Excision and Grafting of intermediate depth burns

The influence of two World Wars and the advances made led to many improvements in burn care. One vital one was the move towards early excision and grafting of burns. A fundamental advance in 1960 was made in Yugoslavia by Zora Janzekovic, a single-handed surgeon in Maribor. She reasoned that instead of waiting six weeks for deep intermediate burns to declare themselves by late healing, she would excise the dead upper layers by serial tangential excision using a dermatome until viable vascular tissue was reached. A split thickness skin graft was then immediately applied. This had an immediate effect in better survival, quicker healing minimising infection and much less severe scarring. When she published her results, they were so good that a delegation from the ISBI (International Society for Burns Injury) led by Alister Wallace,[30] its Secretary General, was sent to evaluate the results. Alister was immediately convinced of the effectiveness of this method and introduced it in Edinburgh on his return. It is now standard practice throughout the world where facilities and expertise exist.

For the method to work well patients need to be treated in a dedicated intensive care facility with 24-hour availability of theatre access with general anaesthetic provision. Wallace became frustrated with the hospital authorities' lack of progress to provide such a unit and threatened he would no longer be responsible for the welfare of burns patients unless a properly built and equipped burn unit was provided. On the 25th of June 1968 the revamped T Block ward was opened as a 12-bedded burn intensive care unit.[31] This unit provided superb facilities and when I went to work there as senior registrar from 1972 to 1975 it was unlike any I had been in before, meticulously clean with fresh air and no hint of aroma from infection.

Prevention of Burns

Prevention of burns is a vital element of burn care. The effect of bathing immersion in hot water causes almost as much burn morbidity as petrol ignition. The new Scottish Parliament was able to legislate for safety matters and as a result Scotland was the first country in the United Kingdom to legislate for compulsory fitting of thermostats in showers.

COBIS Managed Clinical Network for Burns Care in Scotland

Another innovation pioneered in Scotland was the founding of a managed clinical network for burn treatment, the first in the United Kingdom. These networks are an effective way of improving treatment by centralising expertise but unfortunately care in outlying areas can be compromised with de-skilling of care in the periphery. In sparsely populated parts of Scotland this can lead to patients having to travel large distances. Tele-medicine could be an ideal way to counteract this effect.

Overseas Aid in Burn Care from Scotland

As will be seen from the above history of burn care, many developments have been made by Scots working overseas for various reasons usually connected with warfare. There is also a well-known tradition of Scots doctors working overseas with humanitarian aims. A drawback of the visiting group approach (the so called Surgical Safari) is that skills are not embedded and withdrawal of the helpers and their equipment results in no lasting improvement in services. There have however been many occasions where expertise and training have been applied by Scots and Scottish charities to develop health care systems and facilities overseas. Burn units have been a fertile ground for aid. Burns are very common in developing countries and health service provision is frequently lacking in both expertise and facilities.

Professor Jack Mustarde, a retired plastic surgeon from Canniesburn Plastic Surgery Unit in Glasgow, devised and developed a novel approach to medical aid in Ghana. As explained in his book,[32] Jack had no intention of starting a development but was asked to join a Rotary sponsored group to treat patients in Ghana. The vast workload that presented at the first out-patient clinic could not be treated because of lack of surgical operating space. At a reception for the volunteers the President of Ghana spoke to Jack and asked him how he was getting on. Jack said that this type of visit couldn't cope with the vast workload. He asked President Rawlings why they didn't train Ghanaian Surgeons? The President said that they sent people abroad to train but they didn't come back again. He asked Jack to help. Jack spelt out a tri-partite plan for older staff with families in Ghana to train for 2 years in Glasgow to form the consultant core while at the same time getting a team of volunteer consultants to cover the unit in Korle Bu Teaching Hospital for two years, establishing a workload and training junior staff, some of whom would go on to train in the UK. The third part was to build and provide suitable accommodation. All trainees went back and this unit has now been going successfully for 25 years with 8 surgeons in Ghana at two centres: the original in Accra and a second one in Kumasi. An early key to success was the

development of a burn unit and Ghana Medical Service funding for this was forthcoming.

The second unit in Kumasi was developed in parallel under the same charity as described by Agbenorku[33]. This project was spearheaded by Professor Arthur Morris in Dundee, initially funded by a Rotary International and Dundee Claverhouse Rotary Club. Six senior nurses selected by the Kumasi Hospital Authorities were trained in ward and theatre expertise in plastic surgery and burn care at Dundee Teaching Hospitals. The establishment of these two units in Ghana also attracted back two trained consultants from Europe. By March 2018 a total of 14 Surgeons had been trained by the charity or attracted back to Ghana. The charity now named "ReSurge Africa" has also started a similar process in Sierra Leone but, in the aftermath of a civil war followed by Ebola, conditions are much less conducive and progress has been very slow. A separate Charity led by Mr Howard Stevenson, also a consultant in Dundee, and Prof Jimmy James, helped to set a up a burn unit in Blantyre, Malawi 20 years ago.

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THE TWO HUNDRED AND TENTH ORDINARY MEETING

The Two Hundred and Tenth Ordinary Meeting took place on 14 April 2018 at the Royal College of Physicians and Surgeons of Glasgow.

There were four papers, the first from David Hamilton who talked on Edinburgh's Rediscovery of Plastic Surgery. Dr Patricia Whatley then talked on the Highlands and Islands Medical Service. Dr Whatley's PhD Thesis on the Development of Medical Services in the Highlands and Islands of Scotland is available as a pdf at
https://discovery.dundee.ac.uk/ws/portalfiles/portal/12101674/PatriciaWhatley2013.pdf
Kyle Mathews gave a paper on "Why IV infusion failed to flow".
Finally, Dr Gillian Allmond took as her subject "Asylum care for the insane poor in the early Twentieth Century ; Scotland and England compared". She looked at how care was provided in Bangour Village Asylum, near Edinburgh and compared it with that provided in an English Asylum, Whalley, near Preston which was established at a similar time. She published a paper on this subject in 2016 in History of Psychiatry. A pdf of this is is available at
https://pdfs.semanticscholar.org/e922/d436fd27e3d65a6e51ac6058abcc1c8b916a.pdf?_ga=2.81506583.1093528233.1585923352-961686209.1585923352

HALDANE TAIT MEETING 2018

The Haldane Tait meeting for 2018 had to be cancelled as the planned venue was not available. The invited speaker, Dr Ruth Richardson, agreed to present her paper at the 2019 meeting.

THE TWO HUNDRED AND ELEVENTH ORDINARY MEETING

The Two Hundred and Eleventh Ordinary Meeting was held on 23 June at the University of Stirling. There were two speakers, the first, Professor Samuel Cohn Jr, took as his subject "Epidemics : Hate and Compassion from the Plague of Athens to AIDS". Professor Cohn's book on this subject (ISBN 9780198819660) was published in 2018 by the Oxford University Press. The second, Dr Louise Williams, Archivist at Lothian Health Services Archive gave a paper on "Behind the Store Doors. Lothian Health Services Archives for Researchers".

BEHIND THE STORE DOORS
LOTHIAN HEALTH SERVICES ARCHIVE FOR RESEARCHERS

Lothian Health Services Archive (LHSA) is the archive for NHS Lothian, and is part of the Centre for Research Collections (CRC), University of Edinburgh. Established in 1967 as the archive of the Royal Infirmary of Edinburgh, holdings have expanded to also include records from other regional NHS hospitals (including their predecessor bodies), and papers related to healthcare in the Lothians donated by private individuals and local organisations. An Accredited Archive Service[1], LHSA is the largest medical archive in the UK, with over 3,000 shelf-metres of records. These records date from 1594 (an early land indenture) up to the present day and take a variety of forms. Along with paper and bound volumes, LHSA has over 40,000 image records (including photographic prints, glass plate negatives, celluloid film, x-ray film, slides, and engravings), along with born-digital records (such as recent oral history recordings) and some objects of demonstrable significance to Lothian's healthcare history. Hospital records generally fall into three main groups: the administrative (documenting how hospitals were run, such as minute books, finance records and annual reports); staff records (staff registers and wage books, for example); and patient records (by far the largest group of hospital records, including registers of various forms, case books and folder-based case notes).

[1] An Accredited Archives Service is an archive that has undertaken a formal assessment and ongoing review by national assessors in the sector, and meets best-practice standards in both service to the public and custodianship of collections.

Fig 1 The North Front of the Royal Infirmary of Edinburgh (LHB1/68/1), c. 1741. LHSA has its origins in the archive of the Royal Infirmary of Edinburgh, founded in 1967 to preserve the hospital's long history.

One of the most interesting and enjoyable aspect of the archivist's role is making sure that the public can access records. Some researchers choose to come in to see original records in the CRC reading room. The reading room is on the top floor of the University of Edinburgh Main Library in George Square, and anyone can come in to look at collections open to public access (researchers do not have to be students or academics). First-time visitors need to get a reference card to get into the library (along with a reading room card), but requirements for proof of identity are straightforward. More information can be found on the LHSA website (http://www.lhsa.lib.ed.ac.uk/services/index.html) or by telephoning archive staff (0131 650 3392). It is best to email (lhsa@ed.ac.uk) or telephone to arrange an initial appointment to see records, both to make sure that material is physically available (some LHSA records are stored off-site) and to ascertain whether or not records are open to public access (see below for access restrictions on personal information in health records.) In advance of any visit, LHSA catalogues are available online:
http://www.lhsa.lib.ed.ac.uk/collections/index.html
Since requests about records come from around the world, LHSA also runs a remote enquiries service. Most queries answered in this way are genealogical, but they also cover individual medical staff, hospital and local history, and history of medicine in the Lothians. Enquiries come from private individuals, charities, the media, NHS staff (about hospital history and records of past patients), students and academics, and other heritage professionals. Subject to access restrictions, copy records can be sent by email in most cases.

Genealogy researchers either come to health records from their research into statutory records (such as census, birth records and death certificates) that connect an individual to a hospital, or from family history in living memory. Although most family history enquiries to LHSA relate to hospital patients (a birth or a death, for example), some queries come from descendants of hospital staff. Hospitals kept more detailed records of patients than their staff (patient records held by LHSA date back to 1762), and while patients may be represented in a number of registers inside a single hospital stay, it is more difficult to find the same level of detail about the staff who cared for them. Whilst some staff registers survive (such as training registers for hospital-based nurse education), hospital magazines and photographs can also help to answer queries about the lives of staff members. Academics, students and local history researchers use LHSA for a wide range of topics across the history of medicine, but more common projects cover the development of clinical specialisms, the history of particular institutions, the history of psychiatry, and notable medical professionals.

Fig 2 Jessie MacLaren Macgregor (1863 – 1906), an early female medical graduate from the University of Edinburgh (GD1/53/2). Many archive enquiries focus on the history of women in medicine.

On account of the sensitive nature of some of the material held in the archive, access restrictions apply to some LHSA records. Patient and staff records after a certain date (before 75/100 years have passed for adults, and 100 years for children) are closed to general public access, although LHSA works with NHS Lothian to enable legitimate access to otherwise confidential records (either for family history or academic research) as long as strict conditions on patient privacy are upheld. Individuals also have a right to access any information that LHSA may hold about them under the General Data Protection Legislation

2016. Confidentiality restrictions can be confusing if applied in general terms: however, LHSA staff are happy to explain to individual researchers how (and if) restrictions apply to specific material and projects. Access to records is also determined by the nature of the survival of medical information. Although LHSA collects all hospital records prior to 1948, it is not possible to keep a detailed medical record for everyone, and either archive staff or hospital staff will select certain records over others for permanent retention.

Although the records looked after by LHSA are many and varied, the archive has key strengths across several subject areas. Firstly, holdings on psychiatric care have been preserved from a range of institutions across the Lothians.

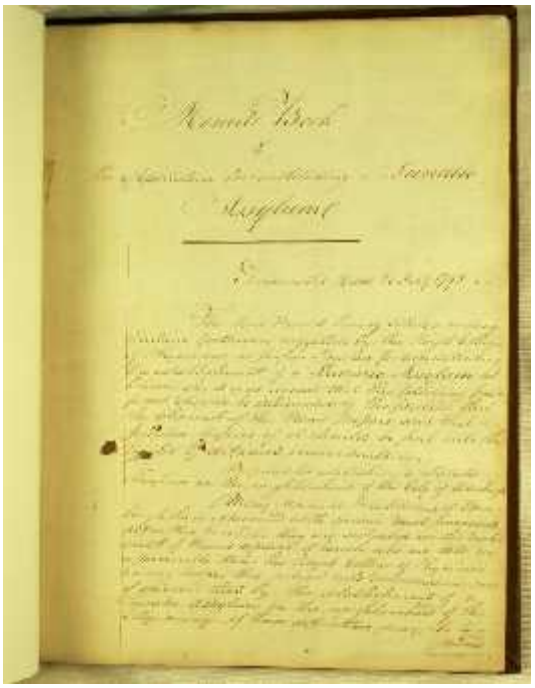

Fig 3 Edinburgh Lunatic Asylum, or Royal Edinburgh Hospital, opened its doors in 1813, but its origins went back to Andrew Duncan's ambition to establish a more humane institution for psychiatric care, as shown by this 1792 meeting recorded in the hospital's first minute book (LHB7/1/1).

The institutional collection of the Royal Edinburgh Hospital is the most widely consulted collection of all held by LHSA, popular with genealogy and academic researchers alike (LHB7). The Royal Edinburgh Hospital opened its doors in 1813 as Edinburgh Lunatic Asylum, and is still operating on its Morningside site today.

Compared to information that survives from more general hospitals, psychiatric hospitals recorded a high level of detail on their patients (from entry to the hospital to case histories to death or discharge). Records are

extremely well-organised. For example, LHSA holds an almost complete set of Royal Edinburgh Hospital patient case books from 1840 to 1932, and a large collection of folder-based case notes up to the 1960s, along with numerous certification papers and registers. This institutional collection is augmented by papers collected by the Physician Superintendents of the Royal Edinburgh Hospital, which not only consist of detail on the running of the hospital, but also feature evidence of research (including handwritten lecture notes by head of the institution, Dr David Skae[2]) and patient artwork and letters collected as a window into little-understood psychiatric states (GD16). The Royal Edinburgh Hospital also kept two libraries, one for patients and a medical one for staff. The latter survives in LHSA, and is a valuable insight into medical thinking in the nineteenth and early twentieth centuries (GD17).

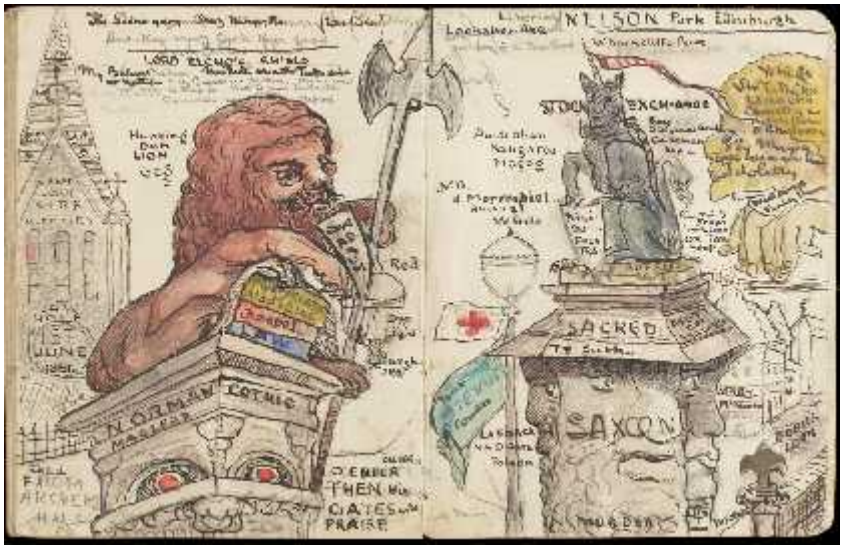

Fig 4 Spread from a notebook created by Royal Edinburgh Hospital patient, William Bartholomew, a member of the famous Bartholomew map engraving family (GD16). Examples of such patient creativity were retained by Royal Edinburgh Hospital Physician Superintendent Thomas Clouston and survive in LHSA collections.

LHSA also holds collections from other Lothian psychiatric institutions, namely: Roslynlee Hospital (Midlothian and Peebles District Asylum, LHB33), Herdmanflat Hospital (Haddington District Asylum, LHB47), Gogarburn Hospital (LHB36), and Bangour Village Hospital (Edinburgh District Asylum, LHB44). Due to a deposit arrangement with NHS Borders, the archive also cares for the historic records of Dingleton Hospital (Roxburgh, Berwick and Selkirk District Asylum, GD30). Although records

[2] For more information on Skae, see: https://bit.ly/2WTNFj3

from private asylums are not held by LHSA (with one notable exception[3]), the collected reports of the General Board of Control (a body set up in 1857 to regulate psychiatric care in Scotland) give an insight into conditions in Royal, district and private institutions across Scotland in their collected annual reports, which LHSA hold from their first volume (inside collection GD17).
In 2011, eleven LHSA collections documenting Edinburgh's HIV epidemic were inscribed to the UNESCO UK Memory of the World Register, recognising their significance as part of the UK's documentary heritage. These papers, multi-media sources and objects document the innovative local responses to rising rates of HIV in Edinburgh and the Lothians, which broke new ground in using multi-agency approaches involving healthcare professionals, local authorities, the voluntary sector, and police and prison services. These local solutions were to inform Scotland's national policy towards HIV and AIDS, and their scope and ambition are recorded in LHSA's collections, which bring together responses from these different sectors in a level of coverage unequalled in any other UK archive.

Edinburgh was unique in the history of HIV since, by 1987, rates of infection were reaching the level of New York, earning the city the label of 'the AIDS Capital of Europe.' The city's high rate of intravenous drug use, combined with a punitive police policy on needle exchange, led to a high rate of infection after the first local case was identified in 1983. Until the early 1990s, infection through sharing needles outstripped sexual transmission of the HIV virus at a local level. From innovative safe-sex campaigns, to minutes of multi-agency meetings and voluntary organisations setting up Scotland's first 'AIDS hospice', LHSA's collections show people across the city working together to lower infection rates and to care for and treat those affected by HIV (before even a link between what came to be known as AIDS and the HIV virus was identified). Since 2011, LHSA has continued a policy of actively gathering evidence of Edinburgh's responses to HIV, adding more than 15 additional collections to the archive, including recording several oral histories with retired Lothian Health Board staff.

[3] The case books of Millholme House, Musselburgh, survive from 1848 to 1872 in the Dingleton Hospital collection (GD30), since Borders' patients used to be housed there until Dingleton's opening.

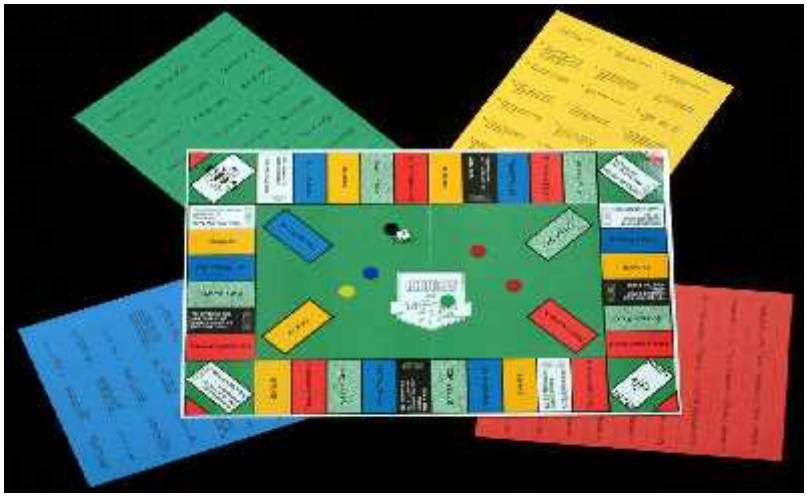

Fig 5 "Choices" board game, designed as part of Lothian's HIV-prevention campaign, Take Care (GD22, O291), and preserved in the archive.

LHSA's HIV collections are truly reflective of their time: they not only include more traditional paper records of decisions and policy, but also include audio-visual material, condoms, publicity material such as balloons and badges, and an enviable range of public health posters. Examples of one of these collections (from the 1989 safe-sex Take Care campaign run by Lothian Health Board and Lothian Regional Council), can be seen in the following educational resource: http://hiv-aids-resources.is.ed.ac.uk/

LHSA's collections around HIV are part of a wider strength in material around public health. For example, the papers of the Edinburgh City Public Health Department (LHB16) offer a wealth of data on the development of welfare and hygiene measures across the city and highlight initiatives such as the Edinburgh Maternity and Child Welfare Scheme (launched in 1917), immunisation and slum clearance.

Another significant source of data held by LHSA can be found in patient case notes. LHSA holds around one million individual folder-based case notes from a range of clinical specialisms. Although a significant minority come from the region's psychiatric hospitals, most originate from the Royal Infirmary of Edinburgh. One of the archive's most notable collections is from the practice of Professor Norman Dott (1897 – 1973), Edinburgh neurosurgery pioneer (LHB1 CC/20, 22, 24 and LHB40 CC/2). The c. 28, 000 individual cases cover the majority of Dott's career in private practice, work in the Royal Infirmary of Edinburgh (where he established Scotland's first neurosurgery department in 1938), wartime Emergency Hospital Service cases, and his later years in the Western General Hospital (where he established the ground-

breaking Department of Surgical Neurology in 1960, just three years before he retired).

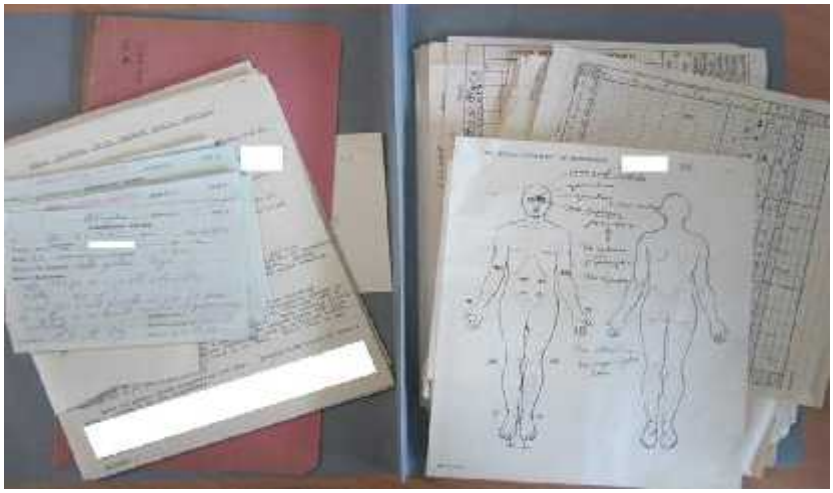

Fig 6 Example of the rich contents of a modern archival folder-based case note created by Professor Norman Dott (LHB1CC/20)

Folder-based case notes are undoubtedly a rich source for the clinical and medical history researcher. However, they are under-used by archive users for several reasons. Firstly, the period of their use in hospitals means that most are closed to public access, and it is extremely time-consuming for an archivist to filter out those that are open to general research in large collections of cases. This restriction on even casual scoping of material of possible interest means that twentieth century cases are often passed over for research projects in favour of more readily accessible earlier data. Even without data legislation restrictions, the sheer size of many collections makes it difficult for researchers to know where to start, and where to locate interesting cases. Moreover, there is no single, uniform way that cases were originally arranged. Some sets were arranged by condition, others by patient surname, and others by date of admission / hospital number. Therefore, how would a researcher locate all cases of craniopharyngioma in Dott's case notes arranged by date of admission, for example, or locate all patients admitted in 1938 from another set of neurosurgery cases arranged by disease? There would be little alternative to surveying thousands of individual folders.

To overcome these barriers, LHSA began a project to open up intellectual access to folder-based case notes in 2012, choosing Norman Dott's neurosurgical case notes as a basis. All c. 28,000 cases were catalogued individually (described and ordered), and an online finding-aid to the cases launched. This catalogue describes each case in general terms (including diagnosis, symptoms and broad categories of treatment) without revealing

individual patient identities, allowing researchers to search by condition or keyword to explore the range of cases in the collection, and on launch was the first such online catalogue to medical case notes in the UK, see https://collections.ed.ac.uk/lhsacasenotes

Medical history is often written as stories of 'great men' – and many great men did undoubtedly contribute to Scotland's medical prominence on the world stage. However, the history of Scotland's health is not, and never has been, entirely the domain of privileged male physicians. LHSA collections reflect this too, from papers that document women's role in medicine to stories of community advocacy and patient protest and power. For example, the Cervical Smear Campaign collection (GD31) stems from a 1985 movement led by women to protest against a Lothian Health Board freeze on processing cervical smears, following unprecedented numbers of patients attending screening.

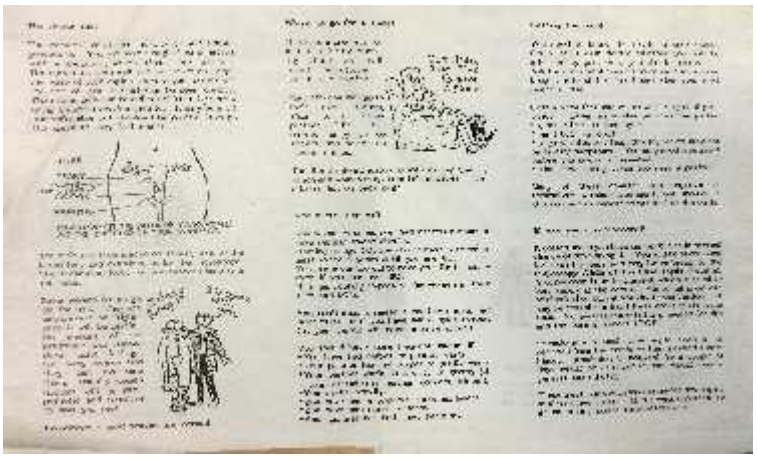

Fig 7 Leaflet from the Cervical Smear Campaign collection (GD31). This style was subsequently taken up by Lothian Health Board's own campaign in the late 1980s.

After a successful petition and support from across the Lothians, Borders and Fife, three-year cervical screening tests were introduced, along with a computerised system of recall and notification, with a Lothian Health Board screening programme following a year later. From a professional point of view, women and medicine are also represented in the papers of the South East Scotland Medical Women's Federation. From early minutes to campaigns for provision of creche services allowing GP mothers to keep their medical education current, the collection tells the story of Edinburgh's fight for female medical education and equal status within the profession.

Other collections testifying to increasing trends for patient advocacy include papers and oral histories from CAPS Independent Advocacy, a project-led advocacy organisation for those who use or have used local mental health services, and the Edinburgh branch of the National Childbirth Trust, a charity providing courses, support and advice for parents. The Lothian Gay and Lesbian Switchboard was the first gay switchboard to operate in the UK. LHSA holds its archive, documenting its inception in the Scottish Homosexual Rights Group to the group's befriending activities across Scotland and an increasing role in Health Board education during the height of Edinburgh's HIV epidemic.

Last but by no means least, LHSA's collections tell important stories around medical people and places. Sixty-nine hospital collections cover institutions, general and specialist, from Edinburgh, Mid, East and West Lothian, including the Boards that managed them from 1948.[4] The archive also holds the papers of individual doctors and nurses. One recent donation is the personal archive of neurologist, Ernst Levin (GD8/2). Born in Berlin, Ernst Levin studied medicine in Munich, specialising in neurology and neurorehabilitation, for which he was awarded a Chair from the University of Munich in 1933. The Nazi rise to power in the same year meant that, since he was Jewish by birth, Levin could no longer work in his native Germany, instead emigrating to Scotland, followed later by his wife Anicuţa and his daughter Annekathrin. Levin worked as a neurologist across hospitals in Edinburgh, including with Norman Dott. Levin's papers reflect an individual's intersection with a turbulent decade in Europe's political and cultural history. As well as tracing a significant medical career, his archive outlines time in the German military as an Assistant Surgeon in the First World War, his close personal relationships, and his family's friendships with prominent individuals in German art and culture.

[4] For more information on hospital collections, see the list at: http://www.lhsa.lib.ed.ac.uk/collections/LHB_list.htm

Fig 8 A photograph of a First World War German field hospital in the collection of Ernst Levin's personal papers (GD8/2).

Levin's archive also shows a family uprooted, adjusting to their new life and status as refugees in Scotland before and after the Second World War. A PhD student is currently studying Levin's archive, and will catalogue part of the collection, much of which is in German, increasing others' access to a story of a fascinating medical life.

LHSA staff welcome any queries about both the collections described above and the many that space has prevented from appearing in this short review. Staff can also help researchers navigate catalogues and suggest material for first-time visitors to the reading room. More information about the breadth of LHSA collections can be found on the archive blog (http://lhsa.blogspot.com/), or researchers are welcome to contact LHSA to arrange an initial chat about using the archive. Edinburgh's medical history is long and fascinating. The discovery of its documentary heritage is, like the motto of the Royal Infirmary of Edinburgh from which the archive grew, 'patet omnibus': 'open to all'.

Dr Williams's paper was followed by tea, which brought to a successful conclusion the 2017-2018 session of the Society.

The Scottish Society of the History of Medicine

Constitution as revised at AGM of 1999

1. The Society shall be called "THE SCOTTISH SOCIETY OF THE HISTORY OF MEDICINE," and shall consist of those who desire to promote the study of the History of Medicine.

2. A General Meeting of Members shall be held once a year on the last day of October or within four weeks of that date, to receive reports
and to elect Members of Council and (when required) Office Bearers. The quorum shall be 20 members and decisions shall be taken by a majority. The President shall have a casting vote, and there shall be no proxy voting.

3. The management of the affairs of the Society shall be vested in a Council, comprising a President, a Vice-President (serving as Deputy President and President-Designate), a Secretary, and a Treasurer (the four Office-Bearers), along with nine other members ("Ordinary Members of Council"). The immediate Past President may also be included as a member of Council, as provided below.
The quorum at Council meetings shall be six and there shall be no casting vote.

4. The President and Vice-President shall be elected at an Annual General Meeting, to serve normally for a tenure of three successive years, and shall not hold their post for more than three successive years, but shall be eligible to serve again after the lapse of one year if re-elected. In addition, the immediate Past President may remain a member of Council for two years after the end of his or her term of office as President.

The Secretary and Treasurer shall be elected at an Annual General Meeting, to serve normally for a tenure of three successive years, and shall be eligible to serve again if re-elected, but should not normally hold office for more than six consecutive years.

The names of all candidates for election as Office-Bearers and of their proposers shall be made known to the Secretary before the Meeting at which election is to take place.

5. Any Office-bearer may be required to retire from office by resolution at any AGM, but the proposer and seconder of the resolution shall give a month's notice in writing to the Secretary (or in the case of the Secretary to the President), and the resolution must be pre-circulated to Members in the papers for the AGM.

6. Three Ordinary Members of Council shall be elected at each Annual General Meeting, to serve normally for a tenure of three successive years, and shall not be eligible for re-election at the end of their tenure until a year has elapsed; each year, the three Ordinary Members most senior by date of election shall demit office. If an Ordinary Member is otherwise unable to complete his or her term of office, the Council shall co-opt a replacement to complete the term, and this replacement shall be eligible at the end of the term to be elected for a further full term, despite having already served part of a term.

7. The Council shall have power to co-opt at any time other members who in their opinion are fitted to render special service to the Society. Such co-opted members shall be in addition to those in clause 6 above, and the co-option shall require the approval of each subsequent Annual General Meeting if it is to continue further.

8. To recognise outstanding service to the Society or to Medical History in general, upon occasion an Honorary Member of the Society may be elected at any Annual General Meeting. Any name proposed (with the name of a proposer and seconder, and details of the case) must be intimated in writing at least three months before the meeting to the Secretary, so that they are included in the pre-circulated Agenda for the meeting. Honorary Members shall pay no subscription.

9. The Annual Subscription shall be reconsidered from time to time by Council and reported to the Society at the Annual General Meeting.
The Subscription (or revised Subscription) will fall due immediately following the AGM. A Member whose subscription is outstanding for a full year shall cease to be a member of the Society.

10. The Council shall ensure that full and punctual Accounts are kept for the Society and shall cause to be prepared once a year a Statement of Accounts and a Balance Sheet for the previous year.

11. The Society's funds shall consist of funds in the hands of the Treasurer, together with other sums of money and securities. These funds shall be held by the Treasurer, acting with the President and the Secretary (the Trustees), in trust for the Society's aims and objects, and in furtherance of this purpose the three Trustees shall have the following powers:

(a) Payments shall be made out of income or capital of the Society as the Trustees shall determine; all cheques shall require the signatures of two of the three Trustees.

(b) The Trustees may purchase and sell stocks, bonds, securities and other investments.

(c) The Trustees may delegate the management and investment of the Society's funds to the Treasurer and will consult with him on a regular basis as to the performance of the investments and assets comprising the Society's funds.

12. The Secretary shall keep brief Minutes of the proceedings both of the AGM and of the Council, shall prepare Agenda, and shall conduct the correspondence of the Society.

13. Meetings shall be held at least twice yearly, and the place of meeting shall be in any of the University centres, or elsewhere, as the Council may decide.

14. This Constitution may be amended at any General Meeting of the Society on four weeks' notice of the proposed amendment being given by the Secretary, such amendment to be included in the Agenda circulated for the Meeting. No such alteration or amendment shall have the effect of prejudicing the Society's charitable status in law.

15. The Council may resolve that the purposes for which the Society's funds are held can no longer be carried out by them or could be carried out more efficiently by some other body, fund or institution, and shall so report to a General Meeting of the Society; and if the General Meeting agrees, require the Trustees to make over the Income and Capital of the Society's funds to that other body, fund or institution whose aims and objects most closely resemble those of the Society, and so bring the Society to an end.