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Editor Dr D.J.Wilkinson

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PROCEEDINGS OF THE HISTORY OF ANAESTHESIA SOCIETY

Volume 7

PAPERS PRESENTED AT THE EPSOM MEETING 3rd February 1990

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MORE ABOUT JOSEPH THOMAS CLOVER (1824-1882)

Dr Aileen K.Adams

Joseph Thomas Clover was one of the pioneers of anaesthesia in Great Britain. His memory is recalled by the biennial Clover lecture delivered on Anniversary Day of the College of Anaesthetists. Twenty five lectures have been given, about half of which have been published, and several have included material adding to our knowledge of Clover.

Early contacts with the Clover family

The inaugural lecture given in 1948 by Dr A.D.Marston, first Dean of the Faculty of Anaesthetists, included the biographical information known at that time.[1] Macintosh in his lecture of 1952[2] describes how he first became acquainted with a member of the Clover family. He looked in the Medical Directory and wrote to the only Clover recorded in it, to find that this was Martin, a general practitioner in Worcestershire, and the eldest son of J.T.Clover. Through Martin and his sister Mary, Macintosh gleaned much information about their distinguished father, and also received from them a great deal of archival material, some pieces of apparatus and some of his personal possessions. Most of the papers are now housed in the Woodward Biomedical Library of the University of British Columbia in Vancouver[3] though some remain in this country in the keeping of the Department of Anaesthetics at Addenbrooke's Hospital, Cambridge[4] and in the College of Anaesthetists, as well as in Macintosh's own collection. More recently a few items were given to the Monica Britton Memorial Hall of Medical History at Frenchay Hospital, Bristol, by Miss Dorothea Clover, granddaughter, who is alive and active, living in Bristol. We are most grateful to the family for these generous gifts, and also to Mr Anthony Clover,* for sharing with us his knowledge of his famous predecessor.

Biographical details

The main biographical facts of Clover's life are well-known. He was born on 28 February 1825 in Aylsham, Norfolk, the third child and second son of John Wright Clover, a successful tradesman. At the age of 16 he was apprenticed to Charles Gibson, a surgeon of Norwich, for an indenture fee of £240 which would roughly equate with nearly £6000 today, a substantial sum for such a family to afford. Two years later Clover went on to University College Hospital in London as a medical student. His casebook describes some of the operations he witnessed as a student both in Norwich and in London.[5] These include the tying of the common iliac artery for a pulsating tumour in the groin, and the excision of the head of the femur in a boy of 13. He makes no comment on the horror of these procedures, carried out as they were in the days before anaesthesia, nor does he record what it was that attracted him first to surgery, and later to anaesthesia as a career. Although Marston and others have stated that Clover was present at Robert Liston's famous first operation under ether, this seems not to be true. He was certainly at UCH at the time, but was on a medical firm, and

* present at Epsom meeting with his son, James [Ed]

there is considerable ambiguity in his diary entries - perhaps an understandable example of wishful thinking! He describes the first two ether anaesthetics he saw given, both for Liston, and records that the ether was unsuccessful. He does however, show remarkable insight into this new technique when he comments that it failed because it was not administered correctly.

Clover in practice

In 1850 Clover became FRCS, and three years later set up in general and anaesthetic practice at 3 Cavendish Place, which remained his London home for the rest of his life. He devoted himself exclusively to anaesthetic practice some years later, it is said due to his chronic state of fragile health, but he must surely also have been influenced by the opportunities offered following the death of John Snow in 1858. He was anaesthetist to University College, the Westminster and the Dental Hospitals, and was soon in considerable demand not only to give anaesthetics, but also to speak at meetings and to advise committees. He published little other than reports of scientific meetings, many of which described his various pieces of apparatus, but the Vancouver collection of papers gives a good idea of his professional work and life.

Snow averaged about eight anaesthetics per week, Clover about twelve, many were for dental extractions. It should be remembered that few operations were done at this time, the Glasgow hospitals were considered to be rather active surgically in carrying out 120 major procedures a year.[5] Many however were also done in surgeons' rooms and patients' homes, so anaesthetists had a great deal of travelling to do. Clover was not idle, spending much time devising and making anaesthetic apparatus, and also surgical instruments - particularly for urology, as well as carrying out experimental work. His more famous patients included the Princess of Wales, Napoleon III and Florence Nightingale.

Marriage and family

Clover married Mary Anne Hall, daughter of a Cambridge don and a canon of St Paul's Cathedral. Some charming letters written by Clover at this time are in Macintosh's collection, one written lightheartedly nevertheless reveals something of his perfectionist nature: 'I like to see good housekeeping - as I like to see good painting and hear good music, in a word the best of everything is good enough for me - but I am not an epicure'.

Clover was obviously careful with money, he retained amongst his papers the record of his income and expenditure as a student, as well as many letters referring to his fees as an anaesthetist, whilst another letter barely conceals a degree of pride in having renegotiated the marriage settlement from his father-in-law, to the Clovers' advantage.

An interesting feature of Clover's papers is that they are written in two different styles of handwriting, a slightly untidy cursive script and a neater more legible copperplate style. Marston had noted this[1] and considered that the better writing had been copied by someone else,

possibly his father, for a permanent record. There is no doubt that the cursive style is in Clover's own hand, it matches his letters, but Marston also shows that Clover, when at school aged 13 was capable of writing good copperplate. In the days before typewriters people certainly took the trouble to write out important and permanent records in a more legible form than they used for casual communications, and Clover may merely have reverted to his tidy schoolboy style from time to time. Also, a copyist would surely not have copied out the alterations and corrections such as are shown in the neat version in the Cambridge papers.

Although Clover worked immensely hard in his professional life, he and his wife seem also to have led a busy social life, moving in a circle of high artistic and intellectual calibre. No doubt both could hold their own in such circles. Gray in his Clover lecture[6] pointed out that Clover's notebooks included sketches of quite considerable artistic merit, as well as quotations showing him to be well read in classical literature. His wife Mary was also an artist, and a portrait she made of Ellen Terry at the age of 15 is now in the Old Vic Theatre Museum in Bristol having been presented by Dorothea Clover.[7]

The Clovers had five children, the eldest dying in infancy, and four who were of widely differing character.[8] It is sad that he did not live to see any of them grow up. He died in 1882 after more than a year of deteriorating health, of pulmonary tuberculosis and renal failure, and he is buried in Brompton Cemetery. In his will he left £29,932.14.2d, sufficient to keep in comfort his widow, who survived him by 47 years, and to educate his children at public school and Cambridge University.

Contemporary opinion

Clover's contemporaries thought highly of him. Quain, editor of the Dictionary of Medicine of 1882 and a personal friend, described him as a most precise observer, intimate in the care of each patient, and expert in scientific study.[9] A letter in the Macintosh collection quotes his doctor - Sydney Ringer - who called in Sir William Jenner in consultation because 'I do not like to be alone in attendance on one who belongs to the whole profession and is so highly valued by us all'. His obituary in the Lancet[10] written by Cadge, a fellow student and lifelong friend, and a surgeon in Norwich, states: 'To speak of him as a man and friend is easy enough, for surely no blemish or fault can be found in his blameless life, which friendship might wish to hide but truth would compel to mention .... his gentle modesty, his absolute unselfishness, his active sympathy with the joys and sorrows of others ... his happiness consisted in honestly doing the duty which lay clear before him ...he had hosts of friends, for he made many and lost none'. Sir Spencer Wells in his Hunterian oration in 1883[11] said: 'Clover has done more for the benefit of the world's suffering millions than almost anyone of his generation'.

Obituaries eulogise, but 30 years later another surgeon was saying the same thing, Buckston Browne describing Clover[12] as 'a man of perfect punctuality and method, patient and kind not only to his patients but to the younger professional men with whom he came into contact -

anaesthesia's gain was surgery's loss'. A week later the Lancet gave him editorial mention.[13] 'He left the imprint of his genius upon many avenues of scientific advance and has not received his public acknowledgement ... along with Liston, Syme and Lister the young Clover might well dream dreams and see visions ... we recognise how much the world owes to Clover ... unknown to the public it becomes all the more a duty to medicine to keep his memory green.'

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MASON'S GAG?

Dr O.P.Dinnick

'There are many different types of gag and in some hospitals they all are called by the name of Mason', but the authors[1] of that quotation recommended the gag 'frequently referred to as Fergusson's'. This paper attempts to clarify this confusion of eponyms.

William Fergusson was born in 1808, became FRCS Edinburgh when aged 21 and surgeon to the Royal Infirmary in that city in 1836. Four years later he moved to London as Professor of Surgery to King's College Hospital where his patients were among the first to be given ether by Robinson and Snow. As Sir William Fergusson Bart FRCS, he became one of the country's leading surgeons and 'gained all the honours a man in our profession can obtain' before his death in 1877.[2]

Francis Mason was born in 1837, qualified with distinction at King's in 1858, became FRCS in 1862 and, in the following year, assistant surgeon under Fergusson. In 1871 he was invited to join the staff of the new St Thomas's Hospital in the same capacity, though he continued to assist Fergusson in the latter's private practice. In 1876 he was promoted to the senior staff at St Thomas's which he served until his premature death in 1886 from 'hospital sore throat' and oedema of the larynx. He had the foresight to have his own tracheotomy instruments placed by his bed where they were needed twelve hours later. He recovered from the operation sufficiently to be able to settle his affairs the next day, but died delirious 24 hours later.[3,4]

Mason's interest in gags was first revealed on 1st January 1876 by Fergusson who, in a paper in the British Medical Journal[5] on 'Hare Lip and Cleft Palate' wrote: 'In my former paper[6] I referred to gags ... [these] ... I have set aside in favour of a more simple apparatus chiefly suggested by my friend Mr Mason of St Thomas's and in a manner perfected by Messrs Mathews, instrument makers .... which .... is the best I have yet seen for the operation in question .... without it chloroform would be worthless'. After describing and illustrating the device (Fig.1) he added 'I presume to say that it will prove a valuable aid to the dentist'.

Fig.1 Fergusson's gag (Krohne's catalogue 1879)
Now known as 'Mason's'

These remarks drew an immediate response from Alfred Coleman, the distinguished dental surgeon at St Bartholomew's who made several important contributions to anaesthesia. In a letter in the next issue[7] Coleman pointed out that fifteen years previously he had published a description of 'an instrument for keeping the mouth open under chloroform' and that his device (Fig.2) was similar in principle to the one described by Fergusson. 'The principle' was that 'of a pair of forceps, with this difference, however, that the handles do not cross each other at the hinge, so that by pressing them together the blades or short extremities are separated'.[8]

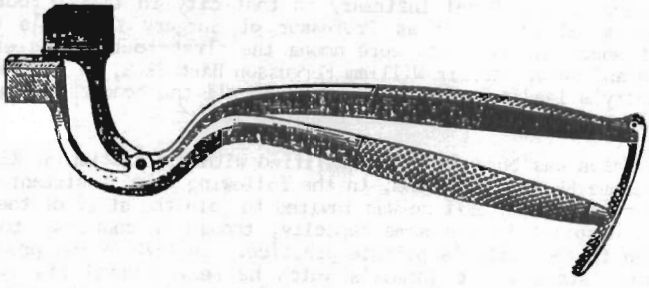

Fig.2 Coleman's gag (1861)

Two weeks later Mason described his own gag (Fig.3) in a letter[9] beginning: 'I am extremely obliged to my friend Alfred Coleman for drawing my attention to a paper by him... . Mr Coleman has kindly offered me the opportunity of comparing the instrument in question with the one made for me ... fully five years ago... . The principle of Mr Coleman's gag and mine is no doubt identical but mine possesses one or two details which I am glad to find meet with Mr Coleman's approval and which rather add to its efficiency'.

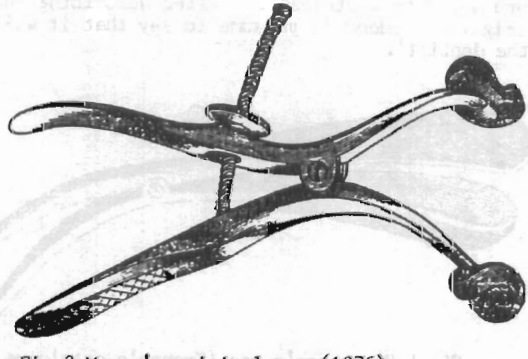

Fig.3 Mason's original gag (1876)

Mason did not say what those details were. The arms of Coleman's gag were shorter and more curved and the blades were 'covered with vulcanised rubber' but Mason's - as he described later[10] - are provided with a swivel which makes them fit and fix on the teeth more accurately'. The adjusting mechanism of Coleman's gag was quite different from that of Mason's - a ratchet on a long arm attached to the end of one handle to engage with the end of the other handle.

'It is scarcely necessary to add' - Mason continued - 'and I do so solely to acknowledge the very friendly expressions conveyed to me by Mr Coleman, that I was perfectly unaware when I had my gag made, that one so similar in principle had already been brought to the notice to the profession'.

However, Mason was rather less effusive about Fergusson's design when he wrote: 'The chief modification of the instrument as depicted by Sir William is, I think, slightly advantageous, inasmuch as the narrow blades being curved backwards are, when the instrument is fixed in the mouth, less likely to hamper the operator'.

Fergusson's modifications were indeed advantageous; his design for the acutely angled arms and slim blades not only differed appreciably from Mason's original version but has remained substantially unchanged ever since. Moreover, Fergusson, unlike Mason, specified the overall length of his gag (about 7"), warned that the leverage it exerted could dislocate a patient's jaw and recommended a smaller size for children.

Fergusson's gag was soon accepted and eighteen months later a report[11] that 'the best gag ... was the later Sir William Fergusson's' stimulated Mason to write a long and slightly paranoid letter[10]: '... I believe there is some misunderstanding as to the origin of the gag sold by some makers as 'Fergusson's gag. ... The fact is that in the years 1868-69-70, Messrs Mathews ... were making various gags at my suggestion and, after repeated failures, we ... hit upon a gag which ... became the model, and included the principle upon which the instrument made for Sir William was constructed. I used it on two or three occasions ... but the parts in contact with the teeth were covered with too thick a pad of india rubber - a small defect easily remedied. The instrument ... lay in abeyance for a time; and the next that was publicly known ... was in ... a paper ... by the late Sir William Fergusson ... . In that paper Sir William, ... gives me the credit for having devised the instrument for he says "... it was chiefly suggested by my friend Mr Mason..."'

Mason then summarised the correspondence of 1876 and concluded: 'I do not therefore join issue with Mr Coleman, to whom I willingly give suitable precedence ... but as regards to the gag referred to [in the report] I venture to think that as Sir William Fergusson himself grants me the prior claim, it is not too much to expect that others would do likewise'.

Many later writers did indeed grant priority to Mason but whether because of that letter[10] is less certain: he did not repeat his claim in his own book[12] on Hare Lip & Cleft Palate of 1878. However, in his first letter[9] he had said 'Messrs Millikins of St Thomas's Street are

now completing a gag for me which I believe will be a very useful instrument'. Surprisingly, he made no similar comment in his second letter[10] but one must assume that the finished article incorporated 'the modifications made by Sir William' as for some years 'Mason's' and 'Fergusson's' gags became identical.

The chosen eponym would often be made by instrument makers; as already noted, Fergusson's was the first to be marketed presumably by Messrs Mathews, who made the original model, and certainly by Krohne & Stresseman in 1879, and by Down Brothers in 1885 and both firms reinforced Fergusson's priority by listing his gag but not Mason's in their catalogues. However, the balance was restored in the same year when Arnold & Son listed Mason's gag, but not Fergusson's, while the dental surgeon A S Underwood (who lived at 11 Bedford Square) also illustrated a Mason's gag made by C Ash in his book.[13]

Then another claimant was supported, for, in Frederick Silk's book[14] of 1888, there was a picture identical to that in Underwood's work but entitled with ironic justice 'Coleman's Gag'! - but I have found no further reference to this eponym.

A more important confusion of nomenclature stems from Hewitt's famous text book[15] of 1893 in which the gag portrayed as 'Mason's' differed from the earlier design in one significant respect. Up till then, all illustrations of Mason's gag (and of Fergusson's) had shown the mechanism for securing the handles in the desired degree of approximation as a nut on a threaded metal rod which was fixed to one handle and passed through the other. However the mechanism which Hewitt portrayed was quite different and consisted of a hollow metal rectangle which slid over, and engaged in, ratchets on the arms of the handles.

This now familiar mechanism had been described by Hewitt two years previously[16] as an additional feature of his own gag and, as he correctly wrote: '...this clip arrangement for keeping the jaws apart is superior to the ordinary screw as it is simpler to manage and takes but a second to adjust'. However, it is not clear from Hewitt's description whether this ratchet mechanism was conceived by him or whether, as I suspect, it was devised by Messrs Krohne & Stresseman, Instrument Makers to the London Hospital who made the gag for him. The prime purpose of this gag - basically a 'Mason' - was to facilitate anaesthesia for operations on the nose and mouth for which purpose it '... was furnished with metal tubes for the transmission of chloroform vapour to the back of the mouth'.

Hewitt's erroneously titled illustration of 'Mason's' gag (Fig.4) was perpetuated in later editions of his book - the last was in 1922 - and was thus very influential in publicising Mason as the originator of the gag: only in the first edition did Hewitt mention Fergusson - and then only in the index as 'Fergusson's gag. - (see Mason's gag)'.

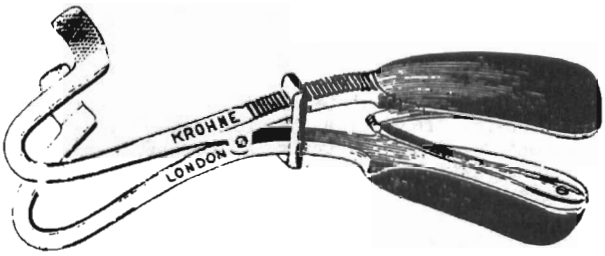

Fig.4 'Mason's' gag according to Hewitt (1893)[15]
Now known as 'Fergusson's'

In spite of Hewitt's cavalier dismissal of Fergusson, the latter's gag was illustrated, as was Mason's, in the catalogue of Arnold & Son in 1895. The Mason shown therein was no different from earlier examples and had the nut and threaded rod mechanism but the illustration of the Fergusson was the same as that for the 'Mason' in Hewitt's book - that is it had the Krohne ratchet mechanism!

I have found no satisfactory explanation for this change other than to assume that the captions of the two illustrations were inadvertently transposed: i.e. that the original intention had been to follow Hewitt's example and to label the gag with the Krohne ratchet as Mason's. Whether or not this assumption is correct, or whether there were also other reasons is immaterial, as Arnold & Company's classification was soon followed. The 1901 catalogue of Krohne & Stresseman and of Down Bros both showed 'Fergusson's' gag with the ratchet and the otherwise identical 'Mason's' unchanged with the nut and threaded rod: these descriptions were repeated in all later editions of Down Brothers catalogue but were only slowly incorporated into text books.[17] Numerous instances could be quoted from the next thirty-five years where the two eponyms were indiscriminately applied to gags with either mechanism or even to quite different gags. Moreover, Fergusson was frequently spelt with one 's' (this is an added confusion as Coleman's original gag had been made by Ferguson & Sons). However a consensus[19-21] was finally achieved so that a gag with a ratchet is now known as Fergusson's and one with a screw as Mason's.

Many other variations of the original design have been described but only one is relevant to my theme of eponyms - that of W R Ackland, the outstanding dental surgeon at Bristol whose many distinctions included serving on the General Medical Council. In 1896 Ackland described[22] his well known 'modification of the jaws of Mason's and like gags' but he did not - as is often stated - design a gag.

It only remains to consider the question posed in my title - is Mason the correct eponym for the basic gag?

Although the gag now known as Fergusson's mysteriously acquired the excellent ratchet mechanism some years after Fergusson's death, it retains the essential features of his original design, namely the shape of the arms and blades, and is therefore not inappropriately named.

On the other hand if 'the principle' is thought to be the most important feature of the design, then Mason possibly deserves the credit, even though Coleman antedated him. However, as the gag now known as Mason's is identical to the one first described by Fergusson, it should really bear the latter's name.

While the contributions of the instrument makers must not be overlooked, the greater share of the credit is undoubtedly due to Fergusson as indeed was recognised in the two men's obituaries - only that of Fergusson mentioned[23] a gag.

Thus my question is best answered in a phrase of fifty years ago: 'Fergusson's Gag - often loosely called Mason's'.[18]

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Postscript

An earlier and unambiguous description of Fergusson's gag with the ratchet mechanism was published in 1892 in the 'Appendix to C Ash & Sons' 1886 Dental Catalogue'.

JOHN SNOW'S GRAVE

Dr D.D.C.Howat

'On the morning of June 9th, 1858, while at work on the ms of his last book 'On Chloroform and Other Anaesthetics', he was seized suddenly with paralysis just as he had written the word 'exit' and on June 17th, at 3pm, he slept the euthanasia. He was buried in Brompton Cemetery and over his grave a few of us who knew him best erected a simple memorial![1] Thus, in rather florid terms, wrote Benjamin Ward Richardson in 1866. Eight years earlier, in his preface to Snow's book, he was not quite so dramatically specific about the word 'exit', but there was no doubt about his respect for and appreciation of its author.[2] There does not appear to be a photograph of this memorial, but there was a drawing from which it was constructed. The epitaph reads: 'To John Snow M.D. Born at York March 15th 1813, died in London June 16th 1858. In remembrance of his great labours in science and of the excellence of his private life and character this monument (with the assent of William Snow) has been created over his grave'.

Nothing more was heard of it until 1936, nearly 80 years after Snow's death. On October 2nd of that year, Ralph M.Waters, Professor of Anesthesiology in Madison, Wisconsin, was invited to read a paper to the Section of Anaesthetics of the Royal Society of Medicine; it was entitled 'Carbon dioxide absorption for anaesthetic atmospheres' and was of course a description of his to-and-fro technique with controlled ventilation with the now-famous Water's canister.[3] It was a memorable lecture, as the late Sir Robert Macintosh wrote; he added: 'more memorable still was the jolt expressed by the majority of the audience when, in his opening remarks, he announced that the greatest anaesthetist was an Englishman - adding, after a short pause, the name of John Snow, someone of whom they had not heard'. Sir Robert stated that it was Waters who told him that Snow's tombstone was in a state of disrepair.[4] Another account eleven years earlier by the late Dr George Edwards states that Macintosh took Waters, at his request, to see the tomb and they found it sadly neglected.[5]

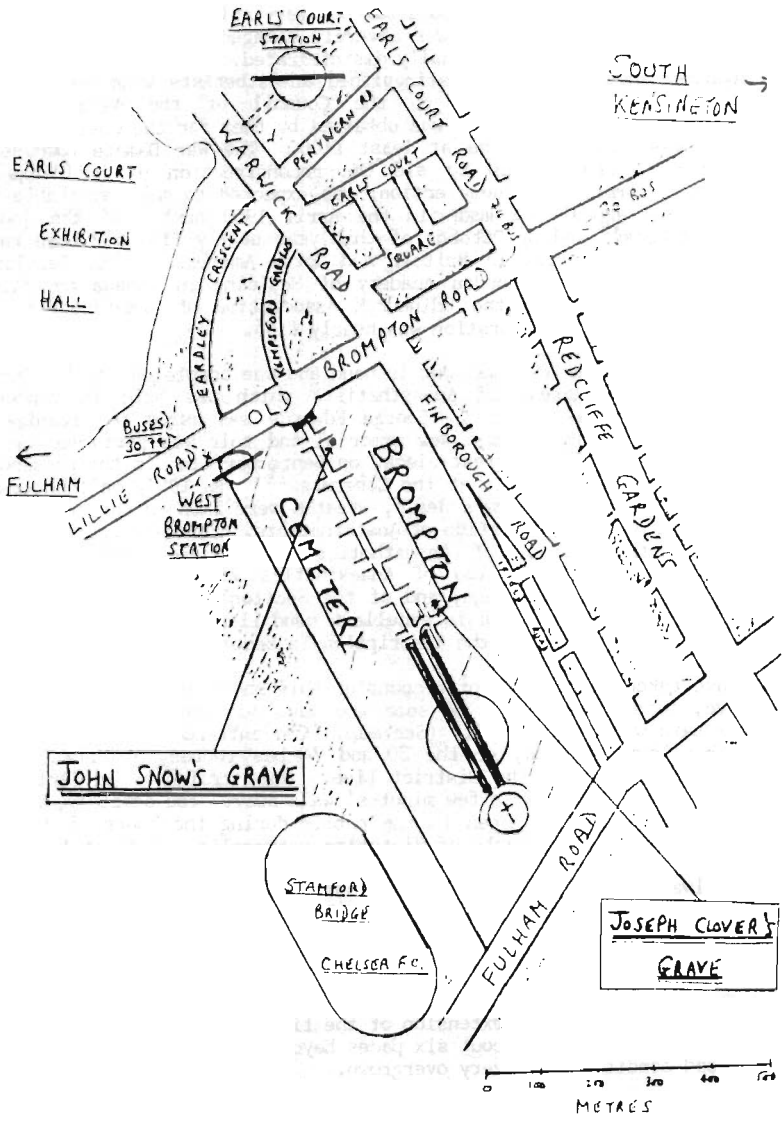
Dr Macintosh (as he then was) wrote to the Council of the Section of Anaesthetics, suggesting that the members might contribute to the cost of repair to the grave. Council, chaired by Dr Ivan Magill, who was President that year, agreed that Professor Macintosh (as he had become by that time) should collect contributions to a maximum of 5/- (25p) per member and a circular letter was sent out. In April of the following year a subcommittee consisting of Professor Macintosh, Dr Harold Webber and Dr John Challis, the Joint Honorary Secretary, was set up to put the repair in hand and by the end of the year the work was done.[6] Unfortunately, the year of Snow's birth was inscribed 1818 instead of 1813. The inscription (copied presumably from the damaged stone) states that the tomb had been restored in 1895 by Benjamin Ward Richardson 'and a few surviving friends'. I can find no reference to this anywhere else - in the medical press, in Richardson's own works, in the London 'Times' or in the local 'Kensington News', in the local archives or in the minutes of the Society of Anaesthetists for that year. It would be interesting to know who the 'few surviving friends' were.

This memorial, which it appears was not very solid, lasted for only four years. In April 1941, it was severely damaged by an enemy bomb which exploded nearby and it virtually disintegrated. In July 1949, Dr George Edwards, another of the distinguished anaesthetists whom we lost last year, reported the fact to the Council of the Association of Anaesthetists. An estimate was obtained by them for the cost of repair, which was expected to be at least £100. The War Damage Commission, which had been set up to aid the reconstruction of buildings and monuments damaged by enemy action, was expected to make available only £10.[7] An appeal was made in the April 1950 number of the journal 'Anaesthesia'[8] and by October of that year nearly £134 had been raised from various sources in Britain and North America. The Section of Anaesthetics of the London Academy of Medicine in Canada contributed £8.10.0. (£8.50) and the Edinburgh Association of Anaesthetists £5.[9] The final cost of restoration was nearly £155.

In July 1951, the work was put in hand and was completed in time for the 26th Annual Congress of Anaesthetists which was held in London in September of that year.[10] George Edwards was asked to organise the unveiling ceremony of the new memorial and this was performed by Miss Una Snow, John Snow's great-niece, on September 6th, in the presence of some of the participants at the Congress.[11] In 1958, on the occasion of the centenary of Snow's death, wreaths were laid on the grave by the President of the Association of Anaesthetists, Professor Cecil Gray, the Dean of the Faculty of Anaesthetists, Dr Frankis Evans, and the Presidents of the Section of Anaesthetics of the Royal Society of Medicine, Dr B.L.S.Murtagh, and of the Section of Epidemiology, Dr Ian Taylor.[12] The stone is in excellent condition, although it is rather stained at its base and the inscription is becoming difficult to read.

I have taken the liberty of recounting this short history of John Snow's grave, because there may be some who have not seen it and who may be uncertain where to find it. (See map) The entrance to the cemetery is in Old Brompton Road, on the 30 and 74 bus routes, and next to West Brompton Station on the District Line. More trains go to Earls Court Station, which is only a few minutes' walk away. The cemetery, which is now a Royal Park, is open to the public during the hours of daylight. It is a wonderful example of Victorian necropolis. I first knew of it over forty years ago when I lived in Earls Court. One of my small sons was always keen to visit it to see what he called the 'cows with wings', meaning the stone angels on some of the more ornate tombs. As soon as one enters the cemetery, one can see John Snow's tomb at the start of the first path on the left, on the right hand side. Joseph Clover is also buried there, but his grave is more difficult to find. If one carries on down the main avenue to the sixth path on the left and goes along it and round the extension of the first building, one will find it behind another grave, about six paces beyond the first cross-path. It is in good condition, but very overgrown.

I hope that these memorials of two great men are kept in good state and are not allowed to deteriorate.


EARLS COURT STATION
EARLS COURT ROAD
SOUTH KENSINGTON
EARLS COURT EXHIBITION HALL
WARWICK ROAD
PENYNGEAN RD
CARLS COURT
SQUARE
30 BUS
EARLSFORD CRESCENT
KEMPSFORD GARDENS
BROMPTON ROAD
REDCLIFFE GARDENS
FINBOROUGH ROAD
OLD BROMPTON CEMETERY
BUSES 30 ↑↓
FULHAM
LILLIE ROAD
WEST BROMPTON STATION
JOHN SNOW'S GRAVE
STAMFORD BRIDGE
CHELSEA F.C.
FULHAM ROAD
JOSEPH CLOVER'S GRAVE
METRES

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KENNETH BRYN THOMAS - AN APPRECIATION

Dr H.R.Rollin

Kenneth Bryn Thomas was one of a quartet of distinguished Welsh medical historians, the Welsh Mafia, as they were whimsically described. The other members of this enviable ensemble, Neil McIntyre, Geraint James and John Cule are happily still with us. Bryn, as he was invariably known to his friends, was not born in the Principality, but in a corner of a foreign field - if, that is, a middle-class house in leafy suburban Sutton can be so described - on 30 September, 1915, the oldest of three children, 2 boys and a girl.

I can only assume that he received his early education in or around Sutton, which probably accounts for the fact that he was not Welsh-speaking, a shortcoming he deeply regretted. What I do know is that when Bryn was aged 15 his father, a schoolmaster, was elevated to a headmastership in Swansea and he thereafter attended Swansea Grammar School where he was a contemporary of that Bohemian yet very Welsh poet and dramatist, another Thomas, Dylan. As a schoolboy, the only exceptional talent he appears to have exhibited was not in scholarship, but in the field of music and drama. He had a fine speaking and singing voice and he did the rounds of Eisteddfods at the Crystal Palace and elsewhere collecting a host of trophies for singing, reciting and cello-playing as he went.

He began his pre-clinical medical studies at Swansea University College and in 1933 he entered King's College, London, for the completion of his medical education, which included clinical work at Charing Cross Hospital. He qualified MRCS, LRCP in 1939. It would be neither unjust, nor unkind to claim that as a medical student Bryn was not outstanding; none of the glittering prizes on offer for the eager beavers came his way. A possible explanation for this lack of distinction could be that he devoted rather more time

than he should to student musical and dramatic activities. It was at King's incidentally that he met Nancy (Nan), then reading French at the College. They were married later - not much later - and had three children, 2 girls and a boy.

It was very soon after qualifying that the 2nd World War broke out. Bryn immediately enrolled in the EMS and served at Great Ormond Street, in what capacity I don't know, but I suspect that he was employed in the Department of Anaesthetics. In 1940 he volunteered for war service in the RAF. He was posted first to Hullavington and then to RAF Hospital Bridgnorth where he was designated a specialist anaesthetist and as such he remained for the rest of his service. He gained the DA in 1941 and in 1954 he was elected to the Fellowship of the Faculty of Anaesthetists of England.

But to revert to his RAF service: in October 1945 he was posted to Singapore. I have read part of a letter to Nan which gives a hilarious account of the unbelievable conditions he and his colleagues had to surmount before they were able to establish a 300 bed hospital. In spite of considerable privations he contrived to enjoy his dangerous yet exotic experiences. Snapshots I have seen show him in dense jungle, bush-hatted and moustached. He achieved the rank of Squadron Leader.

After demobilisation in 1946 he joined the anaesthetic staff at Ashford Hospital, Middlesex. In 1947 he was appointed Consultant Anaesthetist to the Royal Berkshire Hospital, Reading and the Reading Group Hospitals where he continued to work until his untimely death. It was seemingly only after joining the R.B.H. that his spectacular career really took off. From then on his achievements read like the Battle Honours of the Brigade of Guards.

Bryn emerged as a polymath of dazzling virtuosity. His live and fecund mind could be focussed on to a whole range of subjects, mainly allied to medicine, but not to the exclusion of other interests - music, drama and literature, in particular. But it is, of course, as a medical historian with a special interest in the history of anaesthesia, which before his time was virtually terra incognita that he will be best remembered. It is quite conceivable that the appropriate genetic smear tests would claim him to be the putative father of the History of Anaesthesia Society which could, therefore, have been legitimately named after him.

In 1949 he was elected Honorary Librarian of the Reading Pathological Society whose library was splendidly housed in the R.B.H. There is plenty on the shelves of this magnificent library to excite the bibliophile and the medical antiquarian and many are the hours that I have spent browsing among the treasures with Bryn as my guide and mentor. His recognised expertise in this field led to his membership of the Library Working Party of the Combined Libraries Committee meeting in Oxford. Its report was published in 1968. Bryn retired from the librarianship in 1976 and as a token of gratitude of those concerned, the library was thereafter named after him.

His service to the Section of the History of Medicine of the Royal Society of Medicine must be unparalleled. In 1957 he was elected to

the Council: from 1959 to 1972 he served as its Secretary and, finally, from 1970 to 1972 he was the elected President - in all, 15 years of dedicated service. Another of his great loves was the Osler Club of London which he joined in 1956, and in 1969 he was deservedly elected President. Then, from 1972 to 1974 he was President of the British Society for the History of Medicine, and in 1971 he was appointed Assistant Curator of the Hunterian Society.

Thus, it can be seen that Bryn played a vital role in virtually every major learned society in England concerned with the history of medicine. To this must be added his membership of the Education Committee of the Faculty of the History of Medicine, of the Society of Apothecaries and of the Organising committee of the 23rd International Congress of the History of Medicine held in London in September 1972.

The demand for his services was by no means limited to the UK. In 1970 he was honoured by the University of British Columbia who invited him to become an Honorary Lecturer in the Department of the History of Medicine and Science, and in 1972 he was similarly honoured by an invitation to give the first Allen and Hanburys Oration of the Australasian Postgraduate Federation in Sydney, Australia. On the 15th May 1977 he was elected to the Honorary Fellowship of the Faculty of Anaesthetists of the Royal Australasian College of Surgeons.

In 1966 he was appointed Curator of the Charles King Collection of Historical Anaesthetic Apparatus of the Association of Anaesthetists, and in 1968 it fell to him to organise the Historical Section of the 4th International Congress of Anaesthesiologists in London. He was elected a member of Council of the Section of Anaesthetics of the RSM and its editorial representative in 1974. From 1972 to 1974 he was a member of Council of the Association of Anaesthetists of Great Britain and Ireland.

But Bryn was not just a committee man par excellence; his contributions to the literature are prodigious. It is beyond the remit of this brief sketch to give detail (there are no less than 34 papers on anaesthesia and the history of medicine listed in his cv, published between 1952 and 1973), but I am obliged to mention his three great opera:

1 James Douglas of the Pouch and his pupil William Hunter (1964)
2 Curare. Its history and usage (1964)
3 The development of anaesthetic apparatus (1975)

It would be impertinent of me to attempt to assess the value or importance of these three works, particularly of the last two, but I am assured by those who know that each is a classic.

Most of what I had to say so far about Bryn Thomas is in the public domain. All I have had to do is to assemble the information in some sort of biographical form. What I propose to do now is to attempt a pen-picture of him as a man and as a friend of nearly 40 years standing.

Our initial meeting was fortuitous - an accident of war. Early in my RAF career, in 1941, I was posted to RAF Bridgnorth, Shropshire where

Bryn, as I have mentioned, was already established as a specialist anaesthetist. Friendships in the services tend to be ephemeral, but not in this case. We were immediately en rapport, largely, I suppose, because of the community of our interests - music, drama, literature, for example. And despite the vagaries of several postings to stations at home, or abroad, we remained the best of good companions and managed to keep in touch until the declaration of peace restored some sanity and predictability to our movements.

But wherever the Bryn Thomas's set up home - and they moved quite frequently until they finally settled in their beautiful home perched like an eyrie overlooking the Thames in Berkshire - I was always welcome as was my wife, Maria, after I had abandoned my bachelor status. And the more I got to know Bryn the more there was to know.

No portrait, no matter how sketchy, of this handsome, urbane and generous polymath would be complete without a mention of his brilliance as a lecturer and teacher. Not only did he have a profound knowledge of his subject, but he had that other vital attribute of a good lecturer and teacher: he was a superb talker to which could be added the bonus of a mellifluous speaking voice, the same voice indeed that won him a basketful of prizes as a boy. I have heard him lecture on numerous occasions, but more memorable are the countless hours I have listened to him talk in his own home, when sailing with him in his boat on the Thames, when downing the odd pint or two or three in his favourite pub by the river just below the bridge at Henley; or as we walked for miles through the Berkshire countryside - for Bryn, despite his urbanity, was at heart a countryman; and he was, incidentally, the only man I have ever known who could smell a fox!

There is one particularly memorable interlude worthy of mention. Together, in June, 1963, we attended a meeting of the Harveian Society at Padua University held jointly with a sister Italian society. Bryn had done the research and discovered the exact route taken by William Harvey centuries before in 1599 when he had been given the opportunity to continue his studies at that ancient seat of learning. There was this trifling difference, however: Harvey had walked from the Channel port to Padua, a pretty formidable undertaking in itself taking into account the condition of the roads, or no roads, and the danger from footpads and wild animals. We, on the other hand, drove speedily and in comfort, and in safety.

His tragic and premature death had in itself a tinge of classical drama: he died on 22 September 1978 from a ruptured abdominal aorta on the steps of the hospital he loved so dearly, the Royal Berkshire. At his funeral the church was filled to overflowing and the distress of the congregation bore witness to his respect, and the affection in which he was held.

In sketching this inadequate profile of a very remarkable man I must acknowledge my indebtedness for some of the detail I have included to his widow, my dear friend, Nan. Berry, New South Wales, where she now lives, is unfortunately more than a bus ride from Epsom.

THE EARLY DAYS OF CARDIAC ANAESTHESIA

Dr D.M.Carnegie

I was involved with cardiac anaesthesia from 1949 to 1980, but feel I ought to mention some of the more important events prior to these dates, because the developments in cardiac surgery and anaesthesia were closely related.

Pioneers of cardiac surgery

The first operation on the heart took place in 1896 when the cardiac muscle was sutured following injury. In 1901 the first two successful cases of cardiac massage occurred - each by different routes. Arbuthnot Lane in this country was operating on a man of 65 for appendicitis under ether anaesthesia when arrest occurred. He massaged the heart through the abdomen without opening the diaphragm. In the same year a surgeon in Norway was carrying out a hysterectomy on a 38 year old women under chloroform anaesthesia when she arrested. He made an intercostal incision and massaged the heart under direct vision.

In 1929 Cutler and Beck[1] reported 12 cases worldwide of operations on heart valves with only two successful results. The first two were in Paris in 1913 and 1914 when Doyen operated on a pulmonary valve and Tuffier on an aortic. The other ten were mitrals. All these patients breathed spontaneously and anaesthesia varied from open ether on a Schimmelbusch mask to nitrous oxide, oxygen, ether either with a face mask or insufflation through an intratracheal catheter as described by Kelly in 1912. Souttar's case, which was included in the series, was slightly different.

On 6 May 1925 at the London Hospital, Henry Souttar operated on a girl of 14 with a diagnosis of severe mitral stenosis. He carried out the first transauricular approach to the mitral valve and the patient survived a further 7 years. Maurice Campbell,[2] a cardiologist writing in the British Heart Journal in 1965 stated that the patient's survival was probably largely due to the skill of the young anaesthetist - John Challis. Until 1975 most people believed this, but in that year, to celebrate the fiftieth anniversary of Souttar's operation, Dr Richard Ellis[3] of St Bartholomew's Hospital published in 'Anaesthesia' a detailed account of the case. From the original notes it was quite clear that no anaesthetist was involved! In fact, the anaesthetic was administered by Mr Lindsay, a surgical colleague of Souttar's, assisted by a surgical registrar. The patient was premedicated with morphia and atropine, and induced with an A.C.E. (absolute alcohol, chloroform, ether) mixture on a Schimmelbusch mask. Anaesthesia was deepened with ether, an intratracheal catheter inserted, and this connected to a Shipway[4] apparatus, which delivered by insufflation a mixture of warm air and ether. The patient, of course, breathed spontaneously throughout. Shipway produced his original apparatus in 1916, but on his latest model insufflation pressure could be varied - no doubt, a help with the open chest.

No further surgery took place on the heart or great vessels until 1938 when Gross in America ligated a patent ductus arteriosus in a 7½ year old patient under cyclopropane anaesthesia. The following year at St Bartholomew's Hospital, Tubbs performed the same operation, both procedures having a successful outcome.

Until this time there had been no suitable apaesthetic technique for intra-thoracic surgery; but in 1941 Nosworthy[5] of St Thomas Hospital described 'Controlled Respiration'. In 1924 Waters had introduced his canister and with Guedel[6] in 1928, the cuffed endotracheal tube. Cyclopropane appeared in 1934. Taking advantage of this equipment and the respiratory depressant effect of cyclopropane, Nosworthy hyperventilated his patients through soda-lime thus lowering the carbon dioxide content until respiration was controlled.

It was this procedure that really revolutionised anaesthesia for intra-thoracic surgery. The only remaining problem was the explosive inhalational agents, which prevented the use of diathermy inside the thorax. This was partly remedied by Gray & Halton's[7] introduction of curare to this country in 1946, and finally by the arrival of a non-explosive inhalational agent, halothane, in 1957.

Early experiences at Guy's Hospital

Apart from Souttar's mitral valvotomy in 1925 the real impetus to cardiac surgery in this country came with the arrival of Professor Blalock at Guy's Hospital in 1947 on an exchange scheme with the John Hopkins Hospital, Baltimore. On 29 April 1944, in America, he carried out the first Blalock-Taussig[8] operation for Fallot's tetralogy - an anastomosis between the subclavian and pulmonary arteries. By 1946 he had performed 110 operations for congenital heart disease.

In the early summer of 1947 Brock attempted to relieve pulmonary stenosis through a cardioscope in 3 cases - all of whom died. On 2 September 1947 Blalock, with Brock assisting, performed the first successful Blalock anastomosis in this country. In the Guy's Hospital Reports of 1948 Rink, Helliwell and Hutton[9] discussed anaesthesia for the relief of congenital pulmonary stenosis in 42 patients, aged between 3 and 25 years, with a mortality of 15%. The younger patients were premedicated with oral Nembutal (later replaced by rectal thiopentone) and atropine. Induction took place with cyclopropane and oxygen and anaesthesia was deepened with ether for intubation. The older patients received morphia and atropine followed by thiopentone, cyclopropane, oxygen and ether for intubation. In this latter group respiration was controlled using a Waters canister, but in the younger group this was sometimes difficult and eventually small doses of curare were given. Of course, at this time there were no recovery wards or intensive care units, so the patient was returned straight to the ward and placed in an oxygen tent or, if there were respiratory difficulties following extubation, into a steam tent. Very occasionally a patient might require a tracheotomy.

On 16 September 1948, just over 23 years since Souttar's epic mitral valvotomy, Brock[10] successfully carried out a similar operation. In a

'British Medical Journal' of June 1950 he reported 8 cases with 2 deaths. Rink,[11] Hutton and I gave the anaesthetics for 6 of the patients (2 were operated upon in America). These patients were gravely incapacitated with severe orthopnoea and an exercise tolerance of 5-100 yards at the most. Pre-operatively the patients sucked an amethocaine lozenge and the larynx was sprayed with 10% cocaine immediately prior to intubation. The patients were premedicated with Omnopon and atropine, induced slowly with thiopentone followed by cyclopropane, oxygen and ether for intubation and then curare as required. In view of their fragile hold on life it was felt that thiopentone, curare followed by intubation might well produce a fatal fall in blood pressure. However in the last case Hutton did use this technique with success. In the early fifties increasing numbers of mitral, pulmonary and aortic valves were operated upon. This resulted in shorter operations on much fitter patients and anaesthesia became fairly standardised. Thiopentone, curare (and later Scoline) were used for intubation followed by nitrous oxide, oxygen with intermittent curare and thiopentone supplements as necessary. An analgesic such as pethidine or phenoperidine was often used instead of thiopentone.

Hypothermia in cardiac surgery

The next main advance was the introduction of hypothermia. In 1950 Bigelow[12] in Toronto showed that lowering the body temperature to 30 C allowed the brain to be rendered anoxic for ten minutes instead of three. This permitted an atrio-septal defect to be closed as a 'dry heart' was required for only 5-7 minutes. In order to obtain this temperature change three methods were available - surface cooling, arterio-venous and veno-venous cooling.

Surface cooling was first described by Swan in America using a cold water bath. It was a long, messy method but used by Holmes-Sellors at the Middlesex Hospital until 1960, during which time 200 cases were operated on. We, at Guy's, preferred to anaesthetise the patient with thiopentone, curare, nitrous oxide, oxygen, ether to produce vasodilation, assisted by intravenous chlorpromazine (Largactil) and then surround the patient with ice packs and fans. Temperature was carefully measured and the patient was cooled by 1°C every 5 minutes down to 29°C. If cooling was more rapid ventricular fibrillation was liable to occur due to temperature differentials.

Donald Ross, who came to Guy's in 1952 as cardiac research surgical registrar, evolved the methods of arterio-venous and veno-venous cooling. In the former, blood was pumped by the heart from the femoral artery to the saphenous vein via a coiled tube passing through a refrigerator. For veno-venous cooling the blood was hand pumped from the superior vena cava to the inferior vena cava via the refrigerator. These two techniques allowed much more rapid cooling as temperature differentials do not occur. The patient was rewarmed on an electric blanket.

Surface cooling was introduced clinically about 1952-53 and arterio-venous and veno-venous methods in 1954-55 at Guy's, where they were used for the first time in man. Drew[13] at the Westminster Hospital used

deep hypothermia in 1959 taking the patient's temperature down to 8°-10°C, whereby he had 40 minutes operating time.

The development of cardiopulmonary bypass

It was soon realised that hypothermia only permitted very few intracardiac operations, so a device was required that would take over the function of the heart and lungs. Gibbon[14] in America, Bjork in Sweden and Melrose[15] at the Hammersmith Hospital had all been working simultaneously on heart-lung machines (pump-oxygenators). On 6 May 1953 Gibbon carried out his only successful open heart operation; the next two died and he gave up. Melrose improved on Bjork's oxygenator and it was first used at the Hammersmith in December 1953. The patient survived but the next six died, so clinical work was abandoned for some time. On 17 April 1957 the Melrose pump-oxygenator was used again with success by Cleland. He managed to obtain 50 cases of ventricular septal defect from Great Ormond Street Hospital, on whom he operated with a mortality of 20%. In America in 1955, Kirklin at the Mayo Clinic carried out 38 bypasses using the Gibbon pump-oxygenator with a mortality of 58%; this was followed by Lillehei, who used the De Wall equipment for 11 bypasses with very poor results. At Guy's Ross had developed his own disc oxygenator between June and September 1957. During the next 9 months 27 cases for open heart surgery were operated upon with an improved (but still fairly high) mortality. By 1959 bypasses were carried out under hypo- and normo-thermic conditions, and with the advent of relatively safe bypass surgery, operations on the various valves and cardiac abnormalities developed rapidly.

The modern era

With the arrival of halothane in 1957 anaesthesia for bypass surgery became fairly standardised. Omnopon and Scopolamine for premedication; thiopentone and a relaxant for intubation followed by nitrous oxide, oxygen, halothane - or possibly intravenous analgesics instead of halothane. A problem arose during actual bypass when the anaesthetist was dependant upon intravenous drugs. There was a tendency to use long acting relaxants and analgesics and this, of course, led to awareness under so-called anaesthesia. To my delight in early 1960 I found that halothane could be piped into the oxygenator during bypass and thus maintain unconsciousness. However, in 1963 the pump-oxygenator was changed and halothane could no longer be added. This persisted for 8 years. During this period, while on bypass, I kept the patient on intermittent Scoline and thiopentone, so that if anaesthesia became too light the patient could move and further thiopentone could be given with Scoline as necessary. The alternative was a long acting relaxant and analgesics. In 1971, the oxygenator was changed again and an inhalational anaesthetic could be added - this time methoxyflurane (Penthrane) because of its potent analgesic and respiratory depressant effect. It had one disadvantage - a danger of high output renal failure, which seemed to be dose related. It occurred in one case when Penthrane had been used throughout the operation - a vast urinary output took place for 5 days post-operatively and then returned to complete normality. After this Penthrane was only used during actual bypass and no further trouble occurred over the next 9 years. With this technique

much less relaxant was required and most patients were returned to intensive care extubated and breathing spontaneously. I have not mentioned heparin or protamine but, of course, these are required in all bypass cases.

So far, I have not dealt with mechanical ventilators. In 1952 a severe outbreak of bulbar-poliomyelitis occurred in Denmark necessitating the ventilation of many patients for periods up to 6 weeks. At that time the only ventilator available was the 'Iron Lung' of which there were only a few in fever hospitals. The majority of the patients in the Denmark epidemic were ventilated by hand, by relatives, friends or anyone who was available. The then Ministry of Health in this country became anxious about a possible outbreak here in 1953, and called a meeting to discuss ventilatory equipment which I was asked to attend. At that meeting, Beaver,[16] an anaesthetist at Queen's Square, showed the small, easily produced ventilator (costing £40) which he had designed. Engstrom in Sweden had manufactured a very complicated machine at a cost of £2,500. From this early ventilator of Beaver's the sophisticated equipment of today has been developed. I, myself, had no faith in the reliability of things mechanical and ventilated every patient by hand during the 31 years in which I was involved with cardiac surgery and endeavoured in the majority of cases to return them to the intensive care unit extubated and breathing spontaneously.

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THE EARLY DAYS OF THORACIC ANAESTHESIA

Dr W.K.Pallister

War, paradoxically, has always been a time of great medical advance. The effect of chest injury was realised on the battlefields of Europe. Baron Larrey, Napoleon's surgeon and inventor of the ambulance, treated a soldier for an 8cm penetrating wound between the 5th and 6th ribs. Much frothy blood hissed out at each breath. His limbs were cold and pulse barely palpable, colour poor and breathing short and laboured. Larrey closed the wound with an adhesive dressing, covering it with a bandage hoping to conceal distressing bleeding that would soon be fatal. The wound was barely closed before he breathed more freely, felt easier and became calm, and he was cured in a very few days.

The initial problem of lung surgery was that of opening the chest. Once the pleura is opened the lung and mediastinum fall away, especially in the lateral posture. Spontaneous breathing results in 'penduluft' - breathing from the opposite collapsed lung. Hence CO_2 retention, acidosis and hypoxaemia occur - and cardiovascular stress and collapse. The problem was solved by Brauer who enclosed the anaesthetist and the patient's head in a raised pressure chamber, ('Uberdruck'): and by Sauerbruch - Hitler's surgeon - who operated in a low pressure chamber with the patient breathing spontaneously - his head outside the chamber and neck sealed ('Unterdruck').

Morriston Davies, the great University College surgeon,* visited Berlin in the early days of this century. He saw Brauer, Sauerbruch and Wilms demonstrate their methods for extrapleural paravertebral thoracoplasty. He said: 'The next four years were exciting'. The attitude of his physician colleagues was anything but friendly: '..the sight of me and my stethoscope was anathema to the physicians'.

'My first interest was making a new 'Uberdruck' called my 'fire engine'. This, once I had persuaded the youngest of our anaesthetists to become acquainted with it, worked wonderfully well. But it was soon outclassed by the very much simpler ideas of Meltzer and Auer, and the Shipway insufflation apparatus.'[1]

'Of great importance was my own X-ray apparatus, because radiologists refused to co-operate, and the emphatic assertion of almost everyone that chest radiographs were useless in diagnosis. A patient was 'tossed' to me by a physician so that I could waste an X-ray plate on yet another case of chronic bronchitis.'

'The man had no other signs, and it amused me to demonstrate a tumour in the lung unrecognisable by clinical examination. Shortly after, he produced prune juice sputum, and I was sternly reproved for diagnosing carcinoma. I added to this disapproval by doing a dissection lobectomy using my 'fire engine'. I am interested that the importance of covering a sutured bronchus was even then recognised. He did well for six days

* See Hugh Morriston Davies 1879-1965 by Dr.Buddug Owen in Vol.3 Proceedings of History of Anaesthesia Society. [Ed]

but unfortunately died on the eighth of empyema and bronchitis. At necropsy there was no bronchial fistula.'

It was not until 1931 that Churchill of Boston successfully performed dissection lobectomy for adenoma of the bronchus.

In 1920 Magill used a wide bore rubber tube for to-and-fro breathing, and a strong angle piece. It was attached to a machine with a latex reservoir bag, covered by a net, which did not come into play unless the bag was sufficiently inflated. The tension on the bag was balanced exactly by the tension on the expiratory valve, and could in emergency be changed to a high pressure inflation system. The patient was anaesthetised with nitrous oxide and oxygen, after the manner of those days, when 'you saturated the patient with nitrous oxide, then you saturated them with oxygen, and when you had done that once or twice you were able to proceed with the patient'. In 1923, Magill was appointed to the staff of the Brompton Hospital. In those days physicians were appointed for life, surgeons for five years and anaesthetists for one year, renewable. This was the status of anaesthesia in those days, and in some hospitals is unchanged today.

In the 1920's, positive pressure insufflation had given control of the open chest. But most operations were usually under local anaesthesia;for lung abscess, bronchiectasis, removal of bullets from the lung, drainage of empyema and collapse therapy of phthisis, when the pleura was adherent and there were profuse secretions.

At the discussion on anaesthesia for thoracic surgery at the Royal Society of Medicine on February 7, 1930, Dr Langton Hewer stated that there was now general agreement as to the undesirability of drastic purgation before operation (a relic of Galen's teaching), but we must go further and ensure patients have an abundance of fluid in their systems before coming to theatre.[2] This was done orally. He also administered warm saline rectally during recovery. Intravenous therapy was not understood until the second world war and cannulae had to be introduced by surgical cut down.

The next problem was control of secretions. When Magill was first attached to the Brompton Hospital for Chest Diseases, nitrous oxide was very popular. He later said: 'I regret to say that I actually published a series of 200 thoracoplasties done with nitrous oxide and oxygen alone, with occasional increments of intravenous heroin, to preserve the cough reflex'.

In 1932, a visitor, Shenstone of Toronto, came to see Tudor Edwards at the Brompton. He said: 'Well, in Toronto we use spinal anaesthesia for these cases'. Magill's first attempts at spinal anaesthesia in chest surgery were made with some trepidation. The prospect of paralysis of the abdominal and intercostal muscles in a patient whose respiration is already embarrassed by diminished vital capacity and unilateral pneumothorax is ominous in its import. But by 1936, Magill, with his colleague Machray, had given light Nupercaine 1:1500 to 23 patients by the Etherington Wilson technique.[3] The outstanding fact about spinal anaesthesia in surgery of the chest is the manner in which it upsets

previous conceptions about positive pressure in the presence of open pneumothorax. The cough reflex remains active throughout and sputum is voided with reasonable ease, even under light general anaesthesia. Nitrous oxide was frequently used to preserve the cough reflex and clear the airways of secretions, as were chloroform, which was non-irritating, or light ether anaesthesia. Thoracoplasty under paravertebral and field block for collapse therapy for tuberculosis was still the commonest technique for thoracoplasty until the late 1950's at the Brompton Hospital. In the 1930's premedication with rectal paraldehyde or Avertin necessitated a post-operative period of depressed or absent cough reflexes and was undesirable in thoracic cases. Should the cough reflex be impaired during anaesthesia, Magill believed the onus of evacuating sputum fell upon the anaesthetist.

Overholt devised a prone posture and table whereby secretions were retained in the dependent diseased lung.[4] Parry Brown devised chest and pelvic rests that produced postural drainage of pus into the trachea whence they were removed by suction.[5] This was initially with spontaneous breathing but was later found to be better with controlled ventilation. This was the only practicable method for control of secretions when operating on small children with bilateral bronchiectasis. He bronchoscoped the patient post-operatively to ensure the healthy lung was free of secretions. The importance of this was seen in the reduced incidence of post-operative infection and collapse in the good lung.

Magill originally used a tracheal tube together with insertion into the affected bronchus of a suction catheter - later fitted with an inflatable latex balloon (blocker) in the main or lower lobe bronchus. He at first used a laryngoscope with the directional aid of a stilette, but with a view to more accurate deposition devised a combined tracheoscope and anaesthetic tube. The tracheoscope was inserted, and the suction catheter passed down its lumen. When the balloon catheter was in position, the carrier was withdrawn, leaving the anaesthetic tube in the trachea. This was done under topical anaesthesia. In this way protection and suction were in force before dislodgement of secretions could occur.

In 1932, Gale and Waters devised a curved, cuffed endobronchial tube, positioned blindly in the right or left main bronchus. The cuff lay at the tracheal carina, and secretions dislodged at thoracotomy by handling the diseased lung were just as likely to be squeezed past the cuff into the dependent lung as they were to be dislodged into the trachea.
Magill was keen to develop endobronchial methods since his surgeon, Tudor Edwards, had often clamped and divided the bronchus together with the blocker, which Magill had to buy himself. In 1936 Magill reported on the use of left and right endobronchial tubes. He was not then familiar with Water's technique but believed that 'blind' insertion of a rubber tube into the bronchus may be easy in theory, but is more difficult in practice. It is clear that such a tube must be accurately placed if it is to function effectively.[3] Accordingly, he devised an intubating cannula (bronchoscope) of non-ferrous metal and therefore whippy, illuminated at the distal end from a battery in the handle. The cannula was surmounted by a close spiral of hollow, fine metal tubing.

The spiral was covered in turn by close fitting thin latex, tied securely in position with silk in three places. The intervening piece of rubber between the two distal fastenings formed the cuff and was inflated through the hollow wire by a syringe. The method of using the spiral coil as an air channel, he believed, was original. The left endobronchial tube could be positioned safely because the left main bronchus, from tracheal carina to the left upper lobe orifice, is 4-5cm in length. The distal 3cm of latex was removed from the right endobronchial tube. Machray reduced the length of the inflatable cuff to 2cm to enable it to be stable in the left main bronchus, with less risk of occluding the left upper lobe bronchus. Machray was, in 1951, one of the first to give general anaesthesia with the relaxant decamethonium for bronchoscopy when he anaesthetised King George VI, and later for Price Thomas to perform pneumonectomy.

Macintosh and Leatherdale later used an anatomically shaped left endobronchial tube, with suction at the carina, which could be reliably introduced 'blindly' with normal anatomy. The use of a Magill or Thompson blocker remained, however, the most popular technique for left lung surgery until Gordon and Green introduced their tube.

In 1950 Bjork and Carlens pointed out that since the advent of penicillin and streptomycin in association with postural drainage and physiotherapy, sputum could be reduced to almost nothing in many cases of infective lung disease.[6] However, in long standing bronchiectasis, such as one rarely sees today, chronic lung abscess and suppuration behind a blocked bronchus, sputum may be reduced by pre-operative treatment but spill may still occur to the opposite lung. In 125 lung resections between 1937 and 1947, Moody found spread in 21.7% with five deaths due to spill. Bjork and Carlens used a flexible double lumen tube, originally designed for bronchospirometry, introduced under topical anaesthesia and advanced into the left main bronchus. A hook engages the tracheal carina. Disadvantages of the double lumen tubes - the Carlens, the Bryce-Smith, the White, and left and right Robertshaw are that they are bulky - relatively rigid - and may mislead the surgeon when assessing spread of carcinoma.

Gordon and Green produced the first rubber tube that could be placed far enough into the right main bronchus to be stable. They found that the distance from carina to right upper lobe orifice was not less than 1cm, with an average of 1.8cm. The tube was formed on an 8 or 9 straight 'streamline' Charles King tube, with the distal 4cm slightly angulated and bearing a slotted bronchial cuff. The inflation channel of the bronchial cuff is incorporated in the wall, so the lumen is 'D' shaped. The tube has a rubber carinal hook like the Carlens and is directed into the right main bronchus over a stilette. An intubating bronchoscope could not therefore be used.[7]

In 1957, I modified the Gordon Green tube, enlarging the slit to an oval and giving the tube a circular lumen. Bronchial and tracheal inflation channels ran down the outside wall. It could thus be used on an intubating Magill bronchoscope, or the steel Mansfield modification, with a light carrier on the inside wall. Now, a fibreoptic light source and magnifying eyepiece further improve vision.[8]

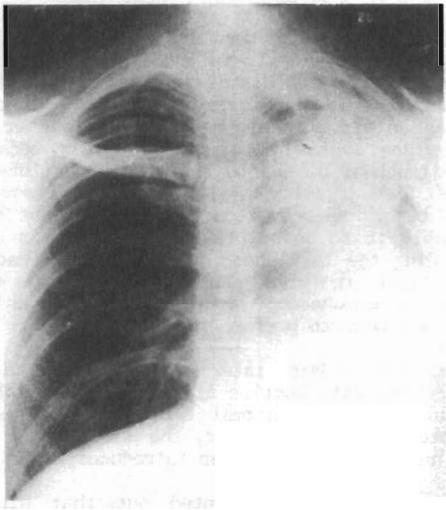

Fig.1. Shows gross distortion of the trachea into the left thorax. A Gordon Green tube passed blindly could not possibly have entered the right main bronchus.

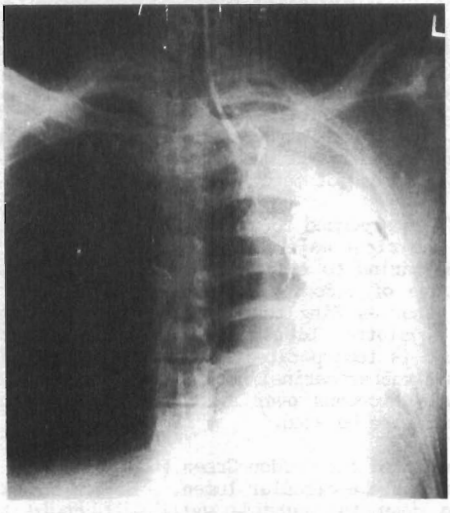

Fig.2. Bronchogram, showing that there was gross distortion of the trachea into the left thorax. A Gordon Green tube passed blindly could not possibly have entered the right main bronchus.

Figs 1 and 2 show that the original Gordon Green tube, passed blind, could not possibly have entered the right main bronchus - hence Magill's plea for visual intubation.

When secretions became less of a problem, reconstructive surgery on the bronchus became possible. The Brompton 8mm triple cuffed tube with two distal bronchial cuffs, one inside the other, enabled control if the outer cuff was pricked during bronchial anastomosis. Provided the tube was not a plug fit, ventilation of one, or of both lungs, was possible. Single lumen endobronchial tubes are the only practical ones for resection of tracheal tumours since they can be passed alongside the tumour without causing bleeding or bronchial tumour embolus. Dynamic lung function tests, FEV_1 and FVC, were being introduced in the mid-1950's but their interpretation was not understood. I was, of necessity, first involved in intensive care when a patient with a pre-operative FEV_1 of 870ml could not breathe adequately after lobectomy. He was ventilated for most of 16 weeks, but could not be weaned. It is interesting that in a major chest hospital such as the Brompton, there was no resident anaesthetist. In no way could I, the only registrar, non-consultant anaesthetist, persuade my chiefs and, more important, the administrators, to allow me to be resident in the hospital. The administrators said there were no rooms available although I was 'squatting' in an empty room every night.

In England, Simpson in 1950 and Westlake in 1954, had studied blood gas changes in chronic respiratory failure, but these were time-consuming methods not applicable to the operating theatre. Exhaled nitrous oxide also invalidated equilibrated, rebreathed alveolar CO_2 values, since it combined with dilute potassium hydroxide, used in the Haldane, Moran Campbell and Draeger apparatus (the latter had been developed for use in German 'U' boats to measure ambient CO_2).

It soon became obvious that the care of patients with respiratory failure needed a room with adequate electrical power plugs, and room for active physiotherapy and chest percussion. Brock had a four-bedded ward set aside at the Brompton in 1957, a prototype intensive care unit for post-operative lung and cardiac patients.

The Frenckner spiropulsator had been used by Craaford, pioneer of resection of coarctation of the aorta in 1935,[9] but ventilators really developed after the poliomyelitis epidemic in Copenhagen in 1953[10] - the Beaver,[11] East Radcliffe[12] and Engstrom. The spiropulsator did not become popular, since it had exploded when used in theatre with cyclopropane. At the Brompton, manual ventilation continued to be used in theatre until 1960, and the Engstrom stood in the corridor covered by dust sheets. One of the main problems continued to be the superior status of the physician; when physicians had care of a patient with chronic respiratory failure, the anaesthetist only controlled the airway, and ventilation. One patient, whom I knew by talking to the relations had barely drunk any liquid for one week, was admitted in chronic respiratory failure. He was producing no urine and the physicians postulated renal failure due to tubular necrosis as a result of hypotension before admission. I said that, if the specific gravity of urine was 1010 I would accept this diagnosis, but if it was 1030 I

pleaded for intravenous electrolytes, but without success. No urine could be obtained on catheterisation, except a few drops, heavily bloodstained, insufficient to measure specific gravity. When the pinched skin on the dorsum of the hand took 10 to 14 seconds to subside they agreed he was dehydrated. His pH and PCO_2 were normal when he died of renal failure.

Today, when automated blood gas analysis can be done as often as needed during heart-lung bypass, it may be difficult to believe that in the 1950's open heart surgery under hypothermia, or using early extra-corporeal oxygenators, was of necessity performed without blood gas analysis or clotting screens - and was therefore experimental.

It has long been realised that control of the airway was of prime import to preservation of life. Hippocrates, father of medicine, advocated manual insertion of a silver cannula into the trachea in airway obstruction, fed along the inside of the lower jaw, by touch. In 'Airs, Waters and Places' he described where to establish a 'colony' that would be healthy. Epsom was a popular spa in the 18th century where the wealthy came to take the 'air and waters'. That it was doing good was obvious from the catharsis induced by the salt-laden waters, but Hippocrates means 'horse trainer'. Where better to come today than Epsom, where modern horse trainers contend the most prestigious horse race in the world? Drink the wine - but do not drink the water!

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ANAESTHESIA AND THE POSTCARD

Dr I.McLellan

Several years ago, I became interested in collecting postcards of the hospitals and operating theatres in which I worked or was a patient. Postcards of operating theatres became a ready source of visual archive material - particularly when looking at the corners of the scenes. A further development was the appearance of actual operative scenes made into postcards. Were they posed or real?

The postcard was, in fact, the answer to the telephone trolley in the days when the postal service had several deliveries a day. A postcard written in the morning by a patient and sent to a relative requesting clothes or personal items would be answered by the evening by visitors.

At our H.A.S. meeting in Leicester my colleague, now retired, Dr Aubrey Stewart, gave a paper on the anaesthetist's trolley and its development and many cards show several examples of this and the apparatus upon it. Often, these glimpses into the facilities available, are limited and need interpretation. A number of these cards show anaesthesia being administered, occasionally in sequences, and this habit of using postcards continued into the Boyle's machine period. One of the earliest I obtained, showing the Vernon Harcourt apparatus in use. (Others show more long-lasting apparatus such as Schimmelbusch mask and Clover's inhaler.) Postcards in this form have continued in use as a demonstration of theatres, as shown by the scene from the Welcome Galleries of the Science Museum.

Postcards also show other evidence of anaesthesia outside the operating theatres such as the 'gas extraction' room in a dental hospital and also one from the streets of Boston, Massachusetts at the time that the picture palace was coming into use. Other aspects of anaesthetic practice were also covered, or para-anaesthetic practice; for example, there are postcards of a neonatal paediatric intensive care unit with pictures of the incubators used in Britain and on the continent. I was pleased recently to find a postcard of the opening of the Leicestershire Hospice. It is possible to recognise my retired colleague and member of the Society, Dr Brian Johnson who was vice-Chairman of the Health Authority and an active supporter of the Hospice.

One of the other aspects of this genre was the comic card. These made fun not only of the anaesthetists 'steady with the gas', but also of surgeons. All are a rich source of historical information as well as providing an interesting hobby.

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A Picture of Health 1989 Cynthia O'Neill. S.B.Publications

A LITTLE LOCAL DIFFICULTY - AN EARLY DEATH UNDER CHLOROFORM

Dr Anna-Maria Rollin

On Friday August 27 1858, a young woman presented herself at the house of an Epsom druggist, one Mr Keeling, who also maintained an extensive dental practice in Surrey and the neighbouring counties.[1] She desired to have a tooth extracted under the influence of chloroform.

The woman, described throughout as 'a remarkably tall, fine young woman of two-and-twenty'[1,2] was the servant of Dr Samuel Barrett, a physician of the neighbouring parish of Ewell. She had lived in the household for some seven years, and during that time had become a cherished companion to her mistress and the children. She had witnessed the successful removal of teeth under chloroform administered by Mr Keeling, not only from her mistress but also the two little boys aged 10 and 12. Now, suffering from toothache herself, she wished to have the same treatment. Dr Barrett, secure in the knowledge that she was in good health, gave his written authority.

Armed with this paper, and accompanied by Mrs Barrett, she walked to Epsom. Mr Keeling administered chloroform, 'merely to deaden the nervous sensibility of his patient - not to produce unconsciousness'. She was given chloroform on a napkin to inhale, and when she said 'now' the tooth was extracted almost instantaneously. She appeared to faint, and despite vigorous and prolonged attempts at resuscitation, could not be revived.

Mr Keeling promptly despatched messengers into the town, to seek medical assistance. Dr Barrett was, coincidentally, on his way to Epsom, and was met by one. He hurried to the scene, but could do no more than to pronounce the unfortunate victim dead. Mrs Barrett was deeply distressed, but 'Mr Keeling's nerve never once forsook him'[1] and he conducted himself admirably throughout.

The inquest, with jury, was held on the following day, Saturday August 28, 1858. The verdict was 'Accidental Death'. Mr Keeling was 'acquitted of the slightest blame', but the jury desired to recommend the cautious use of chloroform in trifling operations in future. On this subject, Mr Keeling himself expressed the opinion that death had been caused by the administration of a minimum quantity of chloroform, and he wished to emphasise therefore that this minimum quantity, administered with the greatest caution, may yet prove fatal. He concurred entirely with the view of the jury about the future use of chloroform in operations of a minor character.

The full story appeared in the 'Times' of Monday August 30, 1858, and was followed by a vigorous correspondence. A letter appearing the following day gave the writer's idiosyncratic views on resuscitation,[3] and someone signing himself 'M.R.C.S.' wrote to comment on the appropriate use of chloroform.[4] This last excited the derision of the 'Lancet'[5] which was much involved in the chloroform debate. Although its opinions were, of course, anonymous, they bear the characteristic

stamp of that great scourge of charlatans, deflator of egos and protector of the public, Thomas Wakley.

Reporting the case in the 'Lancet' of September 4, 1858,[6] the Medical Annotator says: 'It is time that the ethics of chloroformization were established. .... The moral duty of the dentist is therefore clear. He has not the right to risk the patient's life for the extraction of teeth'. But even the righteous and socially conscious 'Lancet' could not rise entirely above the snobbery of the age, for it continues: 'This time it was a servant girl who was sacrificed; the next time it may be a duchess'.

In later issues, there is discussion of the safety of chloroform itself, and also the safest method of administration. The 'Lancet' comes down firmly on the side of Snow's inhaler. Indeed, one correspondent, well ahead of his time, suggests the employment of three persons, the first to administer the chloroform by Snow's inhaler, the second to monitor the patient's condition and the third to be solely occupied as the operator.[7] The 'British Medical Journal', under the editorship of Andrew Wynter, MD, was also involved in the debate, although its tone was altogether cooler and more measured. It chose to address another aspect of the problem, namely the question of the qualifications of the chloroformist. It suggested very firmly that a medical man should 'be at hand to direct and regulate'.[8]

The chloroform debate raged for decades. Within a very short time, the case of the unfortunate servant girl of Epsom was supplanted by other, and more illustrious victims. Indeed, the medical press expressed no special sympathy for her, merely using her to make the point that chloroform was a dangerous drug, the use of which should be most carefully regulated. Even the national press, in its somewhat sensational accounts, appeared more concerned about the distress caused to her genteel employers than the tragedy of the girl herself. Not one of the newspapers troubled to record her name.

To discover that name required a laborious manual search of the register of deaths in Epsom, for which I am indebted to Mrs D.Rham-Robertson, Superindentent Registrar. The Death Certificate, dated 30 August 1858, gives the name of the deceased as Louisa Stone, Domestic Servant, and the cause of death: 'Upon inhaling Chloroform. Accidental'.

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PATIENT SAFETY - NOT A NEW CONCERN

Professor D.Campbell

One of the most important lessons of medical history for today's practitioner is the realisation that many of the great themes which we believe are novel and contemporaneous have, by and large, been considered and debated by notable predecessors. One, however, must allow for and avoid the trap, which is ever present, of searching for a historical justification of the latest fashionable trend or obsession, giving it some spurious authenticity from the imprimatur of a great name of the past. This is hagiography at its most misleading. Like Biblical scholars, we must avoid distorting the ancient texts to provide a veneer of theological respectability for our current prejudice.

With these cautionary words in mind, I nevertheless dare to tread such dangerous ground in illustrating my contention that the all important matter of Patient Safety - today's professional, medico-legal and political obsession - has always been healthily prominent in our profession's deliberations and practice, although it is now at risk of being 'highjacked' by a Government which has not hesitated to corrupt the philosophy of Adam Smith himself.

If I were knowledgeable enough I daresay that I could begin with the pronouncements of the Pharaonic physicians of the earliest Dynasties but the restrictions of time and limitations of scholarship demand that I begin a mere two centuries ago.

Whatever else, William Hunter's reputation as a teacher of stature has survived to our time. The transcriptions of his lectures to medical students and the public at large still provide the modern clinical teacher with many texts which ring as true today as in any past time. Rough notes in his own hand have indeed survived. Here is a relevant selection.

1 Has the patient strength and habit of body and mind fit for the operation? Otherwise let both be corrected.
2 Will the advantage balance the risk?
3 Have trusty assistants and communicate to them.

To mention William without John Hunter would be an unforgivable solecism.

What did he have to do with Patient Safety? I would submit that among his many talents was a predilection for objectivity and accuracy in measurement to support or refute a theory which interested him. His work with Jenner on thermometry in hibernating animals, and the fixing of the time of death from a corpse's temperature, are examples which in a sense lead directly to the modern anaesthetist's diligent attention to measurement as the basis of monitoring the progress of anaesthesia and surgery from induction to recovery. Hunter's thermometer was the 'high-tech' of his day.

The 12th August, 1865 surely marks one of the great milestones in surgical and medical practice when Lister, then Professor of Surgery in Glasgow, applied Pasteur's discoveries to usher in an enormously significant advance in the care and safety of patients. That the principles he demonstrated are still significant is indisputable as we have learned the pitfalls of over-reliance on antibiotics to control deadly infections in theatre and intensive therapy unit as distinct from meticulous attention to aseptic and antiseptic techniques.

Sir William McEwan, one of the last of Lister's surgical assistants and later Professor of Surgery at Glasgow Royal Infirmary himself, took an early interest in the improvement of safety in anaesthesia, in addition to furthering Lister's work.

A Committee of the Infirmary Managers instigated a census throughout Great Britain and Ireland in 1882 seeking to discover what the current practice was in the supervision of training in anaesthesia and in the provision of properly trained members of staff to administer anaesthetics. This was the first national census of its kind in anaesthesia and possibly in all medical practice.

This information resulted in four important changes all aimed at reversing the disturbing frequency of deaths associated with chloroform anaesthesia in Glasgow and elsewhere.

- Regular lectures and practical demonstrations were instituted - Theoretical Instruction.

- Before resident assistants were appointed it was necessary for them to possess a certificate showing that they had attended the special course of instruction - Accreditation.

- Deaths associated with anaesthesia had to be recorded in detail and reported - Adequate Records.

- Any such deaths must be thoroughly discussed at the Infirmary's Weekly Committee - Regular Review.

McEwen's greatest contribution to safety in anaesthesia, of course, is well recognised as his interest in securing a clear and protected airway during anaesthesia for surgery around the head and neck.

It was in 1880, in the 'British Medical Journal', that he published an account of oro-tracheal intubation for these patients as an alternative to tracheotomy, arguably one of the most important technical advances in relation to anaesthesia of all time and of benefit to countless patients over the century since its introduction.

My final illustration of the significance of past contributions to this all important matter of patient safety comes from the work of Sir Frederick Hewitt. His great concern was expressed as early as 1907 when he said: 'Surely the law should protect individuals who innocently submit themselves to the influence of the most powerful drugs in the British Pharmacopoeia at the hands of those who are utterly ignorant of

the risks involved'. He pressed for more structured and better quality education and training for anaesthetists and stressed that a better understanding of the principles of safe anaesthesia was a necessary part of undergraduate medical education. His conviction in this respect was expressed in the preface to the 1901 edition of his textbook 'Anaesthetics and their Administration', written for students and practitioners, as follows: 'I have attempted to meet the requirements of the true student rather than those of men who are content to regard themselves, and to be regarded, as mere dispensers of drugs'.

Patient safety is most certainly no new concern as the honourable record of our predecessors testifies.

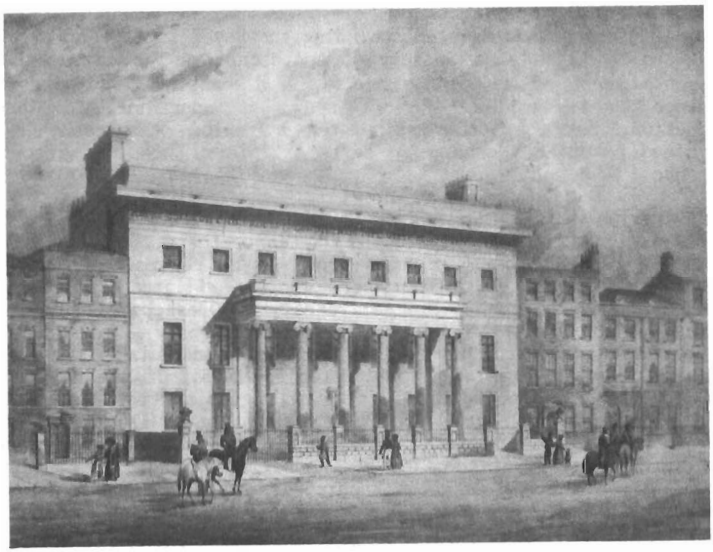
LOSING OUR FACULTIES

Dr Aileen K.Adams

Several institutions have grown up over the years with the object of setting, maintaining and assessing the standards of medical practice. In the United Kingdom the medical Royal Colleges and their Faculties have been predominant.

Surgery is not a recent craft but one that has been practised for thousands of years, long before the advent of effective anaesthesia. In the Egyptian Middle Kingdom period, four to five thousand years ago, trainee surgeons were given considerable advice not only about their practice, but also about what conditions they should and should not attempt to treat.

In Europe from about the 10th century craftsmen formed themselves into guilds, and many of these still exist in the form of city livery companies in London and elsewhere. Their original functions were simple, to celebrate their patronal feast day and to provide support for the families of any of their members who became impoverished. At this time surgery was performed largely by barbers, who had taken it over from mediaeval monks. They too formed a guild, the Company of Barbers, which was incorporated in 1462; whilst a Guild of Surgeons was known to exist although it seems never to have been formally incorporated.



View of the Royal College of Surgeons of England
From a watercolour by F.Rumble, 1835

The Royal College of Surgeons (RCS) is a direct descendant of these two companies, which in 1540 united to form the Company of Barber Surgeons. This received its Charter from King Henry VIII, a ceremony superbly depicted in the cartoons by Holstein in the Barbers' Hall and the RCS. Their first Master, Thomas Vicary, is commemorated today by the annual Vicary Lecture, usually on a historical topic, followed by a banquet held alternately in the RCS and the Barbers' Hall, always a prestigious occasion.

In the course of time the guilds extended their roles, and by the renaissance period had become similar to modern trades unions in some respects. They kept their trade secrets to themselves and tried to run a 'closed shop', but in return for their exclusiveness they took steps to ensure that their members were properly trained and licensed to practice and certainly they took great pride in their work. They also set fees for their services. The Company of Barber Surgeons required candidates to serve a seven year apprenticeship to an existing member before submitting to an examination at their Hall. They were conscious of the difficulty, in a practical subject, that formal examinations cannot test everything, whilst they can test knowledge and problem-solving abilities they can do little to assess clinical skills which are best learned from a wise teacher and practised first under supervision. Hence they laid stress on apprenticeship training, a philosophy remarkably similar to that of our Colleges today. Only after training and examination were they then licensed to practice.

Other licensing bodies existed including the Royal College of Physicians set up in 1518, and the Society of Apothecaries. The latter taught a different aspect of medicine, namely the dispensing of drugs. Their philosophy was similar in requiring an apprenticeship and an examination, but they also stipulated a period of attachment to a recognised hospital, perhaps an early example of hospital recognition procedures.

In the period leading up to the Royal Charter of 1800 the dominant figures in British surgery were the Hunter brothers, John and William. John (1728-1793) in particular has come to be regarded almost as the patron saint of the RCS of England, whereas William is perhaps more renowned in the College in his native city of Glasgow. John is widely regarded as the first to apply scientific principles to the practice of surgery. His collection of writings, drawings and beautifully dissected specimens forms the basis of the Hunterian Museum of the RCS, still a fine and very large collection, in spite of its partial destruction by the air raids of the second World War. John Hunter is commemorated in several ways, by the Museum, by the Hunterian Institute comprising the research departments of the RCS, by the series of lectures competed for by Fellows of the RCS and its Faculties, and of course by an annual feast on or near his birthday, when a Hunterian Oration is followed by a fine banquet.

The union between the Barbers and the Surgeons was not permanent, and in 1745 they separated to go their own ways. By 1800 the surgeons had progressed to a stage where they applied for and received their Royal Charter from King George III, first as the RCS London, later the RCS England. Soon after they made an important step forward when they decided that they should assess the teachers as well as the taught, and in 1836 they created a higher examination, the Fellowship, to test the proficiency of the surgeons themselves. The first candidate to present himself was Erasmus Wilson, then aged 28 and a lecturer in anatomy at University College, who was examined by the whole Council in a two-part procedure. Not only was he the first FRCS but he went on later to become President, and to bequeath a considerable fortune to the College.

The introduction of anaesthetics in 1846 was followed in due course by the evolution of bodies similar to those of the surgeons and other specialists. A remarkably early enquiry into the standards of training and practice in anaesthesia was that initiated by the Glasgow Royal Infirmary in 1882.[1] This was before the establishment of any national body and may be the first audit of anaesthetic practice. The story of the development of anaesthetic organisations is now well-known,[2] how the Society of Anaesthetists founded in 1893 joined with other specialist societies to form the Royal Society of Medicine in 1908, and how this in turn prompted the formation of the Association of Anaesthetists of Great Britain and Ireland in 1932 with the object of starting an examination for a Diploma. This ultimately was done by the Conjoint Board of the Royal Colleges of Physicians and Surgeons, and in 1948 the RCS created the Faculty of Anaesthetists which started a Fellowship examination based on that for the FRCS. The increasing autonomy in its own affairs which was granted to the Faculty culminated in its gaining Collegiate status in 1988.

Anaesthetists have broken new ground in many ways, but have tended to follow the same traditions as other specialties, especially surgery. Its institutions have adopted 'patron saints'; Henry Hill Hickman is commemorated by the triennial award of a medal by the Royal Society of Medicine for outstanding contributions to anaesthesia, whilst the Association has its John Snow medal and lecture. The Faculty, and now the College, has eponymous lectures honouring Joseph Clover and Frederick Hewitt, as well as the more modern 'saints', Sir Ivan Magill and Sir Robert Macintosh whose names are recorded on medals given for the best performances in the Fellowship examinations.

These varied bodies each have different roles, and all appear to fulfil a need. There are however good reasons why the control of standards of patient care and of medical practice are still entrusted to the Colleges and their Faculties. They are totally independent bodies, relying for their financial support only on the subscriptions of their Fellows and Members and on the voluntary donations they receive as charities. They are answerable only to HM the Queen through the Privy Council, and act only in the public interest. Because they have no statutory or

negotiating powers they act by their influence and persuasion, and are perhaps the more influential because of this. To remain effective they need the consent of the public, Parliament and their Fellows, and this is a great responsibility.

Study of the history of these organisations reveals interesting patterns. One notes the tendency for such bodies alternately to amalgamate and to fragment. At present anaesthesia is in a fragmenting phase, perhaps not wholly desirable at a time when many wish to exploit differences between specialties and do not hesitate to drive wedges into the profession as a whole and thus weaken its power. One notes too, the respect for past traditions and rituals, and asks whether bodies should turn their backs on these and look to the present and future anew. Sir Douglas Black raised this question[3] in asking: 'Does the wearing of robes and the formal rituals of the Colleges mean anything? Is this stuffy outmoded nostalgia, or do they give us a sense of continuity with those who have practised medicine before us and from whom we have inherited a respect for learning and for professional dignity and integrity?' Each reader will have to make up his own mind on this.

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SAFETY OF THE ANAESTHETIC MACHINE - SOME HISTORICAL ASPECTS

Dr P.W.Thompson

It is clearly impossible in the space of a short paper to review comprehensively the development of every safety device which has ever been developed for and introduced to anaesthetic practice. It is important to remember that no piece of equipment is essentially safer than the user cares to allow.

The Schimmelbusch wire frame mask of about 1890 was specifically designed for greater safety in administering chloroform in that its 'navicular' shape was intended to ensure that under no circumstances could it be made to fit the contours of the face, thereby always allowing ingress of air at some point. Perhaps as a result of over-enthusiasm for speedy induction of anaesthesia or as a result of the increasing use of ether rather than chloroform, the practice rapidly developed of eliminating this safety feature by applying Gamgee tissue to the face so that all inspired air had to pass through the anaesthetic-soaked gauze.

Again, Minnitt's nitrous oxide and air analgesia apparatus of 1933 was intended to provide obstetric analgesia without (as judged by the practice of those days) significant hypoxia. Intended as it was to deliver a 50:50 mixture of nitrous oxide and air, i.e. 10% oxygen, it was not long before enthusiastic midwives decided that better analgesia could be obtained if the air inlet was occluded with a piece of sticking plaster. Once this was realised the apparatus was redesigned so that this could not readily be achieved.

Truly, we have here perfect examples of the maxim: 'With stupidity the Gods themselves struggle in vain'. But today, with our sophisticated monitoring, such behaviour is still not unknown, and injudicious (or even one must admit accidental) use of a mute control or an alarm disabling button can be equally dangerous. Indeed, there is very considerable support internationally for forbidding the provision of such facilities in anaesthetic equipment so far as International and National Standards are concerned and certainly for mandating that, if provided, they cannot be effective for more than a brief space of time measured in seconds rather than minutes.

But let us go back again to the very earliest days. If we regard, and this is not unreasonable since Crawford Long used the corner of a towel, Morton's draw-over apparatus as our forerunner, we note that it incorporated some design features which have persisted until today even though, from time to time, they have almost been submerged in the course of development. For example, the classical, albeit probably apocryphal, story of Morton having dropped it on his way to the public demonstration at the Massachusetts General Hospital on October 16 1846 demonstrates the ease with which it could be replaced. The basic principle of vaporization was appreciated and Bigelow in 1846 described 'sponges to enlarge the evaporating surface'. And finally there was little resistance to respiration with the wide bore inspiratory tube.

Bryn Thomas in 1975 cited evidence which made clear how rapidly equipment improvements could be made in those days. The model used on October 16 had no valves, whilst that used in the second operation on October 17 and described in Bigelow's paper did incorporate valves in the brass mouthpiece. Let us bear in mind the fact that true efficiency and accuracy in these early devices were not deemed important.

Surely no account of anaesthetic equipment safety would be complete without some reference to John Snow. Let us consider for a moment his ether inhaler which was described in his book on the inhalation of ether in 1847. Snow appreciated the need for wide bore tubing, for adequate exposure of the ether area, and warming of the vaporising chamber and, moreover, he specified most carefully the height of the screw-on air-inlet tube required to combine minimum resistance to the ingress of air with 'prevention of a trifling loss of ether which would arise from evaporation of it into the apartment'. Remember that more often than not probably, this apparatus was used in a domestic situation where a coal fire would be burning merrily in the grate to ensure that the patient was kept warm (no bad thing in itself, one might think these days when all too often theatre staff seem to find any ambient temperature above zero rather too warm for them!). So here we have the original, dare I say it, anti-pollution device. [Of course, Vickers' work for the Association of Anaesthetists published in 'Anaesthesia' on the danger zones around flammable anaesthetic escape had not then been done.]
As things developed, more and more attention was paid to two important considerations: regulating the amount of vapour inhaled and the utilisation of nitrous oxide and oxygen, as these became available stored in cylinders, and their taming by efficient pressure reducing valves and metering by flow meters.

In 1862 Clover showed his chloroform apparatus at the International Exhibition in London. Clover's specification for its construction was detailed in every respect, the nature of the layers of the bag, its volume, the stroke volume of the bellows used to inflate the bag, and the volume of chloroform to be placed in the vaporising chamber. As is well known, on May 15 1873 Thomas Breton an inmate of Broadmoor Asylum for the criminally insane died when the capacity of the main reservoir bag was less than Clover specified and the bellows were stiff from misuse, resulting in an excessively high concentration of chloroform vapour. Perhaps the fact that this was reported by Orange, almost immediately after Clover himself had examined the equipment, in the 'Lancet' 1873 can be regarded as the first appreciation of the necessity for accuracy and conformation with Standards specifications which have become so much a part of the anaesthetic equipment industry today. Only a few years ago a wide variety of angle pieces and expiratory valve mounts could be found on many anaesthetic trolleys.

Another line of development was the utilisation of nitrous oxide and oxygen as these became available stored in cylinders. In the decade 1860-70 a wide variety of designs of gasometers was marketed and firms such as Barth and Coxeter & Son were manufacturing nitrous oxide in 1868 and supplying it in iron bottles; in 1870 they succeeded in liquefying the gas. However, the compressed gas was not easy to control and it was

really in the 1880's, when technology succeeded in storing pure oxygen prepared by the newly developed Lind process in steel cylinders at high pressure, that things really took off.

Today we take it for granted that we have highly efficient pressure-regulating valves and accurate means of controlling the flow of our gases. But it was not always so - the founders of Dragerwerk, Heinrich Drager and his son Bernhard, became involved with compressed gas engineering while it was still in its infancy. They were originally acting as agents for equipment used in connection with the compressed gas pressurisation of beer barrels. Being unsatisfied with various apparatus from diverse origins and of considerable unreliability, they decided that their first step should be to develop an 'excellent and efficient' pressure reducing valve. Heinrich Drager described those already available as 'very undiscriminating' and said that 'they were very often disappointed with performance'. As a result of their thinking they developed a completely new construction. Since the manufacturers for whom they were agents declined to take up this new valve the Dragers set up in business on their own. From this Bierdruck Automat - a mechanism for the automatic control of carbon dioxide pressure in beer pumps - stemmed the effective control of compressed medical gases. This development was followed almost immediately by their production of an effective control valve for cylinders, and the combination of these two allowed an even flow of gas to be drawn from a high pressure cylinder with accuracy, regardless of whether the pressure in the cylinder was high or low.

In this country developments stemmed from the pressure reducing valve developed by Beard in 1888 for the control of acetylene-oxygen mixtures for magic lantern limelights.

Whilst on the subject of the Dragers there was another of their early developments which one might say has recently been rediscovered and hailed as an improvement in safety. Our most modern equipment for the administration of volatile agents often incorporates the accurately measured delivery of drops of the agent as the basis for accurate determination of concentration. In 1902 the Dragers produced their first anaesthetic apparatus in conjunction with Dr Roth of the Lubeck General Hospital. This incorporated an oxygen cylinder and reducing valve, the oxygen being used to operate two injectors which sucked ether or chloroform, or both, from separate bottles for evaporation, the number of drops being carefully regulated as a guide to concentration!

Finally, having earlier referred to the possible dangers of ether in the presence of an open fire may I now refer to the introduction of the warning notice. Acetylene was found to be a first class anaesthetic gas in the 1920's and the Drager 'Narcylene' anaesthesia apparatus was developed in 1925 (Gausss and Wieland in co-operation with doctors of Wursburg University Hospital). Unfortunately, acetylene is highly flammable and explosive and an incident led to the addition of a warning notice by Dragers in their accompanying literature. Perhaps one might note that it is a little more conspicuous than that often to be found these days on a small label at the back of an infusion warmer or piece of monitoring equipment.

It is important to remember that nothing is inherently safer than the user, and to note the words of Peter Schreiber of the North American Drager Company: 'Once efforts have failed to improve human performance, machines should be invented to correct the specific defined inadequacies'. These words (1986) express a philosophy of anaesthetic equipment design which has now become a prime consideration and we have moved rapidly into an era in which an increasing number of safety devices and monitoring equipment are incorporated into the anaesthetic machine. These have indeed come a long way from one of the earliest, the 'Bosun' warning of oxygen supply failure, which suffered from the disadvantage that in its original form it was dependent on a dry cell battery and the maintenance of nitrous oxide pressure to indicate when the oxygen supply failed.

OBITUARY - Dr C.G.Church MB, BS, FFARCS, DA.

Dr C.G.Church, a member of this Society, and a Consultant Anaesthetist in Bradford, Yorkshire, died on April 5th 1989, after a long and courageous battle against malignant disease. He was 45.

Christopher Gareth Church was born in February 1944 in Colwyn Bay and educated at St Alban's School. He studied medicine at St Bartholomew' Hospital, and graduated in 1967. After house jobs at Redhill, he took a short service commission in the Royal Navy, commencing training at Plymouth. He was posted to the West Indies, Malta and Gibraltar. Chris left the Navy in 1973 to pursue a career in anaesthetics, firstly as Registrar in Southampton, then as Senior Registrar in Leeds and finally, in 1977, as Consultant in Bradford.

He will always be warmly remembered in Bradford for his humour, honesty, sense of duty, and integrity. He took a great interest in his work, his colleagues, and, above all, in disseminating the art of anaesthetics and resuscitation through his teaching. His enthusiasm was infectious, and engendered an 'esprit de corps' which was perhaps a typical quality of a Senior Service officer. He spent many hours training, not only medical students and junior anaesthetic staff, but also paramedical staff for the Navy. He held posts of Honorary Lecturer of both Leeds and Manchester Universities, and was a keen examiner of undergraduates. He remained a member of the Naval Reserve and the Society of Naval Anaesthetists, and was very disappointed when his request for active service during the Falklands crisis was refused.

His skill as an organiser was put to the test when he became a director of the Yorkshire Clinic, which at the time had yet to be built and paid for. Within two years it was to become one of the country's leading fully independent hospitals, and set such a high standard that, predictably, it was bought out within seven years of opening. Chris was quite open about his private practice, as he was about most professional matters. Indeed, he took great pride in inviting trainees to visit 'his' hospital, to see how his ideas had borne fruit, as a model in microcosm of what the NHS should be like. Thus, his dedication to duty benefited private and public sectors alike.

At home, Chris enjoyed a full family life with Vicky, a Bart's nurse whom he met as a student. He was justly proud of his children, Nicholas, Katherine and Peter. His interests were varied: an active member of, and MO to, the Keighley and Worth Valley steam railway, he also enjoyed fell walking and was a talented musician. Chris and Vicky were at the forefront in hosting and organising hospital and departmental social events.

Chris fell ill as he was about to take the Departmental Chair, and despite the prospect of prolonged and painful therapy, he decided to continue work, initially in an administrative capacity, but then he made the supreme effort of rehabilitation to full clinical duties. The remission was sadly to last just a year. Fittingly, he will be remembered in part through an eponymous annual examination prize for Leeds anaesthetics students. P.J.B.S.

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