

THE HISTORY OF
ANAESTHESIA SOCIETY
PROCEEDINGS



Volume 13

Proceedings of the Llangollen Meeting
25-26th June 1993

Official Guests at the Llangollen Meeting

Mrs Betty Mushin
Dr Susan Mushin
Professor & Mrs R Owen
Dr & Mrs E Riding

Helpers

Phillida Frost
Susan Hughes
Betty Loyn
Gren Loyn
Elwyn Owen

Proceedings of the History of Anaesthesia Society

Editor Dr A Marshall Barr
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PROCEEDINGS OF THE HISTORY OF ANAESTHESIA SOCIETY

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CELTIC INFLUENCE ON THE TWENTIETH CENTURY DEVELOPMENT OF ANAESTHESIA IN LIVERPOOL

Professor T Cecil Gray

Welsh, Irish, Scots, Manx, Breton and Cornish folk are descendants of the great Celtic family whose origin was the Indo-European people of neolithic middle Europe. Since the foundation in 1948 of the Liverpool University Department of Anaesthesia, out of 17 Senior Lecturers and Lecturers, 10 have been thoroughbred Celts. I shall not attempt to describe the many influential contributions made over such names as Dundee, Geddes, Owen-Thomas and, more recently, Hunter and Campbell. *Res ipsa loquitur*. Those who have gone before are free from embarrassment and so this paper is mainly about three deceased Celtic characters.

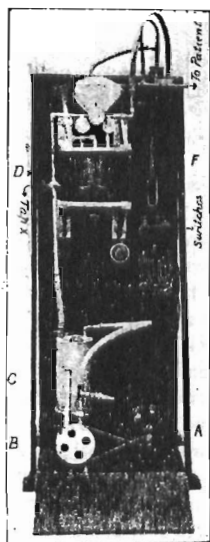
First, however, this account would be miserably incomplete without mention of a most distinguished friend and colleague whom I cannot spare embarrassment. Although G Jackson Rees was born in Oswestry, the family originated in Llandinam, just over the border. Celtic genes account for his *joie de vivre* and must have contributed to his originality of thought and to his compassionate and indefatigable care for children. His contribution to 20th century anaesthesia extends far outside Liverpool and has been on a world scale.

I must also record an historic contribution made exactly forty years ago. Gough Hughes, then Lecturer in Dental Anaesthesia, made the first ever measurements of cerebral blood flow in patients undergoing induced hypotension during clinical anaesthesia.¹ At that time it was a remarkable piece of work demanding dedication to overcome the difficulties of basic research in the clinical environment. For it he received a well-earned doctorate.

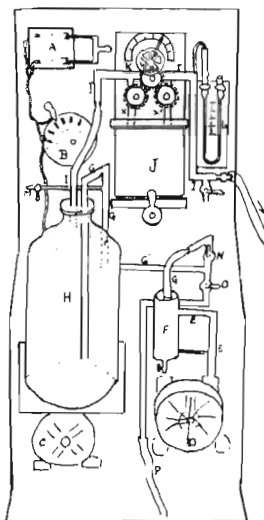
Robert Ernest Kelly

Robert Ernest Kelly, later Professor Sir Robert, certainly of Celtic descent, qualified in Liverpool in 1901. Unusually for those days, he had taken an intercalated honours science degree in Sherrington's physiology department. Nine years later, having picked up an MD and his FRCS, he visited New York and saw Charles Elsberg anaesthetising patients using Meltzer and Auer's experimental ether/air insufflation apparatus and was mightily impressed. On his return to Liverpool, a technician in the Thompson Yates physiology laboratories constructed for him an apparatus based on that of Elsberg, but where Elsberg used hot water in a large bottle to warm the vapour, Kelly substituted a coiled tube immersed in water warmed by an electric element, and wisely added a blow-off valve to avoid spilling the mercury in the manometer. After practice in the laboratory, Kelly proceeded to clinical trials in the Royal Infirmary.

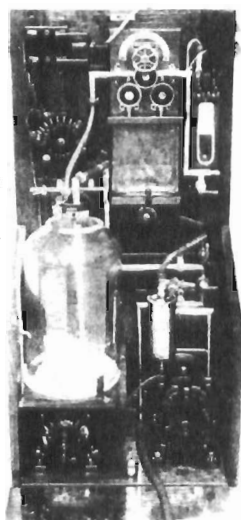
Kelly's machine appeared identical to that of Elsberg. Both were vertical structures about 1 metre high, 0.5 metre wide and 0.3 metre deep. His results were published² in the *British Medical Journal* in July 1912. A school friend from Liverpool Institute days, Guy Drew of Downe Brothers, made a more portable model by putting the electric motor and air pump in one box and the ether vaporiser, heat exchanger, etc, in another. This was conveniently portable and became the definitive Kelly machine. It was used in the Liverpool Royal



Kelly's machine



Elsberg's machine



Infirmary for forty years up to and, by some conservative colleagues, after the introduction of curare. Ether/air insufflation was historically a tremendous advance in anaesthesia for head and neck and intracranial surgery. It enabled the chest to be opened without collapse of the lung and paradoxical respiration, hitherto only possible by using the continental high or low pressure chambers. Skilfully managed, it provided a quiet and relaxed abdomen with, according to Kelly, a greatly shortened recovery period and fewer postoperative complications.

Kelly was a cultured doctor, quite a musician, and a master surgeon. Lord Cohen described him as 'gentle and unassuming, devoid of malice and guile, with never failing tenderness and courtesy'. Quite clearly, he was really cut out to be an anaesthetist!

William James Bennett-Jones

My second character was an expert in the use of the intratracheal air/ether technique. William James Bennett-Jones was known to us as 'BJ' but to his wife's family he was 'Jimmy Jones'. Born in Coedpath, he was Welsh speaking, religious, nonconformist, liberal and always amazingly well-informed on local gossip particularly that concerning anaesthetic accidents. After graduating in Edinburgh in 1899, he decided to specialise in gynaecology. Whilst at the Liverpool Hospital for Women, writing his MD thesis on the hydatiform mole, he fell in love with the theatre sister, Nora Daly. She had come to Liverpool from the London Hospital, where her brother, Ashley Daly, was Visiting Anaesthetist. During the second World War, as Brigadier Daly, Ashley was in command of the army's anaesthetic service.

Nora Daly and Jimmy Jones became engaged. They had both reached their thirtieth year, so clearly BJ had to earn some money, and he went into general practice, while Sister Daly took an appointment as Assistant Matron to Addenbrooke's Hospital, Cambridge. Engaged to such attractive and warm blooded Celt, that was probably wise. Three years later they married.

BJ was still working for the FRCS but, when a family started to arrive, he abandoned these studies and obtained an appointment as Visiting Anaesthetist, first to the Stanley Teaching Hospital and then to the Royal Infirmary. Having an attractive personality and considerable skill, he quickly developed an extensive private practice. His wife, blessed with that degree of ambition which is helpful, didn't care for their house in the not very salubrious Sheil Road district where BJ had his practice. She drew her husband's attention to the success of her brother, Ashley, as a full-time specialist. This did the trick and BJ gave up his general practice, moved to a smart address in Gambier Terrace and bought a motor car. Up to then, he had visited his patients and hospitals on a bicycle, keeping two in case one broke down. As Liverpool's first full-time specialist anaesthetist he worked with an impressive list of Celtic surgeons, Sir Robert Kelly, Sir Robert Jones, Thelwell Thomas, Watson-Jones, MacMurray and Guthrie. Despite this, his income was not large. Years later, he used to say to us tyros: 'You may make £1,000 a year, but never £1,200' and, with a touch of hubris, he would add that not even Minnitt, with all his distinction, was able to give up general practice.



Robert Ernest Kelly



W J Bennett-Jones

His daughter Noreen, to whom I am indebted for most of this information, relates that, despite so busy a life, he was a devoted father and family man. He played a full part in caring for his six children, helping with the bathing and feeding. If one of the babies would not go to sleep, he would slip a little brandy into the bedtime bottle: apparently it always worked. Similarly, as students, we used to catch him just before a list, surreptitiously slipping a little chloroform into his ether bottle. Not surprisingly, he was very successful in demonstrating open ether induction!

His daughter paints a nice vignette of the life of an anaesthetist in the early thirties. Before the Mersey tunnel, cars, steam and horse-drawn wagons and drays used to cross the mile-wide river on an open single-deck ferry and very long slow-moving queues waiting to board were usual. BJ would have a list of private Ts and As early in the morning in Rodney Street and Noreen would take his car, bag and equipment across the river on the ferry and meet him at the underground station in Birkenhead to go on to nursing homes, sometimes as far away as Ruthin Castle. Bennett-Jones was a memorable and very Celtic man. Just before his death in 1948 he was elected a Fellow in the newly formed Faculty of Anaesthetists.

Robert James Minnitt

Minnitt's contribution to anaesthesia was widely recognised. Originally going to Cambridge to prepare for the ministry, he changed course and came to Liverpool to study medicine, qualifying in 1915. He, too, entered general practice and in due course was appointed visiting anaesthetist to the Liverpool Royal Infirmary, where he became a friendly colleague of



Robert James Minnitt

Bennett-Jones. He had an enquiring and disciplined mind and wrote an MD thesis on the treatment of 'shock'. In addition to the Infirmary he was appointed as anaesthetist to the Royal Liverpool Children's Hospital, the David Lewis Northern Hospital and also to the Liverpool Maternity Hospital where, in 1934, he developed the nitrous oxide and air method of analgesia which brought him fame. This and his higher qualification led to a part-time lectureship in the University and eventually to membership of the Board of the Faculty of Medicine.

Supported by Bennett-Jones, he founded the Liverpool Society of Anaesthetists in 1930 and for 25 years was its Honorary Secretary, becoming President for the silver jubilee. Dedicated to raising standards and encouraging recruitment to anaesthesia as a career, he became involved in national committees and had to limit his hospital work to the Northern Hospital where he was the senior anaesthetist and very much in control.

In 1943/44, the Goodenough Committee on Medical Education, exploring the need for full-time clinical chairs, approached the Association of Anaesthetists for a considered opinion on how their remit could be applied to anaesthesia. Minnitt was asked by the Council to write a report on the training of anaesthetists. His report to the Association became the basis of an historic letter from the Liverpool Society of Anaesthetists to the Dean of the Faculty of Medicine written over the signatures of Bennett-Jones as President, Minnitt as Honorary Secretary and R P Harbord who held the University post of Demonstrator in Anaesthesia. It proposed the creation in the University of an academic Department of Anaesthesia under a full-time University head and envisaged a greatly improved course for undergraduates and the institution of postgraduate and refresher courses for specialists in anaesthesia. This proposition was brought to fruition in 1947, but only after the part-time anaesthetists had agreed to it. Bennett-Jones' influence, as their doyen, was especially important: they were fearful of losing their independence, if not their hospital posts.

Of Minnitt's contribution to Liverpool anaesthesia there can be no doubt, but what of his Celtic descent? Minnitt is an extremely uncommon name but does not suggest a Celtic origin. In fact, Minnitt was really not his family name at all. His great grandfather was a Captain Robert Molloy, of an Irish family with a long standing military connection, whose home was just south of the Ulster border. Captain Molloy courted a Miss Minnitt, whose family came from north of the border. Approaching her father for her hand in marriage, the Captain was told that he could only have it if he would change his name to Minnitt. This he did, but kept Molloy as a forename. It was dropped by subsequent generations. Captain Molloy Minnitt's son became the Vicar of Christchurch in the Lancashire village of Healey. His son, Dr R J Minnitt's father, became his father's curate in Healey and ultimately Vicar of St Luke's Church in Formby, where there is a window endowed by Dr Robert Minnitt in memory of his parents.

Minnitt was a contemplative man, with total commitment to his family and profession; he was serious-minded - not without humour, but not welcoming undue levity. His views on the immediate and close doctor/patient relationship without any third party intervention as, for example by a health authority, were uncompromising. When the NHS was instituted, he refused a contract which tied him down to a routine sessional commitment and gave up the practice of anaesthesia, but never missed a meeting of the Liverpool Society. In his later years

he was very greatly concerned by family illness, but still attended a few patients until his death in 1974, aged 84.

Conclusion

Liverpool used to be called the Capital of Wales. That it never was, but it has been tremendously enriched culturally by the influx of the Welsh, the Irish and the Scots. Examples of that enrichment are seen in these anaesthetic personalities. Thankfully, more than half my genes are from that splendid race.

Acknowledgements

I am very grateful to Mr Robert and Miss Dorothy Minnitt and to Miss Noreen Bennett-Jones for a great deal of family history.

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YET ANOTHER AIRWAY

Dr Phillida M Frost

Discovery

When the District Hospital at Bodelwyddan was opened in 1980 (20 years after it had been promised) the patients were moved into new fully-furnished accommodation and all the original theatre and anaesthetic equipment was left behind. A war-time upbringing had made it very difficult for me to discard anything, and I wandered round the empty hospital collecting various unconsidered trifles, some of which were recycled. In the following year several other small local hospitals were closed and pieces of old equipment were passed on to me. Unfortunately, no record was kept at the time of where each piece came from. As I was working full-time, things began to accumulate. It was soon obvious that there would be no home for the larger pieces of equipment (like the oxygen tent) but I eventually acquired several old glass instrument cabinets and the smaller pieces - the airways, endotracheal tube connections, laryngoscopes, syringes, and open masks were housed in them, after each piece had been identified and photographed. I found I had several sets (different sizes) of a variety of airways - Waters', Phillips', Mayo, Guedel and one Guedel-like thin metal airway. As there was only the one specimen it was not included in the collection - in fact I carried it in my car for a year or two thinking it might be of some use for emergency resuscitation and its loss would not be regretted.

One day, while looking through an old Thackray catalogue, I was very surprised to see my ugly duckling of an airway illustrated beneath those of Waters, Guedel, Hewitt, London Hospital and Mayo. And it had a name - 'Mona Roberts'. I set out to discover what I could about Mona Roberts. I first went to the Medical Institute in Liverpool and here the Librarian, Mr Crook, found her obituary in the *British Medical Journal* in 1936 and the fact that she had worked in Liverpool. The rest of my information about her was culled mainly from copies of the *Medical Directory* at the Institute.

Dr Mona Roberts

Mona Dew Roberts was born in Manchester in May 1878, the daughter of Dr John Roberts. His name first appears in the *Provincial Medical Directory* in 1861, his address being given as Crwg, Carnarvon, N Wales. He had qualified MRCS(Eng) in 1859, LSA 1860, MD(Ed) 1861 and had been House Surgeon at the Royal Maternity Hospital Edinburgh during the time of Sir James Young Simpson. By 1863 he was in practice in Manchester where eight years later he became Honorary Physician to Southern Hospitals for Diseases of Women and Children. In 1882 he was President of the Manchester Medical and Ethical Association. So we can assume that his daughter, born at 365 Oxford Road in May 1878, was the child of a successful well established Manchester physician. His connection with North Wales, and Anglesey in particular, is apparent in his daughter's name Mona, after Ynys Mon - Anglesey. Dew was her mother's maiden name.

Mona qualified from the London School of Medicine for Women in 1908. She held various posts in London - Assistant Medical Clinical Assistant and later Junior Obstetric Assistant at the Royal Free Hospital, Clinical Medical Assistant to the Evelina Hospital for Children, Assistant Medical Officer at St Pancras Infirmary. She was a recognised lecturer for the Central Midwives Board. While at St Pancras Infirmary she had two articles published - a report of a case of haemochromatosis in a woman (*BMJ* November 1911) and a case of tetanic spasms (*Lancet* June 1912).

In 1913, 5 years after qualification, she entered into partnership with a Dr Mary Davies in Liverpool. This was the last year that her father's name appeared in the *Medical Directory* (after 52 years); he must have been a very old man and it is possible that his age, illness or death were connected with her move from London to Liverpool. Her name appears for the first time in the *Provincial Medical Directory* as a late entry in 1914, her address being given as 30 Princes Avenue, Liverpool, where she remained in practice until her death in 1936.

Princes Avenue was and still is a handsome thoroughfare - dual carriageway with a wide central tree-lined reservation, running westwards from Upper Parliament Street just north of the Anglican Cathedral to the gates of Sefton Park. Number 30 is one of a group of tall handsome red brick houses; it is a corner house with some rooms set back from the main road, which could well have been the consulting rooms, as we know that the practice was run from this address.

By 1916 she had been appointed Honorary Visiting Physician to the Childrens' School of Recovery and, rather surprisingly, Assistant Anaesthetist to Liverpool Royal Infirmary. It would be interesting to know how this came about but her obstetric interests probably meant that she had considerable experience in administering anaesthesia for delivery. We know that later she gave open ether for all the gynaecological operations performed by Dr Blair Bell, that eccentric Liverpool obstetrician who later moved to London and founded the College of Obstetricians. The First World War meant a shortage of doctors and particularly men, and makes this female appointment more likely.

The Mona Roberts Airway

The airway which bears her name was described in a letter published in the *Lancet* in December 1916 (Vol 2, p 1060) with illustration:

'The tube is modelled on one used in the United States and by Dr Mott of Stoke and modified by Dr Blair Bell who first suggested its use to me. It is a flat hollow metal tube 4" in length with a flange at the external end, the upper edge of which is hollowed out to fit beneath the nostrils, whilst in the lower half of the flange there is a small slit, through which, if required, a piece of tape can be threaded and tied round the patient's neck. The tube is so curved as to comfortably pass over the tongue into the pharynx.'

At that time it was manufactured by Alexander and Fowler but the illustration that I had found was in a Thackray catalogue published after the Second World War, so that it must have been manufactured for at least 30 years. There the story would have ended but for a strange coincidence.

A personal recollection

Mr Crook (Librarian, LMI) knowing my interest, wrote in 1990 to tell me that at an annual meeting of members of the Medical Institute he had met a redoubtable elderly lady who, although infirm and in her nineties, always attended these meetings. She was a retired GP and she had known Mona Roberts. His informant had qualified at Liverpool in 1923 and had entered general practice in 1925. As a student she had been taught how to give open ether by Mona Roberts whom she described as a very good anaesthetist, kind and helpful to the students and always elegantly dressed. Later she had looked after Mona Roberts' patients when she was away on holiday for five weeks in the summer. Most of her patients were visited, were comfortably off and lived in large houses with servants to open the door and, on one occasion, a butler. They were scattered over a large area including the Wirral. Mona Roberts also worked for the Corporation Maternity and Child Welfare Clinics, had a small car which she drove rather fast, was a very pleasant person and a good doctor.

Even when men returned from the forces after the First World War, Mona Roberts was retained at the Royal Infirmary - in fact her appointment as Assistant Anaesthetist was never deleted from her entry in the *Medical Directory*. She suffered a stroke in 1936 when she was aged 57 and died after a few weeks illness.

My great regret is that, having discovered this much about Mona Roberts and her airway, I know nothing of the history of this single specimen. Before the advent of the National Health Service, surgeons from Liverpool visited our area of North Wales to operate and, on occasion, brought their own anaesthetist - maybe this is how the airway found its way here. How long had it lain unregarded before finding its way into my collection? And how nearly I cast aside this small piece of equipment which proved to have such interesting links with the history of anaesthesia, North Wales, Liverpool - and a woman!

ROBERT JAMES PROBYN-WILLIAMS, 1866-1952

Dr J A Bennett

The Probyn-Williams family name survived a mere 61 years. It commenced in 1893 at the Supreme Court when Robert James Williams MD, Arthur Charles Williams, gentleman, and Helen Alice Williams, spinster, all of 9 Woburn Square in the County of London did, by Deed Poll, take the surname of Probyn-Williams to and before that of Williams. This was signed, sealed and delivered on October 23, 1893 and advertised in the *Times* of October 31 that year. The presumption is that the change of name was assumed by the two brothers and sister of the same family. Robert James Williams was born on May 19, 1866 at 107 Great Portland Street, London, the elder son of Robert Williams and Helen Elizabeth, formerly Probyn. The occupation of the father is given as 'commercial clerk' and no evidence can be gathered from the birth certificate as to any important connections that the father or mother might have possessed. However, recent and unconfirmed information from a former housekeeper to Probyn-Williams suggests that the name Probyn was associated with an elite Indian cavalry regiment with later connections with the Royal household.

Early years

Nothing is known of Williams' very early years or of his general education. However, the Registrar of Students at the London Hospital, Whitechapel, indicates that he obtained London Matriculation. University College, London, was one institute granting such status. This may possibly be the case with Probyn-Williams and, if so, would give credence to an entry appearing in the *Chronicle of London Hospital Club*, the objects of which were, inter alia, to promote social feelings among the alumni of the London Hospital, to cultivate an esprit de corps and, as far as possible, to advance the interests of the London Hospital Medical School. This it did by regular dining evenings to which friends were invited. In recording the dinner of November 27, 1884, the *Chronicle* states: 'Some vocalists were kindly provided by the Chairman (H A Reeves) but their hireling harmony did not find half so much favour with the guests as the voluntary efforts of Mr A Caesar, Mr Williams of University College, Mr Sidney Barratt and Mr Charles Edwards. Mr Caesar sang 'I like a soldier fell'; Mr Barratt 'Tell her I love her so; Mr Williams 'Gauze, Antiseptic or Listerian dressings', etc, etc. with great expression and effect'. Williams had a deep interest in music throughout his life and this may have been an early excursion into public performance.

Williams' medical education was divided between the University of Durham and the London Hospital Medical College at which latter he was awarded one of two Buxton Scholarships to the value of £20 or £30 per annum. He obtained his MB at the University of Durham in 1889 and the MRCS LRCP (London) in 1890 - proceeding to MD at the University of Durham in 1892. Whilst Durham University has no records beyond the degree dates, there is a note of the Deed Poll which changed his name. The London Hospital Medical College Archives, however, carry full student career details in the Student Register and enumerate his progress throughout the various clinical firms as 'very good; remarkably good; very good indeed, etc,

etc'. The regulations governing the award of medical degrees at the University of Durham in 1890 indicate attendance there during one of the four years of professional study or subsequently to qualification elsewhere.

First appointments

Following qualification, Williams was appointed Receiving Room Officer at the London Hospital and it was during this time that he must have come under the influence of Frederick Hewitt, from whom he received what was probably his only formal training in anaesthesia, to which a surviving Diploma testifies. Following this, he passed to House Surgeon and House Physician appointments at the London Hospital before being appointed House Physician to the Lying-in Hospital, York Road, Lambeth. This appointment may have been significant in shaping his future social and family connections.

During the time that Williams was a medical student and young doctor, the family residence had moved from Great Portland Street to 23 Alfred Place and, by 1893, the year of the Deed Poll, the Probyn-Williams family was living at 9 Woburn Square. In 1895 Williams was appointed Junior Clinical Assistant at the Royal Ophthalmic Hospital, Moorfields and had become a Fellow of the London Obstetrical Society and Honorary Physician to the Milliners and Dressmakers Provident and Benevolent Institution. This latter seems a strange appointment and it is interesting to speculate on a possible family connection. His father was known in 1866 to be a commercial clerk and had, by the time of Probyn-Williams' marriage, risen to become a manufacturer. One is tempted to suggest his interest may have been in millinery and dressmaking.

The first professional years had already begun to demonstrate his academic nature and lively interest in all his professional duties. Early scientific contributions included papers describing an unusual heart malformation, abdominal wall abscesses following surgery, and observations on temperature, pulse and respiration during labour and lying-in.

Full-time anaesthetist

In 1896, at the London Hospital, developments were taking place in the field of anaesthesia. Frederick Hewitt, the hospital's instructor in anaesthetics, put to the House Committee that, in view of the developments over previous years, and increased surgical needs, two other officers be appointed. There was, at this time, some dissatisfaction at the performance of the two incumbent anaesthetic assistants, Messrs Bruce and Jones, and it was resolved by the House Committee that means be found of arranging their retirement. This having been somewhat unhappily effected, the way was clear to create a post of Anaesthetist and Assistant Instructor in Anaesthetics. Four candidates, including H B Gardner and Probyn-Williams presented themselves: Probyn-Williams was appointed and commenced duties in January 1897. This post was considered the first full-time hospital post in anaesthetics in the country and established Probyn-Williams alongside Hewitt as Lecturer in Anaesthetics at the London Hospital Medical College. In 1902, Hewitt relinquished his post at the London Hospital and

become more closely associated with St George's Hospital. Probyn-Williams succeeded him as Senior Anaesthetist and Instructor in Anaesthetics at the London Hospital, a post which he was to occupy until 1926.

Much of Williams' professional and family life had been centred in London and would continue so to be for a further 35 years. It is therefore interesting that he looked to the district of Burton-upon-Trent for the purposes of matrimony. In 1899 at Church Broughton (west of Derby and northwest of Burton-on-Trent) he married Emily Auden. There can be little doubt that Williams' introduction to the Auden family occurred when both he and George Augustus Auden (subsequently the father of poet W H Auden) were colleagues at the Lying-in Hospital, Lambeth. It was very soon after this that George Augustus took up an appointment at the Lying-in Hospital at Burton-on-Trent, close to the Rectory at Church Broughton where his and Emily's father William, was the incumbent. Emily is known to have been a nurse before marriage but details of her training and subsequent hospital appointments have not yet come to light.

Probyn-Williams made regular academic contributions both at professional meetings and in the medical literature during the first 15 years of his professional life. In anaesthesia he was well known for his investigative powers and he was, perhaps, the first anaesthetist to demonstrate the physiological effects of ether mixtures by means of invasive heart and blood pressure recordings and tracings using animals. He was dedicated to ensuring that the techniques of anaesthesia were safe and that they were well taught. In 1903 he published details of his wide-bore modification of Clover's ether inhaler and later he described a mouth gag for insufflation anaesthesia for oral and post nasal-space surgery. His *Practical Guide to the Administration of Anaesthetics* ran to two editions (1901 and 1909) and in 1904 he published the little volume entitled *Golden Rules in Anaesthesia*. After serving as Treasurer, he was elected President of the Society of Anaesthetists of London (1906-1908) and was, during his term of office, privileged to witness the Society's amalgamation as the Section of Anaesthetics at the Royal Society of Medicine.

On retiring from his appointment at the London Hospital in 1926, Probyn-Williams remained in London and devoted much time to music. Being a member of the Westminster Abbey Special Choir, there is little doubt that he would have sung at the Coronation of George VI in 1937. He was also a keen Freemason and Founder Member of the London Hospital Medical Lodge in 1900, and the only surviving Founder to be present at its 50th anniversary celebrations. In 1946 he attended many of the anaesthesia centenary celebrations in London, including a banquet at Lincoln's Inn, when all the noted anaesthetists of the day were present. He was elected to the newly formed Faculty of Anaesthetists and, at the time of his death, was its oldest surviving member. With his passing in 1952, the last British link with the pioneering days of anaesthesia was lost; indeed, he had, in 1899, delivered at the London Hospital, perhaps the first definitive lecture on the history and 'dawn of anaesthesia'.

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THE GOLDEN RULES

Dr G Jackson Rees

Anaesthesia for medical students 1908

Some years ago, following the death of an elderly general practitioner who had qualified in Glasgow during the First World War, I was asked to look through her library of medical books. Amongst these was a minute volume designed for the waistcoat pocket entitled *The Golden Rules of Anaesthesia*, written by R J Probyn-Williams. I felt that few copies of such an insignificant book would have survived, but not surprisingly another copy was found by Dr Bennett in the effects of Probyn-Williams. Both of these are the 3rd edition, published by Wright in 1908.

The author's aims are clearly set out in the preface. These were to draw the attention of the student to certain principles during the course of his practical instruction, whilst at the same time hoping that they would be valuable to the occasional anaesthetist. *The Golden Rules* was not the first attempt by Probyn-Williams to enlighten the medical student, for there was an early book of 220 crown octavo pages published in 1901. He says 'The average student neglects the larger (books) and either reads nothing at all, or perhaps glances at the article on 'Anaesthetics' in some text book on surgery'. He emphasises that he has no idea of rivalling the larger manuals by Dr Hewitt and Dr Dudley Buxton. Perhaps he wrote *The Golden Rules* in despair at the continuing reluctance of the student to read a more substantial text on anaesthesia.

Changing attitudes to ethyl chloride

The Golden Rules of 1908 notes in its preface: 'As ethyl chloride is now again on trial, and most text books give no account of its use, a short account has been added'. A second edition of the larger book, *Practical Guide to the Administration of Anaesthetics*, appeared in 1909. This also had a new chapter on ethyl chloride which is much more cautionary than the section in *The Golden Rules*. Indeed, it is surprising that a drug with such a turbulent history as ethyl chloride should have received the prominent treatment it did in a pocket book directed at so inexperienced a readership.

In his preface to Snow's *On Chloroform and other Anaesthetics*, Benjamin Ward Richardson tells us that ethyl chloride was first used by Nunneley of Leeds in 1849 (possibly preceded by Heyfelder in 1848). It subsequently fell into oblivion and in 1880 was reported by the Glasgow Committee of the B.M.A., on the strength of animal experiments, to be unsuitable for humans. However, it was re-introduced after Carlsen and Thiesing, using it to produce refrigeration analgesia for dental procedures, observed that their patients tended to sleep! Lotheisen later reported its use again as a general anaesthetic. Probyn-Williams' friend Blumfeld wrote in 1902 (*Medical Monographs, Series 7*) of ethyl methyl chloride and ethidene dichloride, that they were 'mostly unsatisfactory, but possibly ethyl chloride might be

a substitute for nitrous oxide'. In 1905 Flora Murray reported on ethyl chloride as the sole anaesthetic in 150 children under one year of age in glowing terms, and there are shades of her paper in *The Golden Rules*. The 1907 Buxton text states that 'the prudent will recognise that (ethyl chloride) is not the innocuous agent some have suggested'.

In spite of this, *The Golden Rules* of 1908 warns only that recovery from ethyl chloride is not as good as after 'gas', and that occasionally the patient is quite collapsed for some time, which is a drawback in the consulting room. In the section on choice of anaesthetic he states that statistics show that chloroform is five times as dangerous as ether and that it is doubtful whether ethyl chloride is more dangerous than ether. The little book has a section of five pages on ethyl chloride, compared with seven on ether and six on chloroform. This level of emphasis and the total absence of any warnings about serious risks would seem to be a clear encouragement to the reader to use this agent.

A year later these views are considerably modified in the *Practical Guide*. Here, the section on the relative safety of ethyl chloride begins with the sentence: 'This (relative safety) is still the subject of discussion, for though large numbers of successful cases have been recorded, it is also unfortunately true that many deaths have occurred'. How different this is from *The Golden Rules* comment that 'circulation is somewhat stimulated, and the only danger appears to be from any interference with free respiration'. The *Guide* attributes these deaths to heart failure, and states further that 'with the inexperienced anaesthetist ethyl chloride may become almost as dangerous as chloroform' - an example of the euphoria followed by disillusion with which we are familiar following the introduction of many new drugs.

Miscellany

The general content of the little book is a curious mixture of sound common sense and bizarre beliefs. In the section on the preparation of the patient he warns in the 'weakly' patient against prolonged starvation and adds that it is a good plan to give an enema of beef tea or coffee with an ounce of brandy half an hour before surgery. If shock is expected, injection of gr 1/30 of strychnine is recommended.

The section on ether anaesthesia describes in detail the use of the Clover inhaler while open ether using a Schimmelbusch mask gets no mention. *The Practical Guide* of the following year does describe this, saying that it has become a 'routine with some surgeons especially in America and some parts of the Continent'. He was wrong in suggesting that this was a recent development in America, for the report of a committee of the Boston Society for Medical Improvement 'on the alleged dangers which accompany the inhalation of the vapor of sulphuric ether' published in 1861 had condemned the use of inhalers, saying that only a conical sponge or towel folded into a cone should be used to administer ether. Thus *The Golden Rules* of 1908 and the *Practical Guide* of 1909, read in conjunction, give a clear indication of a changed attitude to closed inhalers taking place at this time in the UK.

The section of *The Golden Rules* devoted to maintenance of the airway is concise and complete, and could be read with advantage by some of the trainees of today. The striking thing here is that there is no mention of the oro-pharyngeal airway, for the book was published in the year of Hewitt's description of his airway. This is described in the 1909 *Practical Guide*, where it is illustrated. It surprised me to learn that this first version had no curve, but consisted of a straight tube with a bevelled end.

Probyn-Williams, in his introductions to both these books, recognises that in spite of a growing number of specialists in anaesthesia, the service would be provided largely by general practitioners or other non-specialists - a situation which was not to change for another 35 years. He therefore set out to provide a body of literature clearly distinct from that of the specialists, which would serve the needs of this group. Let us hope that the changed Health Service does not call on us to repeat his exercise.

NEW EVIDENCE RELATING TO THE FIRST ETHER ANAESTHETIC OUTSIDE AMERICA AND EUROPE

Professor J L Couper

During the Third International Symposium on the History of Anaesthesia I reported that Mr Richard O'Shaughnessy had used ether on the 20th March 1847 in Calcutta. This information toppled the belief that Alfred Raymond was the first person to use this agent outside America and Europe. Two reports have been found which reveal even earlier use of ether in India.

The first case (of which there is but scant information) appears to be of a woman who had a tumour weighing three pounds removed from her shoulder by Dr Johnston. The patient was induced with ether but maintained with mesmerism, having been mesmerised eight times the previous day. A second case by Dr Johnston was reported in the *Bombay Times* and was sent from its Madras correspondent on 8th March. The report reads:

'Another and successful operation has been performed here, by Dr Johnston, on a male patient, under the influence of the ether. The man in question was a native, with a tumour below the right shoulder blade of the same description as that which the above gentleman removed from the person of a European lady, but rather less in bulk. He inhaled the ether vapour for about three minutes from an apparatus which Dr Johnston had constructed out of a common inhaler, and was perfectly insensible during the process of extirpating the tumour which occupied two minutes more. After that period he became wide awake again, and continued so during the application of ligatures and stitching.

The extent of skin divided by the knife was equal to 13. 1/2". Altogether this operation seems to have much resembled Dr Johnston's first and we hope that he will take the opportunity afforded by it of instituting a comparison between the respective merits of the two processes by mesmerism and ether. We understand that the etherised patient had been previously mesmerised without difficulty for three quarters of an hour, and assuming that his sleep was then of the cataleptic type suitable for the operator's purpose, we should say that he furnished an example of the decided superiority of mesmerism - where it will apply. Dr Johnston will, we hope, inform the public of any differences apparent in the several results produced upon the circulation of patients by mesmeric influence of ether. The last agent appears to quicken circulation, and consequently to aggravate the natural tendencies to haemorrhage during an operation, while the former has rather an opposite effect. This alone we should imagine is a point of superiority in favour of the older discovery, that must be of some practical value.'

Esdaile had been using mesmerism for surgery in India for some while and this combination of mesmerism and ether is the first report that I have been able to find. I am unaware whether Esdaile even used ether at all. The suggestion that these techniques be further investigated from physiological aspects I find most interesting.

EARLY ANAESTHESIA IN WREXHAM

Dr L W Gemmell

Wrexham in the 18th and 19th centuries

A print by Buck of Wrexham in the 18th century portrays an idyllic scene. Indeed, Wrexham was always held in high esteem for the quality of its architecture (possessing one of the 'Seven Wonders of Wales' - the steeple of the Parish Church). The critical Samuel Johnson found the buildings highly commendable. Turner was much taken by the Cheshire-type timber houses. His painting of Wrexham still hangs in the Victoria and Albert Museum. Wrexham at this time was described as the metropolis of North Wales, and was one of the largest towns in the Principality. However, it was still remote, the railway not being completed until 1849. There were only two coaches a day from Chester and one from Shrewsbury.

The Industrial Revolution resulted in the urban decay of Wrexham producing the overcrowding, squalor, poverty and disease so well described in Dickensian novels. In the mid 1800s there were 26 coal mines, 4 iron smelters and 7 breweries, the population had doubled within 40 years, to 7,000 in the town alone, with no urban planning or sanitation. The report of the General Health Board of 1849 gave a mortality figure of 29.2/1,000 population and went on to describe the living and moral conditions found in Wrexham:

'The house drainage is what might be expected in a place without street sewers ... in many cases not even a gutter ... The privies, where there are any, have cesspools ... usually open and without drains ... filth overflows into yards and courts and not unfrequently into the houses ... Drunkenness among the lower classes, male and female, is very frequent ... Prostitution ... scarcely a lodging house in the town refuses to harbour for this purpose.'

It was at this time that the reforming zeal of the Victorians reached its zenith. The provision of hospitals was part of that great philanthropy. The spread of hospitals in Wales roughly followed population growth - starting usually as a dispensary and then quickly, with charitable funds and donations, to conversion to a hospital. Wrexham followed this pattern with the setting up of a dispensary in Yorke Steet in 1833. Charitable efforts, local philanthropy, and the driving zeal of a local physician, Dr T T Griffiths, established the Wrexham Infirmary in Regent Street in 1839, the facade of which remains as the Art College.

Arrival of anaesthesia

Remembering the remoteness still of this part of North Wales, events happened quickly, following the seminal occurrences in London. An avid reader of the local newspapers would have seen the arrival of the steamship *Acadia* in Liverpool reported in the *North Wales Chronicle* of 22nd December 1846, but its significance would not have been appreciated. Soon, however, the medical journals and local newspapers bristled with the news of 'painless

surgery' and in the *Cærnarfon and Denbigh Herald* of 13th February 1847 the following description of early anaesthesia in North Wales was recounted:

Painless surgical operation

While under the influence of etheric vapour, a successful instance of its application occurred on the 5th instant., at Wrexham, when Mr. Dickenson performed amputation of the thigh, upon a young man. The patient was a person of rather spare figure, tall and about 28 yrs of age; has been suffering from scrofulous inflammation of the knee joint for the last seven years. About 3 years ago he was recommended to undergo the operation, but from the advice of friends and want of resolution he would not consent. Mr. Dickenson having told him that he could have it removed without pain, he at length gave consent. Friday last was appointed for the operation, and several surgeons were present. The patient having been placed on the operating table, he inhaled the etheric vapour for some time, without much effect, the stomach during its administration having several times ejected its contents. The mouthpiece of the apparatus being re-adjusted and an additional supply of ether, its effects soon became perceptible to those around, and in less than five minutes he became perfectly etherised. The opⁿ was now commenced, and in less than 2 minutes the limb was removed the patient having betrayed little or no symptoms of pain during the operation. Afterwards upon being interrogated by the operator and several gentlemen present, he said he was aware of what was going on, but experienced no pain; remembered hearing the bone sawn through; the application of sutures to bring the flesh together caused slight symptoms of pain but upon reapplication of etheric vapour, he almost immediately became insensible. The result was highly satisfactory to the operator and those gentlemen present.¹

This graphic description gives an insight into the early morbidity of anaesthesia and surely the first documented case of awareness under anaesthesia.

A respected doctor

The pioneer of this great North Wales event was Mr John Dickinson (1810-1887). He was born in Cheshire, educated at the Grove Park School, Wrexham, qualified as a surgeon and apothecary in Edinburgh and later completed the 'Grand Tour' of London and Paris. He became a medical officer of the Wrexham Board of Guardians in 1837 and established a private practice at Crescent House in the Beast Market, where a GP surgery exists today. He became Honorary Surgeon to the Wrexham Infirmary, but not until 1855, thus the first North Walian anaesthetic probably took place in his private rooms. Like many of his early 'anaesthetic' colleagues, he had other claims to fame. He became Mayor of Wrexham in 1861 and helped Gladstone cut the first sod of the Wrexham-Connah's Quay railway line. As director of Wrexham Water Company he advocated the complete sanitation of Wrexham. His obituary in the *Wrexham Advertiser* of April 1887 described Dickinson as: 'A medical man of long standing and high repute and a citizen who was widely respected'.

DISCRETIONARY ANAESTHESIA

Dr J E Riding

There are many accounts describing how quickly and enthusiastically etherisation was taken up. Medical histories generally convey the impression that very soon after October 1846 painless surgery became the rule. Major,¹ in his *History of Medicine* wrote that by the middle of the 19th century pain had been banished from surgical operations. Bishop's *History of Surgery*² uses similar terms. According to Cartwright,³ within a year hardly an operation was performed throughout the civilised world without the aid of ether. Garrison,⁴ referring to obstetrics and to experimental work in animals, as well as to surgery, concluded a section on the introduction of ether: 'In these fields anaesthesia was, in the memorable phase of Weir Mitchell, the 'Death of Pain'.'

It is easy to assume, therefore, that ether and later chloroform were readily accepted within a few years by all surgeons for use in all the operations then performed in the advanced world. That this agreeable view might not represent the true state of affairs was long ago remarked by Duncum⁵ who noted from the *Medical Times* of 1868⁶ a 'complete failure' of some French surgeons even as late as 1868 'to recognise the importance of anaesthesia ...'. Morton himself was subjected to bitter attacks, denunciations, abuse and ridicule, as indeed was Simpson, although the latter was better able to defend his views. Initial resistance was perhaps inevitable, but there are many indications that reluctance to use anaesthesia persisted for several years.

Evidence of failure to use anaesthesia

According to Pernick⁷ the use of ether in the Pennsylvania Hospital began only in 1853. Further, he found from the records of that hospital that a substantial proportion of major limb amputations were performed without anaesthesia over the following ten years, the same being true in other leading American hospitals. Ogston,⁸ according to Levack, recorded that as a student at Aberdeen in 1860, there was debate amongst the surgeons about whether chloroform was to be used and usually it was not. Youngson⁹ states that Syme removed a chimney-sweep's cancer of scrotum without anaesthesia in 1861 and according to Sykes¹⁰ the same surgeon performed glossectomy and mandibulectomy without anaesthesia in 1864.¹¹ Morris,¹² in his *History of the London Hospital* stated that some surgeons continued to operate without anaesthesia for years after 1846. There are occasional reports of major amputations under the influence of rum or brandy, for example, in Bristol in 1852.¹³ On the other hand, chloroform was already widely used for limb amputations in Glasgow in 1848.¹⁴

Charles Kidd,¹⁵ in his *Manual of Anaesthetics*, dated 1859, describes an operation for vesico-vaginal fistula without anaesthesia. He states also that the older ophthalmologists of the day preferred to go on as before without anaesthesia. In 1853 Cooper¹⁶ reported that he had been using chloroform for eye surgery for two years. Yet as early as 28th January 1847, Neill,¹⁷ a Liverpool eye surgeon, performed five operations under ether on the same day. At

the same institution, eye surgery was still performed in some cases without anaesthesia as late as 1867. Frank Hamilton, a New York surgeon, had used ether within a year of Morton's demonstration. According to Pernick,¹⁸ who studied his case books, Hamilton '....through a quarter of a century of surgical practice, lasting into the 1870's continued to carry out occasional amputations, even of arms and legs, without resort to ether or chloroform.'

'The advantages derived from the use of anaesthesia are perhaps more evident and appreciated in the field than in civilian practice' wrote George MacLeod¹⁹ in his *History of the Surgery of the War in the Crimea*, published in 1859. This suggests that even at that time anaesthesia was not universally employed. He stated that: 'In one division of our army it was not so commonly used as in others, from an aversion to it entertained by the principal medical officer of the division.' Kidd²⁰ quoted an army surgeon, Mr Cole, as holding the view that he would abolish chloroform altogether.

Others had doubts about anaesthesia. Thus, Gross²¹ in about 1850 felt strongly that chloroform ought to be avoided in operations for bladder stones in adults. The operation, he said, is 'usually unattended with much pain' and having a patient with a clear mind he regarded as advantageous to the safe performance of surgery of this type. The reviewer of Gross' book added that anaesthesia should be withheld also in children for fear of causing injury to the bladder. John Snow²² commented in 1855 on a lecture given by Syme which included a statement that chloroform was given in London in certain cases when Edinburgh surgeons refrained from its use, as in lithotomy and tumours of the jaw. Rees²³ drew attention to the belief of J Mason Warren of Boston, writing in 1867, that the use of anaesthesia was inadmissible in operations for cleft palate in children, while Collis in Dublin had well established by that time that chloroform could be safely used in children of a very young age. Some forms of surgery were considered too minor to warrant anaesthesia. Boyer²⁴ in 1851, giving an account of occasions when chloroform should or should not be used, considered it superfluous in trivial surgery, but unfortunately did not detail what constituted triviality.

Why was anaesthesia withheld?

There were many reasons for reservations about the use of anaesthesia during the first years. Administrations were not always successful. Techniques had to be developed. There were difficulties about the purity of preparations used and, as Kidd²⁵ wrote in 1859: 'Very grave objections have been raised against chloroform for its destroying consciousness of the central organ of which we know so little...' The role of anaesthetics in death associated with surgery was a common concern. There were the problems associated with particular types of surgery, especially of the eye or the mouth.

Some surgeons adopted a cautious approach and were suspicious of the new development. Wakley²⁶ writing at the beginning of 1847, having referred to the 'priceless treasure' at the dawn of a new era, noted nevertheless that 'the most terrible operations are much less painful in reality than they are imagined to be' - a view doubtless confined to medical men. There was an understandable concern about the risks of anaesthesia in the seriously exhausted,

blood-depleted and shocked patient. Skey,²⁷ reporting in 1851 the results of the use of chloroform in over 9,000 patients at St Bartholomew's Hospital, concluded that the agent was better avoided in these circumstances. Kidd²⁸ said that he was afraid of chloroform where the patient had been using digitalis or hydrocyanic acid as a medicine or had suffered mania a potu. As late as 1879, Turnbull²⁹ gave a list of cases in which ether should not be employed. These included very aged patients with emphysema, those with cardiac hypertrophy and habitual drunkards.

Medical education at this period had little to do with research and was founded largely on the authority of the past. It is understandable that assessment of the balance of advantage against risk of anaesthesia was a difficult matter and caused anxiety for many years. Kidd³⁰ in 1859 observed: 'We still perhaps notwithstanding all the advantages of local and general anaesthesia allow too much pain in surgical operations' and added: 'There is no peculiar bravery in the surgeon wishing a fellow creature pain; there is nothing in all surgical science now to the man of delicate feeling worth one half-minute's pathological cutting open alive of a human being ...' The controversy about whether anaesthesia itself, or the slower and more deliberate surgery it allowed added to or lessened the risk of shock, was bedevilled by lack of scientific knowledge. Some surgeons took early advantage of the new conditions. Stanley³¹, in 1852, described a procedure lasting 1¼ hours for careful dissection of a parotid tumour and said there was no good ground for the opinion that chloroform interfered with wound healing. It is understandable that not all surgeons were immediately enthusiastic about the ability of ether or chloroform to make painless surgery possible for all who needed it; but after the initial conservatism and scepticism had been overcome, how widely was anaesthesia used for the range of surgical procedures then available?

It is possible to surmise that factors other than medical and technical may have influenced the extent of use of anaesthesia. The question of 19th century attitudes to pain is beyond the scope of a short paper but, according to Pernick's study, had considerable influence in America over the decision to use anaesthesia. This may well have been true in Britain. Humanitarianism had not by 1851 reached the point of abolition of labour by children under ten as chimney sweeps.³² Records frequently make no mention of minor painful procedures such as removal of necrotic bone, minor amputations, avulsion of toenails. These were performed, but were they done without anaesthesia? Pernick's study³³ of American practice cites several authorities of mid and late 19th century as advising against anaesthesia for minor surgery. Turnbull's 1885 textbook on anaesthesia is quoted as advising that, *inter alia*, amputations of fingers and toes, surgery of the eye and of the anus were too minor to need anaesthesia.

Inevitably, reliance can only be placed on the records of those who chose to leave them. These were mainly the more eminent and articulate persons associated with the chief hospitals of the day. How did the less favoured amongst the population fare surgically? Bristow and Holmes³⁴ in their remarkable survey of hospitals in the United Kingdom, published in 1864, discovered that in most hospitals no operative records were kept. Almost no records exist of the substantial proportion of surgery performed in the home.

Importance of surgery?

How important was operative surgery within the general field of medicine in the middle of the century? Steele's statistics¹¹ of Glasgow Royal Infirmary for 1848 record 207 surgical procedures. During the same period almost 1600 patients were seen in the fever department, almost 1,000 of whom suffered from typhus. In Liverpool in 1847 it was estimated that some 10,000 citizens died, 6,000 of fever, 3,000 of diarrhoea and about 1,500 with tuberculosis.³⁵ By comparison with the havoc wrought by the infections it may be that operative surgery was relatively unimportant and that the great discovery made small impact for the first few years.

The archives of the principal hospitals in Liverpool, Chester and North Wales, for several years after Morton's discovery, offer no suggestion of any substantial change in the activities of the hospitals as a result of the availability of anaesthesia - still less of any excitement being aroused. At the Northern Hospital, sited alongside both docks and railway in Liverpool, fewer than 30 operations were noted for the years 1861-62. At the Liverpool Royal Infirmary the numbers amounted to fewer than 80 for the years 1860-62. No mention is made in either hospital's records of anaesthetic usage or of minor surgery.

When large scale suffering, united with evil social conditions, was the preoccupation of the day, it may be that individual suffering had little importance, and there was no widespread will to alter radically the status quo of surgery. Much later, when the great infections, pestilence and hunger had been largely vanquished, individual pain assumed a degree of importance previously inconceivable. Certainly, many years elapsed following Morton's demonstration before the benefits of painless surgery actually became available to patients for the full range of surgical procedures.

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WHITHER THE WHITE CELLS?

Dr A E Edwards

George Bernard Shaw in *The Doctor's Dilemma* (1906) observed: 'There is at bottom only one scientific treatment for all diseases, and that is to stimulate the phagocytes'; also, 'Chloroform has done a lot of mischief. It's enabled every fool to be a surgeon'. While neither statement is strictly true, their appearance in a popular play reflects the public interest in both immunology and anaesthesia at the turn of the century.

The early history of active immunisation relates to the ancient Chinese practice of placing cotton wool, impregnated with smallpox pus into the nostrils to prevent future infection. Lady Montague, wife of the Ambassador in Constantinople, advocated its use in Britain in the first decade of the 18th century following successful immunisation of her sons. Seventy years later Jenner established 'Vaccination'. Locally, in 1774, Sir Watkin Williams Wynn arranged the inoculation of Ruabon by a Dr Lancaster, following a smallpox epidemic in Chester. Smallpox has been eliminated; tuberculosis has so declined that Llangwyfan Hospital, North Wales, is closed, where thirty years ago major thoracic surgery was being undertaken by Mr Howel Hughes; tetanus is rarely seen, but the memory remains vivid of trying to manage a case in the isolation ward of the old Wrexham Maelor Hospital, in an iron lung, itself a survivor of the post-war poliomyelitis epidemic. The recent introduction of immunisation against haemophilus influenzae should ensure that acute epiglottitis in children will become a rarity.

Despite all such advances, surgical and anaesthetic work did not decrease, and modern anaesthetic practice has opened the door to apparently limitless surgical intervention. The first anaesthetic in Wales was given in Wrexham in February 1847 by Dr J Dickinson but the development of 'light balanced anaesthesia' a century later was equally revolutionary. In Wrexham between 1955 and 1975 the number of operations and anaesthetics being undertaken trebled, reaching 10,000 per year. A growing number of older and iller patients were undergoing surgery of increasing complexity. A retrospective study¹ demonstrated that post-operative mortality in patients over 65 years undergoing general surgical operations actually increased marginally between 1968 and 1975, but subsequently decreased over the next ten years coinciding with the development of high dependency and intensive care facilities.² George Bernard Shaw understood: 'The phagocytes are stimulated, they devour the disease, and the patient recovers - unless of course he's too far gone'.

Anaesthesia and the immune response

Five year survival studies on our elderly patients, following general surgery, demonstrated that following an initial increased mortality, the pattern approached that of an age-matched population. However, the presence of malignancy and the pre-operative level of fitness significantly affected outcome. It is the very success of our developments in anaesthesia and intensive care that have revealed the need to re-examine their effects on the immune response and the results of surgery. This interest is not new. An historical survey³ revealed that Rubin,

in 1904, studied the effects of alcohol, ether and chloroform on the resistance of rabbits to infection, and was the first to suggest that the immune system is impaired by anaesthetic agents.⁴ It was noted in 1916 that ether enhanced the growth of breast cancer in mice.

In vitro studies by Nunn⁵ demonstrated conflicting results and there have been further numerous contradictory studies.⁶ The recent increase in understanding of the immune response has not answered the questions that were raised a century ago: which anaesthetic agents and techniques compromise the patient least, what are the effects of trauma and what is the role of the stress response? How do they affect malignancy and sepsis?

Our own findings⁷ suggest that limited trauma, associated with a 'light, balanced anaesthesia technique', stimulates both the stress response and aspects of the immune response and, more importantly, contradict the general assumption that totally stress-free anaesthesia is always advantageous. Other answers may lie in changing clinical practice. Minimally invasive surgical techniques have clearly identified the advantages of limiting tissue trauma. The growing use of epidural techniques has decreased the need to ventilate patients following chest injuries and thoracotomies and demonstrated the advantages of spontaneous breathing against the problems of prolonged positive pressure ventilation. Recent animal studies have shown that increased intrathoracic pressure reduces thoracic duct lymph flow. The effect of controlled ventilation is worsened by PEEP which depresses bacterial clearance from the peritoneal cavity. Professor Mushin and Dr Nancie Isobel Faux, formerly Consultant Anaesthetist, Rhyl 1951-69, advocated the 'use of the Both Respirator to reduce postoperative morbidity'. Recent technological developments with cuirasses, e.g. the Hayek Oscillator, may enable this aspect to be re-explored. Maybe now is the time to re-examine our clinical practice, to reconsider our use of prolonged IPPV, the long term use of drugs, the place of blood transfusions, intravenous feeding and invasive monitoring and to justify our interventions. *Primum non nocere* - first of all, do no harm.

Heat shock proteins

Recently it has been suggested that the answer to our dilemma with the immune response may lie in pre-history - in the evolutionary development of cells and organisms - phylogenesis. It has been demonstrated that both bacteria and host cells respond to a variety of stressful stimuli by increasing the synthesis of 'heat shock' proteins which have been observed in all cell types examined, and are among the most conserved proteins in phylogeny with respect to both structure and function. Heat shock proteins have a protective function in preserving more complex proteins responsible for cellular function and are not normally expressed on cell surfaces unless the cells are stressed. Human immunological memory for heat shock proteins is generated early in life, probably at the time of establishment of gut and skin flora, and then boosted by repeated exposure to minor infections throughout life. Thus stressed, host cells and invading bacteria may initiate the same response, and that response which may be advantageous in preventing infection may also be destructive of stressed host tissues. Similarly, depression of immune function following prolonged stress may be a protective

mechanism to preserve stressed host cells, but may increase susceptibility to infection.⁴ A recent paper⁹ asks why athletes under intensive training appear to be prone to infection.

In this complex scene the interface between trauma, stress, infection and malignancy will be intricate and close. There may be choices to be made between anaesthetic techniques which enhance the immune function in patients prone to infection or selectively depress aspects of the immune system in patients undergoing tissue repair or transplant surgery. The balance is likely to remain a fine one.

Acknowledgements

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NOT ON THE DENBIGH COLUMN

Dr Buddug Owen

The first anaesthetic in Denbigh?

There have been two papers^{1,2} in the last 15 years on early anaesthesia in North Wales. Neither mentions anaesthesia in North Clywd in 1847 despite its having two workhouses (at Holywell and St Asaph) and in Denbigh a hospital for nervous diseases and also an infirmary.

Denbigh Infirmary³ had been founded as a charity in 1807 as a dispensary for the relief of the sick and diseased poor, the gratuitous supply of trusses and vaccine inoculation. Wards for reception of inpatients, 10 in all, containing 16 beds were opened on the 1st March 1826. Being the only institution of its kind in North Wales it received applications for admission from distant places. It is mentioned in Dr Meyrick Emrys-Roberts book⁴ as a voluntary hospital which was charging patients as long ago as 1813. The Annual Reports⁵ first mention surgery in 1827. Operations included a strangulated hernia (discharged cured), cataract (discharged cured) and amputation of forearm (discharged cured). Was this where the first anaesthetic in North Clywd was given? I looked up the *Caernarvon & Denbigh Herald* for 1847 and found on the 20th March, under the heading Denbigh, a report as follows:

'Dr Pierce of this town has performed some of the most formidable operations in Surgery, whilst his patients were under the influence of ether. His first experiments were with some of the minor operations & being successful with these he proceeded to try its effects with the most important & painful, & invariably he found it to be effectual. The last operation he performed was for strangulated hernia, to his utmost satisfaction. All those who have been under his influence at being interrogated as to the sensation experienced, reply that they were not in the least conscious of pain; but that they had delightful dreams, so that we may now consider surgical operating sources of transient enjoyments.'

Was this an account of anaesthesia in Denbigh? Unfortunately, Dr Pierce was not on the staff of Denbigh Infirmary and he was not appointed to the staff of Ruthin Union, a workhouse 8 miles from Denbigh, until 1851. I obviously had to find out more about him.

Dr Evan Pierce

Evan Pierce⁶ was born in an isolated small farm (the house is now derelict) called Bryn, in Prion near Denbigh on 1st March 1808; his mother was a devoted Wesleyan Methodist. The family later moved to Plas Meifod, Henllan, a prosperous farm in the Vale of Clywd. This farmhouse dates from 1510 and is one of the Historical Houses of Wales. Cromwell is said to have visited it. So they were quite well-to-do. He became a pupil of Denbigh Grammar School and later was apprenticed to Drs Yorke-Jones and Lodge in Denbigh. He then went to Edinburgh University, completing his medical course in 1832. During the early summer of 1832 a cholera epidemic occurred in Musselburgh and Portobello near Edinburgh. All the

local doctors fled and the professors called upon the medical students to assist in the emergency; Evan Pierce was one of those recruited. When he returned to Denbigh during the summer holiday he found a cholera epidemic raging there as well. There were 300 deaths (10% of the population) during June and July 1832. He assisted the town doctors during the epidemic and 17 years later he was given an illuminated address and portrait in recognition of his work.

He began to practise from his home in Plas Meifod in 1833, most of his patients coming from the rural areas. Later he moved to live in Salisbury Place, Denbigh, an imposing property in Vale Street which has been demolished and on which site now is Gateway Superstore. In 1836 he became a Licentiate of the Royal College of Surgeons of Edinburgh, of the Royal College of Physicians of Glasgow, and of the Society of Apothecaries, London. In 1844 he graduated MD St Andrew's University and in 1870 he was elected Fellow of the Royal College of Surgeons of Edinburgh. His Day Book⁷ for the period September 1833 to August 1834, and also August - December 1836, is in the National Library of Wales, Aberystwyth. He had carefully indexed the names and addresses of his patients, their occupations, medicines supplied and their costs, and his travelling expenses - unfortunately, this is his only surviving Day Book. He claimed to have delivered Henry Morton Stanley in the cottage of his grandfather, Moses Parry, which stood outside Denbigh Castle. The explorer was born John Rowlands on 28th January 1841, the illegitimate son of Elizabeth Parry, and during the labour he recited Welsh poetry to Elizabeth. A ceramic mural in Denbigh library incorporates the names of notable people of Denbigh and it includes both Evan Pierce and Henry Morton Stanley. The only memorial to Stanley is a plaque in St Asaph Cathedral.

Pierce had a number of pupils in his charge and was therefore a doctor of repute who liked teaching. In 1850 he was requested by Queen Victoria to choose a Welsh nurse for Prince Arthur of Connaught. His selection was accepted, so he was a doctor of integrity whose judgement was valued. His obituary in the *Denbigh Free Press* of 23rd March 1895 pointed out that he did not charge the poor for consultation and medicines, and that he had maintained at his own expense a hospital where he admitted the sick poor free of charge. On this work of charity he spent in a few years between £1,500 and £2,000. An article in the *Provincial Medical Journal* in January 1893⁸ stated that for many years he maintained entirely at his own expense a private hospital containing 15 beds; this hospital was at Salisbury Place.

A possible site for the early anaesthetic

The brochure⁹ for the hospital reveals that it was called Salisbury Hall Retreat and Sanatorium, North Wales, Licensed under Act of Parliament. It was established for men of good social position desirous of overcoming habits of intemperance or of indulgence in narcotic drugs. The plans show it had 11 bedrooms, 2 servants' bedrooms on the ground floor, and a large consulting room which might have been used for surgery before it became a hospital. The only date in the document is 29th February 1878 on an advertisement. In the picture of the Sanatorium can be seen two water fountains which Dr Pierce had presented to the people of Denbigh to commemorate the Diamond Jubilee of Queen Victoria in 1887. In 1847 it was his

private house where he held surgery. Though the house was large it is conjecture whether he admitted patients at this time for surgery and convalescence, free of charge - but if he did not, where did he perform surgery?

The hospital was not very successful, but one patient, a Miss Alethea Eliza Brandon, inherited £10,000. Evan Pierce married her in 1887 in St Bede's Church, Liverpool, when he was 79 years old. They continued to live in the house and Mrs Pierce remained there until her death in 1932.

Coroner

In 1848, out of several applicants, Evan Pierce was appointed Coroner in West Denbighshire, a position he held until his death. Of 577 deaths¹⁰ reported to him between 1874 and 1885 no inquest was necessary in 254. The remainder were classified as accidents 299, natural causes 30, suicides 54, visitation of God 9, and one case of wilful murder. He had 20 years' experience as Coroner when, in August 1868, he was responsible for the inquest into the Irish Mail Disaster in which 33 first class passengers were burnt to death. It happened on 20th August at Llanddulas near Abergele between Chester and Bangor when the Irish Mail, travelling at 30 mph, crashed into a number of runaway wagons full of casks of paraffin oil coming down an incline of 1 in 90. There were many difficult legal matters which included identification of the bodies and disposal of recovered property, including valuable jewellery and 19 gold watches. There was considerable criticism of the Coroner by the new Lord Fareham whose father had been killed in the accident, but correspondents of national newspapers, especially *The Times*¹¹ and *Daily Telegraph*¹² defended the procedure. He had been criticised because of his insistence on identification of all the remains first, showing he approached it in a systematic way, and was not to be bullied into proceeding immediately. His Welsh manner of speaking was criticised, but he was a Welshman who loved his country and maintained that that did not prevent him from being just and honourable.

Editorials appeared in the *British Medical Journal*¹³ and *Lancet*¹⁴ explaining that the cause of death was not an explosion as had been described in the national press, but passengers were probably stunned and asphyxiated quickly by the anaesthetic properties of the vapour from the volatile hydrocarbons of the oil, e.g. amylene, by black smoke of very high temperature from the immediate ignition of the highly inflammable oil and by the products of combustion-carbonic acid and carbonic oxide. No cries for help were heard from the burning carriages and no effort seems to have been made by the passengers to escape. An Editorial in the *Lancet* on 19th September, when the inquest had been concluded, paid tribute to the calmness and forbearance the Coroner had shown during the inquiry and in the correspondence which ensued afterwards.

In the National Library of Wales there is a folder of newspaper cuttings¹⁵ which had presumably been collected by Dr Pierce from various English and Welsh newspapers at the time. It includes one in Welsh from *Y Dydd*, a newspaper that was published between 1868-1950, giving an account of Dr Pierce's life and the railway disaster.

A more likely site

Here at last I found some answers¹⁶:

'When he returned to Denbigh he applied for a vacant post on the Staff of the Infirmary. It was essential to get the majority vote of support of the doctors on the Staff but because of some jealousy on their part he did not achieve this. Because he wanted to practice good medicine he spent hundreds of pounds paying rent & rates for Bryntirion & changing it into a hospital & taking all patients without payment. He is regarded as the most successful physician, surgeon and obstetrician in North Wales.'

On the 1875 map of Denbigh,¹⁷ Bryntirion can be seen in close proximity to Salisbury Place and Denbigh Infirmary making it a very convenient spot to carry out surgery. The likelihood is that this was the place where the first anaesthetic in North Clywd was given though I have not found any documentation about Bryntirion.

Denbigh Town

Dr Pierce was interested in all aspects of Denbigh town affairs and was a member of the Town Council from 1848 until his death, first as Councillor, then Alderman. He was the first Captain of the Fire Engine Service. He was Mayor of the Borough for five successive years - 1866-1870. During this time he provided an annual tea for the schoolchildren. He donated a water fountain outside his house, another outside the Town Hall and also a clock for the Town Hall. He was appointed a magistrate. That he was highly thought of in the community there can be no doubt. In 1872, when he had been a physician in Denbigh for 40 years, a committee was formed to raise funds to commemorate his services to the town as Justice of the Peace, Mayor and Physician. He thought a scholarship would be more appropriate but the committee were determined on a statue. He bought the land opposite Salisbury Place, and a column 72 feet high of limestone from the Graig Quarry, Denbigh, was erected, surmounted with an 8 foot statue of Dr Pierce in best Sicilian marble; the cost was £8,000. On three sides of the base are bas reliefs in bronze representing 'Healing the Sick', 'Feeding the Hungry', and 'Mercy interceding with Justice' while the fourth bears an inscription giving the doctor's public offices and philanthropic and charitable undertakings. There is no mention of anaesthesia.

He gave a considerable amount of money to the Wesleyan cause in memory of his mother, despite the fact that he was banned from taking communion between 1872-1875 because of his habitual cursing and swearing, which was felt by the minister to be unworthy of a man of his position. His exuberance surfaced in hunting. In Henllan there is a place in Lôn Fain called Naid y Doctor (The Doctor's Leap) after Dr Pierce's habit of jumping from one field to another across the road at that spot. He is reputed also to have ridden up the marble staircase of Llewenni Hall. He was a patriot interested in all things Welsh and was Patron of the Eisteddfod. In 1886, at the Caerwys Eisteddfod,¹⁸ one of the Competitions was 'Evan Pierce - the renowned Doctor and Patron of Denbigh' with a gold medal as the prize.

He died on 15th March 1895 and is buried in Eglwys Wen - St Marcella's Church - about 2 miles from Denbigh. Obituaries appeared in the *British Medical Journal*¹⁹ and *Lancet*.²⁰

To have a statue erected during his lifetime was a rare honour but because he was of local importance only he is not mentioned in the *Welsh Dictionary of National Biography*. He is, however, mentioned in John Cule's book²¹ on *Wales and Medicine* as a physician of Denbigh. Since this book is intended as a guide for medical historians, I have informed Dr Cule of Evan Pierce's connection with Henry Morton Stanley and with anaesthesia.

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PROFESSOR W W MUSHIN CBE 1910-1993

Dr Lyn Rees

There have been many formal tributes to William Mushin in medical journals and the press, so perhaps there is room for some variation. The actor Kenneth Griffiths recently said in a TV interview: 'God forbid that I should ever sink so low as to present an unbiased report'. This view of Bill Mushin is of that sort; a personal selection of his writings, mixed with my own comments and memories. I spent a year with him in 1950-1951 as a Junior Registrar (there were no SHOs in those days) and subsequently became a Consultant in the Department in 1958. This presentation owes a great deal to friends in the Department and to Betty Mushin who allowed me to trespass on her memories and gave me access to all his writings - nearly 700 articles and speeches, carefully indexed in 21 volumes.

Early years

William Mushin began his anaesthetic career as House Anaesthetist in The Royal Dental Hospital in 1936. He then worked in the Seamen's Hospital, Greenwich, and in 1943 made a crucial move to the Anaesthetic Department in Oxford, having been encouraged so to do by Macintosh himself. During this seven-year period he published eleven articles, the first in the *Lancet* in 1936 describing a new dental prop. For a doctor aged 26, writing almost certainly without experienced advice, it is a remarkably mature paper, properly constructed, and the language as clear and concise as any in his later work. The prop was designed 'not to break under the strain of the bite, especially with nitrous oxide anaesthesia' - a glimpse into the past. Another paper described a slide rule designed to give percentages of each gas in various combinations of flow and pre-dating in a sense the halothane wheel some of you may remember, giving halothane concentrations in low flow and closed circuits.

In a talk given decades later in India he mentions that during this period he read all the standard anaesthetic books available, selecting as the most striking, for its scientific quality, Sir Frederick Hewitt's *Anaesthetics and their Administration* published in 1893. It taught him, he said, to search the literature before assuming that one had an original idea, a statement that perhaps reflected his liking for Ecclesiastes: 'The thing which hath been is that which shall be'. You will recall that one of his best known orations entitled 'Craft and Intellect' was also based on Ecclesiastes: 'The wisdom of a learned man cometh by opportunity of leisure'.

His first publication from Oxford, in 1943, was on the control of hyperbaric spinal solutions by gravity, arguing that they were more controllable than light solutions. In that year he and Macintosh published a letter in the *Lancet*, exemplifying the occasional acerbic wit which earned him some enemies in his early days. Mallinson, of brief Myanese fame, had just published an article showing graphs of blood pressure drops during ether anaesthesia, condemning the agent and arguing for Pentothal on the grounds that it was 'almost entirely non toxic'. The letter from Oxford observes: 'We cannot allow to pass unchallenged his

almost hysterical condemnation of ether. Dr Mallinson's charts are striking, but whether they incriminate the administrator or the agent is open to question.'

Cardiff

Mushin came to Cardiff as Director of Anaesthesia in 1947, the post, with a salary of £2,000 per annum having attracted a large number of applicants. With the introduction of the Health Service in 1948 he became a Senior Lecturer in the Welsh National School of Medicine with honorary Consultantship in the United Cardiff Hospitals. By the time he arrived in Cardiff (and he was then 37) he had set himself some very high targets: the improvement of anaesthetic services in Wales and the raising of the status of British anaesthesia as a specialty. He was lucky, of course, in a number of respects. He was lucky to have been encouraged to move to Oxford by Macintosh and been fired with his enthusiasm. He always spoke with great affection and admiration of those days. He was lucky insofar as anaesthesia in Cardiff badly needed a saviour. There were once seven deaths in one theatre in one week attributed to anaesthesia in one Cardiff hospital. Finally, he was lucky that, with the inception of the NHS, money became available for logically argued expansion, and nobody I have ever met presented better a case for more resources.

Mushin was always a realist and saw that the quickest and surest road to local status and influence was through the provision of a comprehensive anaesthetic service. A high quality academic department alone would have cut little ice with the surgical barons of that day in Cardiff, and he managed from the outset to combine excellent junior teaching with a fairly ruthless dedication to service. Viewed as a junior it sometimes seemed odd that when the Department was fully staffed I was fit only for minor cases, whereas when many people were away I might find myself in the hills, anaesthetising silicotic miners for a part-time consultant surgeon who was in a hurry to get back to his private practice. This system, effectively if unintentionally, identified those with the stomach for anaesthesia as a career. My fellow junior Registrar of that time subsequently enjoyed a flourishing career in Public Health.

Professor

He used frequently to say: 'I'm a Medical School man through and through' and always seemed more at ease talking to academics than, for example, to part-time consultant surgeons. He once remarked that he had difficulty relating to men who measured the lumps they removed in terms of fruit rather than centimetres. It was his immediate involvement in School affairs, and no doubt his influence on the then Provost, Picken, that led in 1953 to the establishment of the first University funded Chair of Anaesthesia in this country and he, of course, was appointed to it in open competition. Successful politicians emphasise the importance of a solid home constituency and Bill Mushin never neglected his home platform. His first allegiance was always to his Department and to Wales.

In the Principality we had at that time an organisation called the Welsh Hospital Board, which roughly corresponded to the English regions. He soon became a member of the Board and

Chairman of its Planning Committee, so his carefully reasoned requests for anaesthetic expansion in Wales were considered by a committee of which he was chairman. He also became Consultant Adviser in Anaesthesia to the Board and his memoranda on the state of anaesthesia in Wales at that time paint a disturbing picture. Open ether and oxygen used in operating theatres with linoleum or rubber floors; GP anaesthetists whose first allegiances were always to their general practices and a Hospital Board ruled by treasurers rather than doctors. 'Surely it would be cheaper to have a GP or registrar' appears again and again in correspondence to him. Surgeons were regularly giving anaesthetics and then operating on the same patient with a nurse 'looking after' the patient. Given this background, the rapidity with which he raised the quality of service in Wales is quite astonishing. In 1952 there were a dozen consultant anaesthetists in Wales. Twenty years later there were 67, of whom almost half had been trained in Cardiff. As part of the improvement process he founded the Society of Anaesthetists of Wales which welded anaesthetists in Wales into a single body.

In the beginning the Department was rather like a benign dictatorship. He tended to close policy discussion, if it wasn't to his liking with the words: 'Entirely a Medical School matter, nothing to do with you'. Democracy arrived in the guise of Mike Rosen who, as a recently appointed consultant, argued for a stronger consultant voice in policy matters, which was achieved after considerable trauma. On one occasion the Professor said to me: 'I can't go on. You will have to stop him'. It was, in retrospect, a turning point because gradually from then on, as the Department expanded, he adopted the role of counsellor and adviser, over and above his research and teaching interests. His contribution to the furtherance of our careers was immense. 'Without him we would have had nothing' a past colleague recently remarked to me.

He was a fine natural teacher, one of the best I have ever known, able to deliver the eternal anaesthetic truths to a changing population of juniors with unflinching enthusiasm. But he once said to me, after what had seemed an excellent academic meeting with the juniors: 'Have you any idea what a burden it is grinding out enthusiasm year after year and listening to the same banalities?' There is something of the actor there playing a part, an essential ingredient of most really memorable teachers. His sense of duty to the juniors was immensely strong and his Sunday morning bedside rounds were a feature of the Infirmary and subsequently the Heath throughout his career. The clarity with which he wrote and analysed problems was outstanding. All who wrote with him improved their ability to express themselves clearly and succinctly. If the thought crosses your minds that this article negates that statement, regard it as the exception that, as he himself used to say: 'tests the rule'. He was too much of a logical purist ever to say: 'proves the rule'. It was not possible in his view to take too much trouble over any presentation. On one occasion the Department was to be on public show, with Lord Cohen and many other dignitaries present, and we had a full rehearsal of everybody's contribution, including his own so that nothing was left to chance.

For the moving boundaries of the specialty his interest was inexhaustible. Here is a quote from the preface to *Anaesthesia for the Poor Risk*: 'Now and then a paper excites one's interest. Perhaps it is the novelty of the subject or perhaps the author states one's own half

unconscious ideas. Then comes the re-reading of the paper, the excitement of tracking down others on the same subject, the discussion with colleagues and, finally, the formation and crystallisation of one's own views for the time being.' It is a perfect example of his style and reveals 'for the time being' the scientist with an open mind. But how many doctors have this level of enthusiasm for their subject? In anaesthetic company other topics seemed to him unimportant and I'm sure his idea of purgatory was sitting between Barbara Roberts and me at a dinner, as happened on one occasion, when we talked golf.

He made a number of very far sighted and innovative decisions. The Records system brought in almost as soon as he arrived was far ahead of its time and was always seen predominantly as an epidemiological tool. His appointment of Bill Mapleson, the physicist, gave us all a different dimension of scientific analysis and knowledge. If a research idea got through Mushin and Mapleson then it was worth doing. Progress, I believe, is of two sorts. There are the changes which are waiting to be made. If the innovator had been absent someone else would soon have seen the need and filled the gap. On a different level are the major advances that stem from genuinely original minds. Much of his work was in this latter category and as examples only I would cite *Physics for the Anaesthetist*, first published in 1946, which defined the physical foundations of the specialty; an article in the *British Medical Journal* in 1949, entitled 'Pethidine as a supplement to nitrous oxide anaesthesia' because this was one of the pioneer precursors of all analgesic supplementation; *Automatic Ventilation of the Lungs* in 1959, not only because it has been a standard reference book for so long, but because it rationalised an uncharted field; and, finally, the paper in the *British Medical Journal* in 1971 on the dangers of repeated halothane administration. That is a far from exhaustive choice and you would probably choose differently. He himself once defined his view of research within the Department: 'My own influence has been to keep our researches, however fundamental they may be, relevant to the problems of clinical anaesthesia'.

Bill Mushin didn't instinctively find human relationships easy. Many juniors and even some consultants were in awe of him and ill at ease in his presence, but he was a relaxed, pleasant and assiduous host and a delightfully urbane and undemanding guest with an easy flow of conversation adapted to the host and hostess. But basically he was a shy and private person. The dedication in one of his books tells us much about him: 'To my wife the good provider of that inestimable thing, a tranquil home'. I had the pleasure of presenting him for an honorary degree of Doctor of Science in the University of Wales and I conclude as I did on that much more formal occasion: 'There is a poem by the Rhondda writer Huw Menai called *The Simple Vision*:

" Give us the simple vision,
Make us free to choose the straight direction of our road."

The title captures the clarity and sureness of William Mushin's thinking. He chose as his road the improvement of anaesthesia and walked that road with originality, with sustained enthusiasm and, above all, with immense effect.'

THE PHYSIOLOGICAL BACKGROUND OF ANAESTHESIA 100 YEARS AGO

Professor J E Utting

There are big difficulties in pursuing what I wanted to pursue. It's difficult to imagine what anaesthetists **thought** about the corpus of knowledge available to them in, say 1900 and how much they actually used this in everyday thinking. It's difficult to know, for that matter, exactly how much physiological knowledge we ourselves use, consciously or unconsciously, in our daily work. Ideas are much more difficult than folk. In fact, especially in intensive therapy, we use a lot. We may not be directly conscious of this but, then, we are not continuously conscious of our grammar and syntax as we speak.

Sir Frederic Hewitt

Sir Frederic Hewitt is too well known to need introduction. He was born in 1857 and died in 1916, having been the most notable anaesthetist of his day. He was also the most scientific, and in this respect clearly a trend-setter. That's why I chose him. I intended to compare him with his contemporaries. I couldn't really do so: he was streets ahead. He wrote three books, including a most successful textbook. This latter went into five editions and was published for 30 years; the last edition, published posthumously, was edited by Robinson, but still obviously his work. His life has been examined thoroughly, but his textbooks have been given less attention, even in the eponymous lecture dedicated to his memory.

Looking at Hewitt's textbook, (the earliest I have been able to consult is the second edition) one realises it is, above all, a work of massive scholarship, made more remarkable by the fact that Hewitt had to employ a reader. There are over a thousand references in the 1907 (the third or middle) edition, many from the French literature (Kappelet, Dastre, Bert, Claude Bernard); their dates span the entire period from 1847 to 1903. Hewitt, though remembered as inventor and politician, was scientifically head and shoulders above his contemporaries, at least his English contemporaries, in this respect. He was a leader, and his influence was to spread widely but, I think, quite slowly. He was well informed; he was no jobbing gas-man and yet, in the late nineteenth century, people like Buxton were complaining that the anaesthetic was often given by the surgeon's coachman.

Much of what Hewitt wrote under the heading 'physiology' we would now regard as pharmacology. Indeed, in the posthumous edition of his book, the section on physiology is written by a pharmacologist, A J Clarke; it shows, too, being not as good as the editions which Hewitt himself edited.

The question is: 'What did he know and how did he use physiology?' Well, a good deal. For example, his advice on the use of intravenous saline is clearly founded in physiology. Saline could be used by intravenous infusion for surgical shock. The formula for the preparation of the solution, 2 drachms of salt to a pint of water, gives exactly 0.5%. Not 0.9% but near it,

and it is not surprising that oedema was observed when 320 ml/kg^{-1} were given: this would be equivalent to 21 litres to a man of 70 kg. That oedema occurred as late as it did is because presumably it wasn't being given for nothing; there had already been losses of some sort.

On respiratory physiology, Hewitt most frequently quoted Dastre, a French physiologist. I have read his book and understood most of it, despite the fact that I cannot understand a French newspaper. I could no longer get hold of Dastre so, for background, I used Schafer's *Textbook of Physiology*, published in 1900, with authors including Langley (ganglia), Starling (heart), Gotch and Sherrington (nervous system). The last two held the Waynflete Chair in Oxford and Sherrington was subsequently, in his '70s, to get a Nobel prize. The British were poised to take over from the Germans who, till then, had been pre-eminent with men like the immortal Pflüger.

Simple or complex general anaesthesia

Sir Frederic's attitude to physiology was coloured by his attitude to anaesthesia, which he suggested, could be divided into a **simple general anaesthetic** or a **complex general anaesthetic**.

A simple general anaesthetic is: 'the state or condition which is distinctive of the simple action of a general anaesthetic, and which is unattended by any intercurrent complication materially affecting the respiratory, the circulatory, the nervous, or the muscular system. This is the state usually obtained by the experimental physiologist who, having anaesthetised his subject, introduces a tracheal cannula and introduces through it a regulated anaesthetic vapour' A complex general anaesthetic is, in essence, a simple one: 'with one or more intercurrent complications due to other causes than the direct action of the anaesthetic and capable of materially affecting the respiratory, the circulatory, the circulating, the nervous or the muscular system'. Prominent among these complications were those involving the upper respiratory tract - coughing, laryngeal spasm - and, above all, what he described as 'swelling' of the walls of the upper airway. Syncope was also given prominence, though the measurement of blood pressure during anaesthesia was still experimental, Lockhart-Mummery being prominent in that field. When one realises that complex general anaesthesia was the rule rather than the exception one realises that life, for Sir Frederic and his contemporaries, was difficult indeed.

The difference is between 'As usual, something nasty's happening' and 'Good gracious, all is going well'. There is a great deal in it. The simple anaesthetic is now recognisable to us in, say, the patient with a tube in, with or without P P R. We would recognise this as the **physiology of the steady state**. It's much more difficult to study the complex **physiology in an unsteady state**, and anaesthesia was very prone to be unsteady. This Hewitt completely appreciated.

Respiratory physiology

Some of the **basic** facts of respiratory physiology had been known - Pflüger in 1868 and Waller in 1877, had respectively shown that carbon dioxide and acids increase ventilation, while Bert in 1878 demonstrated that decreased P_{O_2} is the cause of increased ventilation at high altitude. It was also known that anaesthesia depresses ventilation, and its response to CO_2 . Of course, we know very much more today - the CO_2 response curve, the fact that the ventilatory response to hypoxia is not simple, that hypoxia wrecks. The advent of the oximeter has made us more neurotic about a touch of cyanosis.

Some of the postulates in Schafer's physiology textbook may seem a trifle odd by present-day standards, but these are the exceptions. For instance, the question was seriously asked: 'Was there something, other than hypoxia or hypercarbia, that caused death when excessive rebreathing took place?' One authority found that the injection of condensed human breath into a rabbit was fatal, but the textbook goes on to imply that bad physical hygiene was the thing that made cramped conditions oppressive. This may sound contemptuous, but the opposite is the case: one cannot but go in awe of contemporary physiologists. It would, for example, be reasonable to conclude, from their experimental work, that, in a 70 kg man at rest, oxygen consumption was 250 ml/min^{-1} and carbon dioxide eliminated 200 ml/min^{-1} . Respiratory quotient was, therefore, 0.8. This was all done, incredible though it may sound, by gravimetric means.

Hewitt was keenly aware of the importance of **blood gas analysis**, a pivotal feature of modern anaesthesia. His contemporaries didn't mention blood gases at all. However, at this time analysis of blood gases was primitive and inaccurate, depending on crude predecessors of the Van Slyke apparatus for extraction and subsequent analysis. The contemporary equivalent of the O_2 dissociation curve was of little value, since it was the curve of haemolysed red cells.

Despite these confusions, there were perspicacious looks ahead. Collingwood, Demonstrator in Physiology at St Mary's, produced **something** which, though pertaining to anaesthetic vapour, is an embryonic oxygen cascade. **Indeed**, Collingwood himself points out the analogy with oxygen. Isn't it interesting that Hewitt took a direct contribution from a physiologist into his **book**? I can find no trace of his contemporaries doing that.

And, **finally**, in the last edition, work by Niclour (1906) showed the delay curve of chloroform following administration, comparing this with the non-volatile agent Neuronal - the beginning, **almost**, of pharmacokinetics.

Postscript: I found myself, when writing this paper, concocting a eulogy for Sir Frederic, not quite what I intended. And a eulogy, too, for the skill of contemporary physiologists. As far as physiology is concerned, other texts on anaesthesia are pale indeed but they, eventually, would follow the great man's lead.

DAVID JOHN THOMAS - A PIONEER MELBOURNE ANAESTHETIST

Dr J Lewis

David John Thomas was born on September 12, 1813 to Ann, wife of William Thomas, a gentleman, of Llwyn-y-Berllan, Llangadog, Dyfed. His father had no profession but was well respected and a capital horseman. His mother came from a good Welsh family: her brother Dr John Davids, practised in Cowes, Isle of Wight, and her half brother was also a doctor. David Thomas was the eldest of four boys and two girls. His mother died when he was fourteen and his father remarried but did not survive long. David inherited the family estate and when quite young sold the property and with the proceeds supported the young members of his family and educated himself. During those years he showed a propensity for easy spending and the family money soon disappeared.

In 1834 Thomas began his medical apprenticeship at the Swansea Infirmary. His chief teacher was George Bird, Senior Surgeon who had a great personal liking for Thomas and considered him of 'a very superior order'. In 1836 he moved to University College Hospital, London, his tutors being Robert Liston, Samuel Cooper and Anthony T Thomas. Cooper had 'no doubt he would prove an efficient and honourable member of the profession'. During his student days he lived highly and showed a youthful vitality which characterised his later life in Melbourne. In early 1838 he graduated Licentiate of the Society of Apothecaries and Member of the Royal College of Surgeons and took a position as House Surgeon at the Lying-In Hospital, Queen Street, Golden Square.

To Australia

While waiting in London to take his degree of Doctor of Medicine, he met Captain John Buckley, an old school fellow, now master of a fully rigged ship, the *Louisa Campbell*. The ship was preparing to sail to Launceston, Tasmania, and one imagines that Buckley easily persuaded the adventurous-spirited young Thomas to sail with him as ship's surgeon for the round trip. The *Louisa Campbell* arrived in Melbourne, Victoria, a bustling town of approximately 2,000 inhabitants, on February 20, 1839. Thomas was persuaded by several prominent citizens to stay. There were five doctors already practising in the Colony and Thomas, with his puckish sense of humour and his conscientious discharge of duties, soon became very popular. Later in 1839 Dr Farquar McCrae, his mother, wife and sisters arrived and he joined with Thomas in partnership. On December 1, 1840 Thomas married Farquar's sister, Margaret Forbes McCrae.

Medical practice was arduous in the 1840's and good horsemanship was a necessity. Thomas was prepared to attend to any patients under 80 miles, this distance being not at all uncommon. By 1847, he had decided to limit his practice to Melbourne and the suburbs. In 1841 Thomas joined with three other doctors, Wilkie, Myers and O'Mullane, to establish a stop-gap hospital in a two-storey building in Bourke Street West, and in these 'most inadequate and inconvenient quarters' surgery was performed, amputation being the

commonest operation. Thomas claimed to be the first surgeon in the Colony to ligate the radial, femoral, carotid and external iliac arteries, to excise the upper jaw, and to perform Syme's operation and Syme's perineal resection and in 1846 he probably performed the first laparotomy in Australia.

He played a leading role in the formation of both the Port Phillip Medical Association in 1846 and later the Medical Society of Victoria in 1853. There was a great deal of strife and petty internal bickering in which Thomas had his share. He was often a blunt, but fair, critic, always striving for peace among the members, but unfortunately he harboured several grudges. Referring to the authorship of a paper, Thomas once replied: 'I know you did not write it, you have not the brain or the ability to write it'.

Anaesthesia 1847

Thomas first used ether on a patient on August 2, 1847. At an ordinary meeting of the Port Phillip Medical Association, on September 7, 1847 held at Dr Wilkie's house, he read the first scientific paper on a medical subject - 'On the inhalation of aether with cases'. The paper was prepared for publication in the *Australian Medical Journal*, but it was not printed until 1933, approximately 90 years later, for the journal ceased to be only six months after its inception in 1846. The paper was rediscovered by Dr Howard, Consultant Physician to the Melbourne Hospital in 1933. The full text, never previously published, appeared in the Melbourne Hospital Clinic Reports of December 1933.¹ I quote from Dr Howard's article an account of the circumstances under which the paper was delivered:

'The meeting of the Port Phillip Medical Association held at Dr Wilkie's house was under the guidance of little, fussy, rosy-cheeked Patrick Cussen (these meetings) were more convivial than scientific. Members played host in turn, dined and wined in the prevailing Lucullan way, and subsequently discussed, in conversational fashion, their professional conundrums. Conventionality, with its carefully prepared paper and formal procedures, was ushered in by the most unconventional member of them all, the genial Welshman, Dr D J Thomas a delightful combination of Puck, Peter Pan, Fluellen, and shrewd, alert, efficient leader of the profession.'

The original lecture is in the museum of the Medical Society of Victoria.² In his paper Thomas showed that he had familiarised himself with all the researches which had been carried out in regard to the use of ether:

'Although the inhalation of this vapour has long been known to produce exhilarating effects, the discovery that a patient under its influence is insensible to pain is of recent date and the discoverer deserves the thanks of the world at large, for operative surgery is now deprived of its terrors and many nervous and timid persons will now submit to the knife who otherwise would have preferred death. I perceive there exists in the minds of many, a doubt as to its safety or the prudence of the universal applicability of this agent. I shall start by stating my belief in its being applicable in all cases in which Capital Operations can with safety be performed. I look upon it as one of the greatest blessings

bestowed upon mankind, and instead of being a nine day wonder, I consider that when the mode of employing it is better known it will become much more general.'

Thomas was concerned with possible effects of other drugs: 'A certain degree of caution is necessary in prescribing any drug, even a dose of salts or Castor Oil'. He was referring to the first patient given ether who, on the fourth postoperative day, collapsed after castor oil. Thomas had frequently taken ether himself and described its effects:

'The first sensation it produces in me is a sort of tingling of the fingers and toes. This gradually creeps up until the whole of my body becomes similarly affected. Shortly afterwards, I feel as if I am possessed of no body at all, still perfectly conscious of everything. If I go on inhaling it, I get into a sort of dreamy state, and have the most delightful sensations. I hear the most rapturous music, and feel altogether as if translated to some fairy land where the roads are paved with gold, the country covered with most beautiful flowers and the choirs in melodious strains and I feel as if my head is without a body and passing from one enchanting scene to another in this visionary land of bliss. This is a most pleasant state to be in when undergoing surgery. In no case in which I have administered the aether have I had the slightest difficulty in restoring the patient to his natural state.'

He follows with a description of the anaesthetic:

'The vapour of aether should be diluted with a sufficient quantity of atmospheric air to prevent coma - this is done by making the opening in the apparatus for the administration of a current of air a little larger than the opening in the mouth piece. I should say that I use an apparatus made on the same principle as that of Mr Robinson's of Gower Street; and if any difficulty is experienced in bringing the patient under its influence, this opening for the air is partially closed either with a slide constructed for that purpose or with the point of one's finger, as it is not necessary to give the aether until it produces a state of stupor. The operation should be commenced the moment the pulse is decidedly affected whether increased or diminished, and the patient goes on inhaling, whilst the operation is being performed.'

He was firmly of the opinion that indifferent results were due to its being improperly administered. He considered that atmospheric air was absolutely necessary and that the aether vapour should only be diluted with pure atmospheric air: 'therefore the air which has been taken into lungs should not be expired again into the vessel from which it was inhaled. The apparatus before you has the advantage of preventing this'. He was concerned that too much aether was given for painless dental extraction in order that the patient's mouth could be opened easily and recommended that the patient 'should inhale through the nostrils by means of an apparatus constructed for this purpose'. He spoke at length on the first patient given aether:

'The patient, Mr Egan, residing over one hundred miles from Melbourne received a severe injury of the left arm and hand on the 26th July 1847. He was determined to come to Melbourne and place himself under my care. He travelled every day nearly thirty miles, over bad roads, in wet weather, on unsuitable diet, in a very uncomfortable cart.'

When Thomas saw him he decided to defer the examination until the next morning 'as nothing could be done in his present state'. At 10am next day, Thomas examined the injury and told the patient: 'nothing in my opinion could be done to save the arm and the sooner it was off the better but as a satisfaction to him as well as myself, I recommended that some other surgeon should see him. My friend Dr Payne was agreed upon, who when he saw him concurred with me and three o'clock was the hour fixed for the operation'. Thomas considered this 'a case in which the administration of ether might be useful'. He 'removed the arm by the flap operation as practised by my teacher, Mr Liston. The period occupied from the commencement of the first incision to the separation of the arm from the body by the saw occupied a period of forty seconds'. The patient exclaimed after the arm was off: 'It is no use giving me that mouth gas, you must do it without'. The patient returned to his home on horseback 'In good health and spirits' in early September. In his concluding remarks Thomas said:

'I assure you that I have not read this paper thinking that it possesses any particular merit or talent. I have this evening read this short paper (the first before the Society) hurriedly got up, hoping it may be an inducement to others more capable than myself of doing likewise.'

Thomas claimed to have introduced chloroform to Victoria; the anaesthetic was given by Dr O'Mullane, while Thomas operated 'in a scientific manner in the presence of 8 or 10 medical men'. He was also the surgeon when Victoria suffered its first anaesthetic death. When the Melbourne Hospital was opened in 1848 with 20 beds and arrangements were made to staff the hospital, Thomas topped the poll. He continued to serve on the staff, except for the six years while he was in Europe, until his death in 1871. This was a period of massive population change. The discovery of gold announced in 1851 meant a great influx of people and doctors from other parts of Australia and later from overseas. The population of Melbourne swelled from 23,000 to over 168,000 by the following year.

In 1853 Thomas toured Europe with his family. He travelled widely, studying at London, Paris, Heidelberg and the principal cities of Scotland, Holland, Switzerland and Italy. He was particularly interested in microscopic studies. His microscope is in the museum of the Royal Australasian College of Surgeons. In October 1853 he obtained the Doctorate of Medicine, University of Saint Andrews, and in 1859 the Fellowship of the Royal College of Surgeons of London. He returned to Melbourne on November 5, 1859. Things were different in the Colony; practice had changed and Thomas was financially insecure. He had sold his property before leaving and had lived expensively abroad. There were now 600 doctors and ethical standards were low. He wrote: 'It is a capital country for quacks, the regular practitioner has no chance with them'. He had a namesake, a quack who advertised extensively; Thomas lost hundreds of pounds and was forced to send a disclaimer to the *Argus*.

Medical Honours

In spite of all these difficulties he re-established his position by hard work and in the 1860 election for the staff of the Melbourne Hospital he again topped the poll. In 1862 the Medical

School in the University of Melbourne was opened and Thomas had the Doctorate of Medicine conferred on him. He became the first examiner in anatomy and set the first anatomy paper in 1862. In 1864 he limited his practice to surgery and became the first Specialist Surgeon to the Melbourne Hospital. In the same year he was elected President of the Medical Society of Victoria, to which he frequently contributed papers on surgical topics.

In the period 1862 until his death he wrote 45 papers, mainly on everyday surgery. In 1865 he wrote two papers on the value of chloroform: 'On a case of intestinal obstruction, treated by chloroform', and 'On dislocations of the hip of longstanding and the value of chloroform in such cases'. He introduced his long valedictory address on January 11, 1865 with his opinion on chloroform:

'The administration of chloroform as an anaesthetic agent, whether during the performance of some convulsive and spasmodic diseases, such as epilepsy and tetanus, has been one of the felicitous improvements made in modern times in the practice of Medicine and Surgery, and indeed, without the employment of this invaluable agent, many of the nicer and more difficult operations of surgery, such as resections of joints and many plastic operations, would be almost impossible. Although the use of chloroform has unfortunately been attended in certain instances with fatal results, and although the exact circumstances which conduce to those results have not yet been sufficiently ascertained, still the disadvantages attending the use of this anaesthetic are immeasurably counter-balanced by the suffering it has saved and by the improvement in surgery effected under its aid. Its introduction into the practice of our profession, therefore, may justly be considered one of the great boons which has been conferred upon the human race.'

In 1869 he was presented with a signed testimonial,⁴ beautifully illuminated on vellum 'expressive of the estimation in which he was held by the Society'. On July 1, 1871 while preparing to operate, he suffered a major stroke. He died intestate leaving a wife and four surviving daughters. His obituary⁵ in the *Australian Medical Journal* concluded:

'So died David John Thomas, a loyal Welshman, a cheerful impulsive warm hearted man, with a vivid sense of humour, a surgeon of note whose diagnoses were singularly accurate and whose system of treatment was distinguished by its simplicity. He was the first in our profession who stood out above his fellows - surely one of the founders of Victorian Medicine.'

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MR TROUTBECK AS THE SURGEON'S FRIEND

Dr D Zuck

Early audit

The idea of audit and of CEPOD, is not a new one to anaesthetists, since the founding fathers of our specialty, Snow, Robinson and Simpson, enquired into every death associated with anaesthesia which came to their notice. Virtually from the beginning, it had also been the practice to hold an inquest into such deaths. The first death that we know of, at Colchester, was the subject of a paper by Dr Casale at the Cambridge meeting of this Society, and no inquest was held on that; nor on the second but, following the third, which was at Grantham on 9 March 1847, an inquest was held, and when the surgeon complained in the medical press, John Snow replied roundly that it was his own fault.¹ Because he had attributed the death entirely to the new agent, ether, it was very natural that the relatives should ask for a legal investigation.

So a precedent had been set, and when Hannah Greener died after inhaling chloroform on 28 January 1848, an inquest was opened the following day, and the doctors almost appeared to welcome it,² and fortunately it continued so that in contrast to surgical mishaps, these deaths were recorded and investigated. At our Epsom meeting Dr Rollin gave an account of such a case where again the operator was exonerated, and chloroform carried the can.

As late as 1901 the Coroners' Society of England and Wales received this enquiry from one of its members: 'I have always been in doubt whether Inquests should be held in cases of operation. I should be glad if you will let me know whether you think shock following abdominal operation is a matter which ought to be inquired into or not'. And he mentioned a certificate in which the cause of death was given as cancer of the sigmoid flexure, intestinal obstruction, shock following abdominal operation. The Secretary of the Society, Mr A Braxton Hicks, a lawyer, was the Coroner for the South-Western District of London. His father was the well-known obstetrician and gynaecologist whose name is attached to the painless uterine contractions during pregnancy. Braxton-Hicks replied: 'The question of holding Inquests in deaths arising after, or out of, an operation has been discussed by the Society on several occasions. While some few took the view that an operation was an injury, so an Inquest should be held, it has been the general opinion for many years that it would be unwise to do so where the operation had been for the relief of disease. In the case of an operation following an injury, of course an Inquest must be held' and he continued: 'It may be in both these classes of cases an anaesthetic was administered and in such cases it has generally been held advisable to hold an Inquest'. He concluded: 'In cases like the one you mention it would greatly hamper medical men performing operations if they thought that in case of death an Inquest would be held. I think it is a wise plan not to hold Inquests in these cases, unless the relatives or friends of any person complain of the action of the medical men, or allege any negligence'.³ This attitude towards the

anaesthetic is understandable when we remember that then, as now, the law did not per se require anyone giving an anaesthetic to have any sort of qualification.

Appointment of a new Coroner

In May 1902 Mr Braxton Hicks, who appears to have held a very understanding, not to say cosy, relationship with the medical profession, died. His successor, Mr John Troutbeck, was a very different kettle of fish. He was born in Cumberland, the son of the Reverend Dr Troutbeck, Precentor of Westminster Abbey, and was brought up, and lived all his life, at 6A Dean's Yard, at the side of the Abbey. He was educated at Westminster School and Queen's College, Oxford. He qualified as a solicitor in 1884, and in 1888 he was appointed Coroner for the City and Liberty of Westminster by the Dean and Chapter, in whose gift this appointment was. This is not necessarily evidence of nepotism: he may have been the only applicant.

The law in relation to coroners was codified in the Coroners Act of 1887 and one section of it came to play a very important part in later events. This was the first paragraph of Section 21:

'Where it appears to the Coroner that the deceased was attended at his death or during his last illness by any legally qualified medical practitioner the Coroner may summon such practitioner as a Witness, but if it appears to the Coroner that the deceased person was not attended at his death or during his last illness by any legally qualified medical practitioner the Coroner may summon any legally qualified medical practitioner who is at the time in actual practice in or near the place where the death happened and any such medical witness as is summoned in pursuance of this section may be asked to give evidence as to how in his opinion the deceased came to his death.'

The next paragraph provided that the Coroner might direct any such Medical Witness to make a postmortem examination of the body.

In 1902 the London County Council appointed Mr Troutbeck, in addition, to the South-Western District, and he came there with a mission: '...to restore in the South-Western District the independence and authority of the Coroner...'. The Council put the tools into his hand, by laying down, among its requirements, that postmortem examinations must be entrusted to a skilled pathologist in all cases except where the coroner was satisfied that the medical man connected with the case was competent to make a trustworthy postmortem examination, and the Council gave a list of some dozen skilled pathologists from whom the coroners could choose. Mr Troutbeck, in contrast to his predecessor, concluded early on that none of the local practitioners were competent pathologists, and from the list he selected Dr Ludwig Freyberger to perform all his postmortem examinations. Dr Freyberger was an Austrian who graduated MD Vienna in 1889, and became an MRCP London in 1894.

In the Medical Directory of 1904 he is described also as a barrister of law of the Middle Temple, toxicologist, pathologist selected for London inquests, and honorary physician to St Pancras and the Northern Dispensary. He was a member of many medical societies, including the British Medical Association, and the author of many publications, both original and translations. Later he became a Justice of the Peace. He lived at 41 Regent's Park Road, NW London, and although this detail may seem insignificant, great play was subsequently made of it, as we shall see. How he came to be chosen by Mr Troutbeck is a mystery; it seems a most unlikely alliance.

Medical outrage

Within weeks, the practitioners in the South-Western District began to feel the effects of the new regime. Not only were they being deprived of postmortems, they were no longer being summoned to inquests. With postmortems at two guineas a time, and inquests at one guinea, these were quite considerable sums. Through their representative associations they complained, first to Troutbeck, and then to the London County Council, but without avail. So on 12 May 1903 a joint deputation of representatives of the British Medical Association, the South-West London Medical Society, the Medical Defence Union and the Capital and Counties Medical Protection Society, waited on the Lord Chancellor, the Earl of Halsbury.⁵ Lord Halsbury was at that time in his eightieth year, a pillar of the establishment, and a man of enormous influence. From the correspondence one sees that the doctors went very much cap in hand. The deputation was led by Sir Victor Horsley, at this time one of the leaders of the profession, a pioneer in neurosurgery, very active in the affairs of the British Medical Association, and noted for his abrasiveness. The complaint alleged that Mr Troutbeck, in a wide variety of instances, had departed from the usual and recognised procedure adopted by Coroners in that he dispensed with the evidence of the Medical Practitioner who had been in attendance at the time of death, restricted the medical evidence that was placed before the jury, and had 'introduced the somewhat novel plan of calling in outside medical testimony' in that he regularly called upon a Medical Practitioner who had no knowledge of the case to conduct the postmortem examination. The deputation recognised the requirements of the London County Council, but whereas Mr Braxton Hicks had never felt the need for outside assistance, Mr Troutbeck constantly did so, employing a Dr Freyberger, not known to any of the representative bodies as a pathologist, in some 65% of all inquests. Cases requiring special knowledge did occur, but not frequently; they constituted perhaps 1% of all inquests. As examples of what Mr Troutbeck regarded as special cases but the deputation did not, they quoted a judicial hanging in Wandsworth Gaol, and a man who had been killed by a train cutting off his head. Furthermore, Mr Troutbeck, during certain enquiries, had drawn a parallel between Dr Freyberger and the local medical men, not to the advantage of the latter. The coroner had no right to express an opinion on the qualifications of medical men. Horsley stated that in his opinion the evidence presented was sufficient to establish the charge that Mr Troutbeck had contravened the Coroners Act, by his disregard of Section 21. Further, he had contravened the Act in that he had in a large number of cases set aside the clinical evidence. Also he had gone so far as to state that general practitioners were not

trained in pathology and were not competent to perform pathological investigations in ordinary cases. This the British Medical Association strongly contested. Medical men were thoroughly trained in pathology, and in the vast majority of cases the medical man who had attended the patient was perfectly competent to perform the postmortem examination.

The Lord Chancellor, in his reply, said that he had listened to them, as was his duty, but he could express no opinion adverse to Mr Troutbeck until he had heard what he had to say. However, he could not agree that Section 21 of the Coroners Act had been contravened, since this was advisory rather than an absolute statutory requirement. Taking the examples that the deputation had advanced, it was absurd to say that the person who had last attended them should be called to the inquest of either a judicial hanging or a man who had been killed in a railway accident. These things must be left, as so many things must be left, to the person conducting the enquiry. As regards what the coroner had said about this or that medical man, it would hardly be appropriate for him to enquire into that, or to express an opinion until he knew the facts. It might be said that the medical men might have incurred the coroner's animadversions properly. In conclusion, he said that he agreed about the importance of the matter, and that 'he would make a communication to the coroner, and if the coroner gave him an explanation it should be conveyed to them. The deputation, hearing the words but not the message, thanked him and withdrew.

The Lord Chancellor wrote to Mr Troutbeck a week later asking for his comments on the British Medical Association's memorandum. Troutbeck replied at length a week after that, to the observations of what he called the two Medical Societies and the two Limited Liability Companies. He contradicted all their accusations, and particularly those of Sir Victor Horsley, and he submitted that the Lord Chancellor's approval of the deputation's demands would 'establish a peculiar and privileged position for a special class against the general interests of the community'. This reply was communicated by the Lord Chancellor's office to the British Medical Association without comment, on 3 June 1903, where it was received with outrage, and it was resolved to supply the Lord Chancellor with full details of all the cases proving the charges against Mr Troutbeck. This letter was sent on 27 July,⁶ and included a dossier of some fifty cases in which the Coroner was held to have transgressed the rules. Among these was one which kept cropping up as the dispute progressed. This was a child, alleged by the general practitioner to have died of measles, but because Freyberger had not seen the body until the rash had faded, was reported as a death from blood poisoning.

Additional documentary evidence was submitted on 17 May 1904; and on 1 July the British Medical Association wrote asking when they might expect a reply. On 25 July the Association wrote to the Prime Minister, Mr Balfour, setting out the case against Troutbeck and asking that the Lord Chancellor be requested to direct his attention to the matter. No reply was received to this, but on 29 July a letter was received from the Lord Chancellor's office stating that 'the Lord Chancellor had not found it possible to give time for a minute examination of all the facts and arguments' that had been

placed before him, and that while his present impression was not in favour of the coroner's practice, he did not think a case had been made for the exercise of the only jurisdiction that he possessed, which was to remove him from office for misconduct.⁷ More evidence was submitted on 5 January 1905, with a request for a judgement, and a further letter was sent to the Prime Minister on 6 March, to which no reply was received.⁸ At the Annual Representative Meeting on 26 July, with Sir Victor Horsley in the chair, a condemnatory resolution was passed *nem con*, and the following week, Troutbeck, the Lord Chancellor and the Prime Minister were strongly attacked in a long editorial in the *British Medical Journal*.⁹ This stimulated a flurry of correspondence, during which the proposal that the whole profession should vote to unseat the present government in the forthcoming election was countered by the question: when had the radicals ever done anything for the doctors? It had taken the profession two years to realise how monumental a brush-off it had been dealt.

The British Medical Association, frustrated, attacked on another front. As a ratepayer, it made an application to the Local Government Auditor, questioning the legality of certain payments made by the London County Council through Mr Troutbeck. The report of the enquiry, in the *British Medical Journal* ran to some 17 full pages.¹⁰ Both the British Medical Association and the London County Council were represented by barristers. Essentially, the British Medical Association's case was centred on Section 21 of the Coroners Act, and the argument was whether the local practitioners had the *right* to be called either to perform postmortem examinations or to give evidence at inquests in uncomplicated cases, in which case all the payments made to Dr Freyberger were illegal. Much harmless fun was had by all. As regards, for example, the man found decapitated on the South-Western Railway, Counsel for the British Medical Association submitted that from one's knowledge of English history, there was not much doubt, when a man was decapitated, as to the cause of death, so was it really necessary for Dr Freyberger to be brought down from Regent's Park Road to say that what this man died of was that his head was found on one side of the line and his body on the other? The case of measles was raised again. Then there was the question whether Dr Freyberger could in any way be described as being in actual practice near the place of death. Counsel for the London County Council submitted that insofar as he carried out postmortem examinations there, he could be so described, whereupon his adversary commented that if that was the case, all his patients, fortunately or unfortunately for them, were dead before he got there.

What was spurring the British Medical Association on will be seen from the figures submitted by its Counsel. During the year in question, £1,098 had been paid to Dr Freyberger, and including the previous ten months, a total of £1,767. Under such attacks by the Association of which he himself was a member, Dr Freyberger must have been crying all the way to the bank. In fact, during that year he had been able to move to a much more imposing residence near Regent's Park. The report of the somewhat bemused District Auditor was issued on 11 January 1906.¹¹ It expressed sympathy with those members of the profession affected by Mr Troutbeck's procedures, but had to conclude that the payments had to be allowed. Some six months later he issued a slightly longer statement giving his reasons for the conclusion

he had reached: the coroner had filled in the forms properly, so there was nothing he could do about it. After this setback, things fell quiet for almost three years.

An important inquest

We have seen that in 1901 the Coroner's Society had advised against holding an inquest where the surgery, not the anaesthetic, was thought to have accelerated the death; so Mr Troutbeck was breaking new ground when, on 3 June 1908, he held an inquest on a woman who had died in the Bolingbroke Hospital after an operation for the removal of a tumour from the brain. This inquest was reported in *The Times* the following day.¹² The surgeon, Sir Victor Horsley, had been called as a witness, and had said that the case was such an ordinary one that he could not understand why an inquest was being held. The Coroner had replied that owing to the advance of surgery, operations were much more frequent than they used to be, and since they were clearly to some extent a cause of the deaths that resulted, they came within the Coroners Act of 1887, which made inquests imperative in such cases. Sir Victor replied, somewhat unwisely, that if that were the case 10,000 inquests would have to be held every year.

In his address to the jury the Coroner said that it was the opinion of all coroners that if a death had been accelerated by an operation, it could not be said to be a natural death, and so came within the third section of the Coroners Act, which provided that an inquest must be held when death was due to causes either unnatural or violent. A death that had been accelerated by an operation could not possibly be said to be a natural death. He knew that many such deaths were never reported to the coroner, so they were in a state of complete ignorance as to what proportion of deaths were accelerated by surgical operations. He had learned that from the Bolingbroke Hospital alone 13 such deaths had occurred, and in 30 others there had been an operation in connection with the terminal illness. Whether those operations accelerated death one could not tell, but a serious condition of things stood revealed, and he did not intend to let the matter stand. It was important from the public point of view, and the coroner represented the public. They could not leave these things to any profession, however honoured or skilled. In the case under consideration, he directed that a verdict of 'Accidental death' would be a proper one if the jury were satisfied that the operation was justifiable and that all due care had been taken. Such a verdict was returned.

Two days later *The Times* carried a long letter from Horsley.¹³ It began by again questioning the grounds upon which the inquest had been held. The case was a perfectly simple one, and no manner of doubt existed as to the cause of death. But not only did Mr Troutbeck hold an inquest, and hold it in his special way, he had put forward in his address to the jury a claim for coroners' jurisdiction in general which, if universally carried into effect would put an end to the practices of medicine as well as surgery, besides involving the ratepayers in an enormous cost in coroners' fees and other expenses. Then there was the question whether Mr Troutbeck was competent to reach the vast and highly technical decision of whether the death had been accelerated by the medical practitioner in charge of the case. He repeated the accusation about the celebrated case of measles, and took a swipe at both the Lord

Chancellor and Dr Freyberger en passant; and he concluded by pointing out that the responsibilities that every operating surgeon has to bear at the present day are heavy enough: 'If to these is to be added the prospect that in every case which terminates in death the propriety of his technical methods will be publicly adjudicated upon by incompetent persons, his position will be an intolerable one!'

This was followed on by a letter from Dr D F Shearer, Hon Secretary of the South-West London Medical Society.¹⁴ This contained the startling information that between May 1903 and February 1905, whereas the other seven coroners in London had between all of them 46 cases requiring the attendance of a special pathologist, Mr Troutbeck had found it necessary to call Dr Freyberger 816 times. He went on to assert that Troutbeck's decision to hold this particular inquest could only be attributed to his specific animus against the medical profession. Year by year hundreds of death certificates had been registered in Mr Troutbeck's district in which an operation had been set down among the causes of death. Yet till he could attack Sir Victor Horsley, who took part in the agitation against him some years ago, Mr Troutbeck had let them pass. A reply from Mr Troutbeck was published in *The Times*¹⁵ on 10 June:

'Horsley's letter hardly merited serious notice except for certain mis-statements of fact, which might as well be corrected since they were misleading to the public. Horsley's description of the cause of death was incomplete. At the postmortem examination another cerebellar tumour, the size of a chestnut, had been found, the existence of which had not been suspected. It had not been removed, so the operation had been incomplete. Then various statements had been put into Troutbeck's mouth that he had not made; and in the death from measles, the facts were again wrongly stated. The death had been from erysipelas following infection of a vaccination. A medical man had been called in only after death, and had said that he could not certify as he had not attended the case. The so-called rash had not faded. The case had been investigated by the Local Government Board, who had come to the same conclusion as the jury. So much for personal matters. To come to the real point, if Sir Victor Horsley was right, that inquests on all deaths caused by operation would amount to 10,000 each year in London alone, then none of those deaths were being brought to the attention of the coroners. The objection to publicity in Horsley's letter was significant, but why should it exist? Was it because some operations would never be undertaken at all if there was a possibility that the surgeon would have to explain publicly why he had operated and why his patient had died? A Select Committee of the House of Commons had concluded that our system of death certification was so imperfect that we did not know what was happening: 'The power of dealing with other people's lives by means of surgical operations should not be allowed to continue uncontrolled and without some provision being made in the interests of the public. The people have a right to know the full cause of death in those cases where their relatives have had the misfortune to die after an operation!'

Two days later, *The Times* carried another letter from Horsley, and a long editorial attacking Mr Troutbeck and his practices.¹⁶ Horsley denied that a second tumour had been found. It had been a false capsule, purposely left behind at the operation, as he

had explained to Dr Freyberger. Later, on cutting it open, he had found that it contained blood clot. He wrote also about the expected quality of life of the patient: had she survived for some months without operation she would have been totally blind, vomiting, racked with headache and totally bedridden. The editorial leaned very heavily toward the stand taken by the British Medical Association. It commented on Horsley's latest letter, which contained the accusation that the decision to hold an inquest at the last moment had caused the funeral to be postponed, inflicting great pain and inconvenience on the relatives. It noted that at the inquest Mr Troutbeck stated that he had been informed that the operation had been the cause of death, but he had neither named nor called his informant. The relatives had not been dissatisfied and had not communicated with the coroner. Neither had he called the private practitioner who had attended the patient during the last three years of her life; and the evidence of the pathologist appeared to have been immaterial to the verdict. 'Now,' it thundered, 'we have no hesitation in saying that this sort of thing will never do. It is intolerable, and justly intolerable, to the whole medical profession.' It continued that it might be that our system of death certification was imperfect, but if so, then Mr Troutbeck did not seem to be going the right way to improve it. His peculiar mode of operating cast a most unworthy slur on the whole medical profession. Surely it was high time for the Lord Chancellor to intervene.

As might be expected, that week's *British Medical Journal* carried another long editorial, going over the whole ground again.¹⁷ Troutbeck replied briefly, in *The Times* on 13 June, to its editorial. He regretted that matters of purely public policy could not be discussed without the personal bias shown in the leading article and correspondence. It should be apparent to anyone of ordinary commonsense that if an inquest was to be of any use it must be an independent inquiry, and the sole object of the procedure to which such exception was taken was to render it independent. The idea that there was any intention to cast a slur on the medical profession was ridiculous; on several occasions he had held an inquest in order to protect a doctor against unjust and unreasonable complaint. In this case the informant had been the Registrar of Deaths. The medical superintendent of the hospital had supplied particulars; he had been summoned as a witness but did not attend. The name of the general practitioner was not given to him until he was in court. He did not propose to comment on continued mis-statements originally made in 1903 and repeated in other letters. He had refuted them all in his letter to the Lord Chancellor.

A final tilt

Apart from two further editorials in the next issues of the *British Medical Journal*,¹⁸ there the matter rested, until the following year, when a leading article in the *Journal*¹⁹ took its last tilt at Mr Troutbeck. This was occasioned by two inquests held by him in March 1909. One was on a patient who died shortly after operation by Ian Sampson Handley for cancer of the bladder. The second case was a child extremely ill with peritonitis. As there was just a possibility of saving his life, the surgeon, Mr Swainson, had operated. A 12" length of gangrenous bowel was found, and the child died soon after. The *British Medical Journal* began with a survey of Mr Troutbeck's practices

and pronouncements to date, all of which were not unnaturally taken to show that Mr Troutbeck, for some unknown reason, had thought fit to take up an attitude of hostility, or at least of malevolent neutrality, in regard to the profession. 'But,' it continued with heavy sarcasm, 'it appears that we have been mistaken, and that the coroner for the South-West District is in reality the doctor's friend, and in particular is anxious to shield the operating surgeon from blame, and to vindicate his ways to men through the medium of the enlightened juries whom he directs.' What had Mr Troutbeck done to merit this encomium? Well, he had been pleased to express the opinion that there could be no doubt that Mr Handley had been justified in undertaking the operation in the circumstances; and in the second case also, Mr Troutbeck had come forward as the surgeon's friend, and had decided that the operation was fully justified; and in both cases the jury had obediently returned a verdict of 'Accidental Death'.

The coroner had said that these inquiries were primarily for the benefit of the public, but had been good enough to add that they were perhaps of even greater benefit to the operators, who were given this opportunity of showing that they had taken the right course. It should be a great satisfaction to them to hear a jury express approval of their efforts at a public enquiry. Whether Mr Troutbeck had his tongue in his cheek is anyone's guess, but the writer of the Editorial certainly had, for he now expressed the fear that the profession may have misconceived Mr Troutbeck's friendly intentions; indeed, it would seem that he had been wholly misjudged. The profession had not suspected that Mr Troutbeck was a humorist. What had been taken for the insolence of office was humour. The idea that a leading surgeon should be gratified by the approval of his work expressed by a coroner's jury was truly comic. Now that Mr Troutbeck was understood, it could be seen that the absolution gratuitously bestowed by him upon surgeons who had done their best in almost hopeless circumstances was not impertinence but friendly fun. However, it went on, Mr Troutbeck was not happy in his choice of occasions for his jokes, and surgeons might well pray to be saved from so over-zealous a friend. No surgeon would care to submit his highly skilled workmanship to the judgement of men utterly incompetent to form an opinion of value. It continued by warning of the danger of what we would today call defensive surgery, and concluded by proposing that only men with a medical as well as a legal training should be appointed to the office of coroner. As regards Mr Troutbeck, the profession would rather have him as an open enemy than as a friend in disguise.

Conclusion

There was another side to Mr Troutbeck. He was much involved in charitable work, like all members of his family he had a deep interest in church music, and at the coronation of George V in 1911 he was one of the viola players in the orchestra. But the profession got him in the end. He developed acute appendicitis, was operated on, made satisfactory progress for a few days, suffered a relapse and died on 29 February 1912. No inquest was held. The effect of Troutbeck's death on Dr Freyberger was devastating, to the extent that, within a week, he had to remake his will, revoking a number of bequests. He now only hoped to be able to provide for his wife, 'owing' he

said, 'to the unfortunate turn which my affairs have taken since the death of the late Coroner, John Troutbeck, whom I deeply mourn ...' When he died, at the age of 69, on 22 August 1934, his estate was valued at nil.

This story illuminates a number of attitudes and aspects of practice in Edwardian times, social, economic, medico-legal, and medico-political. It demonstrates the lay attitude to anaesthesia and surgery, delineates the pecking order within the profession and provides an example of the impotence of doctors when in conflict with lawyers and politicians. The inquest held on Horsley's patient in June 1908 was of very great significance. It marked the end of the autonomy of the surgeon, and the beginning of public accountability.

How do we view Mr Troutbeck today? Is he the hero or the villain of the story? In the Beverly Allitt case, according to a newspaper report,²⁰ if at the first inquest the Grantham coroner had ordered a postmortem examination by a paediatric pathologist, she might never have got beyond her first victim. Certainly Troutbeck blazed a new trail. While he must have been a very awkward customer to deal with, and appears, by his employment of his 'own' pathologist, and latterly his insistence on removing the body to the public mortuary, to have been the originator of the system that we still occasionally grumble about, we are nowadays not unhappy to see the possible surgical contribution to a death being questioned, nor do we take umbrage when commended for our efforts by a coroner's jury.

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*I am indebted to Dr John Burton, Hon. Secretary of the Society and HM Coroner for the Western Division of Greater London for this information.

CHLOROFORM: THE DARK SIDE

Dr J W R McIntyre

Ether, halothane and chloroform have each been occasionally used for criminal purposes such as robbery, abduction and sexual assault. The purpose here is to focus on chloroform and document the increasing number of police procedures that complicate the task of expert medico-legal witnesses whether they support the defence or the prosecution.

John Snow's opinion

During 1850 several assaults were reported, the most notorious being that on an elderly clergyman in Kendal.^{1,2} The conclusions sometimes stimulated strong objections from John Snow³ who based his denial that chloroform played a significant role in those cases on pharmacokinetics and his clinical experience. Objections were presented lucidly in 1851 to the Right Honourable Lord Campbell, Lord Chief Justice of the Queen's Bench, regarding the mention of chloroform in a clause of the Proposed Prevention of Offences Bill. Dr Snow's letter not only demanded accurate reporting and logical reasoning but expressed concern that the specific mention of chloroform in the act would bias the general public against the clinical use of the drug, and encourage its use by criminals. A later reviewer believed chloroform so ineffectual when compared with bludgeon, pistol or knife, that the general public would be safer if criminals were indeed encouraged to use it.⁴ Lord Campbell rejected Snow's request and mention of chloroform remained.⁵ Some derogatory comments have appeared in Lord Campbell's biographies^{6,7} but these were directed at his personality and his reputation as an author:

'.... His were simply the defects of a man of pushing character whose eagerness to succeed made itself too plainly felt. But whatever difference of opinion there may be as to the spirit in which he served his country, there is none as to the value of the services themselves. As a legislator and a judge he left a name which can never be passed over when the history of our law is written.'

Thus it is likely that the basis of his opinions were as valid as those of Dr Snow. Whatever the relative strength of their positions, chloroform may be used to conveniently and temporarily immobilise subjects for detailed search or for transport to some other location. The drug is readily available; it is used in hospitals, laboratories and industrially in North America and central Europe, where it is also put to criminal use, and is employed in old fashioned techniques of heroin preparation in Hongkong, where it is also put to other undesirable uses.

Questions

The pharmacokinetics of chloroform have been a central issue when predicting how long a safe induction must take if the victim is to remain unconscious for a specified period of time in the absence of maintenance dosage. What length of time dare assailants spend in the victim's vicinity? The possibility that chloroform unconsciousness can be induced surreptitiously without awakening a sleeping subject has been addressed several times in the courts.

Perhaps the most dramatic was in 1880 when the wife of a policeman claimed that while asleep in bed she had been chloroformed, during which time her husband in bed beside her had been murdered.⁸ Another much different case in 1900⁹ merits reading because it includes an elaborate tirade against expert witnesses, their failure to agree with one another or to be comprehended by lay persons. The recommendation that such cases 'should be debated by medical witnesses before an impartial board of properly qualified medical men so that the argument could be academic in character' is as valid now as it was deemed then. Since the last century pharmacokinetics and the possibility that sleeping persons could be chloroformed have remained significant factors, but another issue is the assailant's knowledge of the hazards of chloroform: aspiration, ventricular fibrillation and vagal arrest. This has been particularly important when chloroform has been allegedly used to promote an assailant's sexual interests with the subject dying at that time.

New practices

There are two other aspects of chloroform pharmacology that newer police practices have brought to the court room. One is urine production. Would a person allegedly unconscious from chloroform for 3 - 4 hours void an abnormally large volume of urine on recovery?⁹ If, under the influence of chloroform, a large volume of urine was in the subject's bladder, would urinary overflow occur? The second aspect stems from the automatic recording of all emergency communications to the police. Does the voice of a person recovering from the influence of chloroform have particular characteristics identifiable subjectively or by computer analysis?⁹ Such information may be crucial.

In conclusion, chloroform has been used more convincingly for criminal purposes than it was during Dr Snow's time. Even physicians have attempted it, with sometimes disastrous results. Expert witnesses can expect an increasing number of difficult questions that must be answered in a manner comprehensible to attorneys and juries alike.

At least one new avenue of anaesthesia research has been indicated - speech analysis under the influence of inhalational anaesthetic agents.

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LLANGOLLEN - GATEWAY TO SNOWDONIA

E Rothwell Hughes

Reflections of 18th Century Travellers

'From the elegant and beautiful scenes of Valley Crucis I wandered into the dirty, ill-built and disagreeable town of Llangollen. The streets are narrow and all the houses are built of the dark shaly stone so common in North Wales. The situation of the place is, however, truly delightful to the admirer of nature; it stands on rocks that overlook the river Dee and is surrounded by high and bold mountains.'

So wrote the Rev W Bingley when he visited the Vale of Llangollen in 1798. By the end of the eighteenth century romantically minded travellers were beginning to discover the 'Alpine Tracts of Brittainia' and as they set out in search of the picturesque, from Bath in the south or Shrewsbury and Chester in the north, they all eventually arrived in the Vale of Llangollen. The Rev J Evans noted in 1800:

'The town is small on the southern bank of the river Dee and has nothing to boast of, save a good parish church, dedicated to St Collen, an Irish saint of eight descents from Mathwalch, Lord of Curl in Ireland, who lies buried here; and a well endowed free school. The houses are meanly built and the streets narrow and without pavement. But Llangollen derives its consequence from the celebrity of its vale, the beauties of its surrounding scenery and the interesting objects of antiquity in the vicinity.'²

The famous Welsh topographer, Thomas Pennant, described in the mid-nineteenth century by William Catherall as 'the Father of Cambrian Tourists' wrote of Llangollen in his *Tour of Wales* (1778-1783):

'I know of no place in North Wales where the refined lover of picturesque scenes, the sentimental, or the romantic, can give fuller indulgence to his inclination. No place abounds more with various rides or solemn walks.'³

The population of Llangollen in 1801 amounted to only 1,287 inhabitants. It contained 289 houses and its appearance daunted even the author of the famous *Cambrian Travellers Guide*: 'Llangollen is an ill-looking and measly built market town forming a wretched contrast to the scenery which surrounds it.'⁴ However, some 1800 years earlier the Celts had built another centre of population on the hill which in medieval times had a castle built upon it. Castell Dinas Bran dominates the present town and commands fine views of the valley of the river Dee in both directions, and also of the limestone escarpment of the Eglwyseg rocks. The ramparts of the celtic fort can clearly be seen from the air and their outline traced on the ground. The very name 'Bran' may be a reference and a folk-memory of the mythical celtic giant or god who is referred to in the ancient Welsh saga known as the Mabinogi. It is likely that celtic houses were built by the river, for tradition has it that the early Christian, St Collen, established his cell during the seventh century so that he could convert the pagan celts to Christianity. A folk-tale

attributes the defeat of a giantess called Cawres y Bwlch (Giantess of the Mountain Pass - possibly the Horseshoe Pass) at a place called today Bwlch Rhiwfelen to the sword of Collen. The giantess was taken to represent the forces of evil and paganism.

During the early middle ages the Anglo-Saxons penetrated into the Vale of Llangollen. An ancient stone now known as the Pillar of Eliseg or Elise stands on a small knoll close by the later Cistercian Abbey of Valle Crucis. On it are the remains of a long inscription in Latin recording the ancient glories of the royal house of Powys against the Anglo-Saxons. Due to weathering the inscription can no longer be read but, fortunately, it was recorded in 1696 by Edward Lhuyd, the celtic scholar and lexicographer. It reads:

'Cyngen, son of Cadell, Cadell the son of Brochwel, Brochwel the son of Elise, Elise son of Gwylog. Cyngen, therefore, the great-grandson of Elise, erected this stone in honour of his great-grandfather Elise. It was Elise who united the inheritance of Powys (laid waste for nine years) from the hand of the English with fire and sword.'

The opening pedigree records the kings of Powys in the 8th and 9th century. Cyngen, who lived to an old age, died on pilgrimage to Rome in 854. Elise, the great-grandfather of Cyngen would have reigned in the middle of the third quarter of the 8th century; he was therefore a contemporary of Offa, King of Mercia (757-796), the ruler who erected Offa's dyke which divided Mercian territory from Welsh lands. This dyke can be seen crossing fields close to Chirk Castle and passes just west of Ruabon. On the death of Cyngen the land of Powys passed to his nephew Rhodri the Great of Gwynedd, and the lands around Llangollen were ruled by successive Welsh princes. By the 1230's, Dinas Bran had become the site of a Welsh castle probably built by Madoc ap Gruffydd of Powys and it is the ruins of this castle that dominates the hill above the town today. Madoc came from a distinguished family, his father being lord of Bromfield and Ial, and his grandfather Prince of North Wales. Madoc was the ruler of northern Powys and when Cistercian monks made their way from Strata Marcella Abbey near Welshpool to Llangollen in 1200 Madoc gave them land and founded the Abbey of Valle Crucis, close by the site of Eliseg's pillar (hence the name 'the Valley of the Cross') on 28 January 1201. It became the fourth wealthiest Cistercian house in Wales. On his death in 1236 Madoc was buried in the abbey church. Throughout the middle ages Valle Crucis was an important centre for learning and religion but it was dissolved by Henry VIII. The Rev J Evans waxed in a purple passage in 1798:

'The situation of Valle-Crucis Abbey, in this reclusive vale surrounded by lofty hills, and secluded from the world's rude gaze by thick woods, peculiarly fitted it for meditation and prayer. In the deep repose of this secluded spot not a sound was to be heard that could disturb the solemnity such scenes were calculated to inspire. The mouldering walls, loudly bespeaking the frailties of all earthly things and the sun bursting from behind a cloud and breaking through the time-worn crevices of the building, threw a tint of melancholy light and the consideration that it was holy ground, all tended to heighten the energy of thought.'

Sadly, a nearby caravan site now mars the landscape but on quiet days the scene has changed little. The church of Llangollen was granted to the Abbey of Valle Crucis and, although the church was enlarged in 1883 - its wooden tower replaced by the present stone tower - it still retains its 15th century oak roof. This hammer-beamed roof with its rich and varied designs of traceried bands and foliations is probably the finest in North Wales.

In 1277 Edward I declared war against Prince Llywelyn (the Last) and the castle of Dinas Bran fell into English hands and was given by the King to Earl Warenne. He found the badly damaged castle inaccessible and its military siting unpractical, and so settled some time before 1311 at Holt beside the Dee; Dinas Bran fell into disuse as a military stronghold. By 1390 the house of Tudor Trevor held the castle. From 1400 to around 1411 North Wales suffered hardship under the usurper Henry IV (Henry Bolingbroke) and the Welsh rose in revolt under their leader Owen Glyndwr. Owen had his seat of residence at nearby Glyndyfrdwy and over the Berwyn hills at Sycharth. Between Glyndyfrdwy and Llangollen, close to the road, we can still see the remains of his castle motte. It was here that the young Prince Hal (later Henry V of Agincourt fame) came and set fire to Owen's residences in the early 1400's. The revolt died down and Owen died in Herefordshire around 1415.

During the Tudor period the Welsh lords of the neighbourhood sought to improve their status and families such as the Trevors, the Wynns of Wynnstay, near Ruabon, and the Middletons of nearby Chirk castle established their hold over the area. During the Civil War, Sir Thomas Middleton reinforced his home - the Edwardian castle of Chirck - and as a supporter of Cromwell became Sergeant Major General of the Parliamentary forces for North Wales. The castle was seized and held by the Royalists when Sir Thomas was away fighting. Although the whole area saw active fighting during the Civil War there is little evidence to show that Llangollen suffered at the hands of either side. By 1648 Sir Thomas had begun to lose faith in Cromwell and in 1659 declared for Charles II. On the King's restoration he was awarded £30,000 for the repair of Chirk. This castle, only a few miles from Llangollen, is still lived in by Sir Thomas' descendants but it is now under the care of the National Trust.

Throughout the 17th and 18th centuries the landed gentry continued to add to their estates. Wynnstay became the seat of Sir Watkin Williams Wynn and this family continued to support the Welsh poets and harpists. Nearby Erddig was built by Joshua Edisbury between 1684 and 1687 but on his bankruptcy it was purchased in 1716 by John Mellor, a prosperous London lawyer. On Mellor's death it passed to his nephew Simon Yorke and the Yorkes continued to live at Erddig until 1973 when the last squire, Simon Yorke, gave the property to the National Trust. Erddig and its furnishings remain largely unchanged since the mid 18th century.

Industrial Revolution

All these families needed to reinforce their revenues and it is not surprising to see evidence of their support for the early entrepreneurs of mass production. At nearby Bersham and Brymbo, John Wilkinson had established his iron works. The 7-years war gave Wilkinson the opportunity to produce cannon, shells and pipes and he soon began to venture into lead mining. Mathew Boulton and James Watt produced their second patent for making steam engines in 1775 and for 20 years all but three or four of the engines supplied by Boulton and Watt had their cylinders made at Wilkinson's works. Coal at Wrexham ensured continued success of the iron industry at Brymbo and Ruabon. At Llangollen there had long been trade in Welsh woollens and in 1820 a cotton factory was set up. All these industrial developments required improved communications and it was not long before a canal was planned to link the river Mersey with the Dee at Chester and with the Severn at Shrewsbury. Unfortunately, this canal would miss the industrial areas of Wrexham and Ruabon and so it was proposed to build a branch canal 18 miles long through Ruabon and then along the northern slopes of the Vale of Llangollen to the Irenant Slate Quarries at Valley Crucis. The Act for the Ellesmere Canal received the Royal Assent on 30 April 1793 and in September Thomas Telford was appointed as 'General Agent, Surveyor, Engineer, Architect and Overlooker' of the canal. His masterpiece, the Pont Cysyllte Aqueduct, together with the smaller but still impressive Chirk aqueduct, is still in use some 200 years later. The aqueduct of nineteen spans and a total length of 1,007 ft with an approach embankment reaching a height of 97 ft above the bed of the river Dee was by far the greatest earthwork and ironwork raised in Britain at that time; barges still ply the route today and one is still impressed by Telford's achievement.

It was Telford, too, before the age of railways, who surveyed between September 1815 and March 1817 the whole route of the coach road from London to Holyhead, via Shrewsbury and Llangollen. Since the 1780's Llangollen had become an important staging post for the mail and stage coaches on their way through the mountains of Snowdonia. Up to the time of Telford the journey from London to Holyhead took 48 hours. Telford's magnificent road (followed generally by the A5 today) has a maximum gradient of 1 in 20. The section between Llangollen and Betws-y-Coed still bears witness to his brilliant engineering skills with its embankments, terraces, cuttings and, for mail coaches, its gentle sweeping curves. The mail coaches improved their average speed to 14 miles per hour, changed horses every 11 miles and with the completion of the Menai Bridge in January 1826, the journey time was reduced to 26 hours and 55 minutes. Just outside Llangollen we can still see one or two of Telford's toll houses, and his beautiful cast-iron mile plates set into their mile stones can be seen by the observant traveller.

Llangollen became popular with the visitor and the Hand Inn was established as an important place of accommodation. It was mentioned by all the writers of guide books of the late 18th and early 19th centuries. The Rev W Bingley wrote in 1804:

"The Hand is the only tolerably good inn in Llangollen, but in summer I have more

than once found it very unpleasant from the crowd of travellers that are constantly passing on the great roads to and from Ireland, and from the number of Welsh tourists who visit Llangollen. I never yet heard anyone say that he received either civility or good accommodation at this house. I have often heard, and I have experienced the contrary.'

The Reverend J Evans was not so harsh on the Hand or the Union Inn:

'We met with excellent accommodations but the charges were extravagantly high. This did not appear unreasonable when we learned that mutton was 6d per pound, beef 8d, veal 9d, chickens 3s and 3s6d per couple and every other article proportionately dear.'

More recent tourists

Along the Holyhead road there came in 1780 two lady friends from Ireland. Lady Eleanor Butler and Miss Sarah Ponsonby had resolved to live together in 'harmonious love' and after many adventures and attempts to escape from their clutching families in Ireland, they arrived in Llangollen. They set up home at Plas Newydd and lived together in a romantic setting for over 50 years. Today this partnership would no doubt be interpreted as a perfect lesbian relationship but to the many contemporary visitors who paid their respects at Plas Newydd their relationship aroused a mixture of curiosity and admiration. Many of the famous of their time - Southey, Byron, Castleragh, Wellington, Prince Esterhazy, Lord Ormonde, Sir Walter Scott and other notables visited the ladies and admired their way of life. Plas Newydd was seen as an idyllic setting for the lifestyle of the ladies who, in the words of a visitor at the time 'had the courage to retire, when in the meridian of youth and beauty, from the flowery but fatal paths of fashionable dissipation, and to dwell with virtue, innocence and peace in the retired shades of Llangollen'. With their deaths in 1830/31 their images became a source of early Victorian tourist mementos and the Ladies of Llangollen were associated with summer holidays by the many visitors who came in the late 19th and early 20th centuries.

Today, Llangollen is famous for its International Musical Eisteddfod inaugurated in 1947. The town is now an excellent centre for leisure and cultural activities. It is remarkable that one can still walk over the 14th century bridge, take a canal boat, experience the calming atmosphere of Valle Crucis and view scenery all largely unchanged from the days of the early tourist to Llangollen over 200 years ago.

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JOHN B STETSON 1927-1993 - AN APPRECIATION

John B Stetson, academic anaesthesiologist and medical historian died suddenly and unexpectedly at his home in Greencastle, Indiana in April 1993. He was Emeritus Professor of Anesthesiology at Rush Medical College, Chicago, Illinois and, latterly, since his retirement from active practice in 1988, had held the honorary appointment of Visiting Professor at Purdue University, Indiana.

John was born in Chicago but was educated at Harvard and was by nature the type of sophisticated New Englander who, despite the origins of the American Revolution in Boston, feel a close cultural affinity with the British. He was an anglophile who made frequent visits to the United Kingdom, where he had distant cousins. He was an Overseas Fellow of the Royal Society of Medicine and a member of the History of Anaesthesia Society; in fact, his death occurred only a short time after his return to the United States from London, where he had attended the joint meeting of these two Societies in March 1993 - a meeting which he had greatly enjoyed.

John Stetson's career as an academic anaesthesiologist and clinical pharmacologist was productive, but it was also peripatetic even for an American! He always seemed to be searching for the ideal appointment which would give him complete freedom to express his intellectual and clinical independence and, not unnaturally, this trait did not always endear him to the heads of the departments which he joined; in his time, amongst several others, he held appointments at the Boston Children's Hospital and Universities in Michigan, Ohio, Indiana, New York State and Chicago, as well as at least two posts with pharmaceutical companies and one in Haiti! He was, by inclination, a paediatric anaesthetist, but he will be best remembered for his work on prolonged tracheal intubation in the early days of the development of intensive care.^{1,2} His animal and clinical investigations, in association with Professor Wallace L Guess of the University of Texas, established that the stannous polymers, which were employed to stabilise the earlier plastics used for the manufacture of endotracheal and tracheostomy tubes, played a major part in producing the local tissue toxicity which later resulted in tracheal stenosis.³ This work was an important factor leading to the establishment of international standards for plastics used in medicine. Later, when ethylene oxide was becoming established as a method of sterilisation, he demonstrated the importance of allowing the potentially tissue-toxic gas absorbed in the plastic to evaporate before use.⁴

Stetson edited and contributed to several monographs in the *International Anesthesiology Clinics* series and wrote on the use of hypothermia in surgery and intensive care.⁵ British anaesthetists will also be interested in his modification of the EMO vaporiser with a Teflon rotor instead of the customary metal part; this was designed to prevent the difficulty of 'freezing' of the rotor if the apparatus is only used infrequently.⁶ If this modification had been adopted on production models considerable frustration might have been avoided, particularly in developing countries!

John had a career-long interest in the history of anaesthesia as befitted one who had his early medical education at the Massachusetts General Hospital. One of his first papers on the subject published in 1959, discussed early reports on resuscitation under anaesthesia.⁷ He had an enviable collection of books on anaesthetic history and played a leading role in the quickening interest in the subject during the last two decades. Stetson also made several important communications to both the Second International Symposium on the History of Anaesthesia in London in 1987⁸ and the Third International Symposium in Atlanta, Georgia in 1992.⁹ One of the 1992 papers was particularly fascinating. It elucidated the contribution of the rather shadowy figure of William E Clarke of Rochester, New York, who administered ether for a dental extraction in January 1842.¹⁰ This was before Crawford Long in Georgia (March 1842) or the seminal demonstration of William Morton in Boston (October 1846), and long before Horace Wells of Hartford, Connecticut used nitrous oxide for the same purpose (December 1844). Stetson's historical research was always meticulous and he clearly indicated where surmise and coincidence could be used to fill gaps in the narrative.

Stetson had a pointed and occasionally bawdy sense of humour, his political opinions were distinctly right wing and he expressed his views on any subject with a directness which was disconcerting at times. There was, however, little malice in his pronouncements. He was a member of many organisations. These included several degrees of Masons, the Elks Order, the American Legion (he had served in the US Navy as an enlisted man) and the National Rifle Association; in the latter connection he had a formidable collection of historic guns.

I first met John in 1956 when we were both instructors in the nascent Department of Anesthesia at the University of Michigan Hospital in Ann Arbor. He helped me to adapt to my new and unfamiliar surroundings, I admired his grasp of the then recent developments in the field of anaesthesia, and my wife and I enjoyed his generous hospitality and that of his first wife Dorothy. We remained friendly with both of them through the next four decades and, although they lived apart, we sensed with pleasure a reawakened understanding between them.

T B Boulton

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BOOK REVIEW

HAROLD GRIFFITH. THE EVOLUTION OF MODERN ANAESTHESIA

Richard Bodman & Deidre Gillies

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Harold Randall Griffith (1894-1985) is well-known to most anaesthetists as the Canadian pioneer who, with his associate G Enid Johnson, introduced curare into modern clinical practice in a brief but classical paper (*Anesthesiology* 1942; 3:418-420). The authors of this biography are, however, fully justified in using the sub-title '*The evolution of modern anaesthesia*' not only because of this dramatic event, which was only one of his major contributions to scientific anaesthesia, but also because Harold Griffith's active clinical career of nearly fifty years, starting in 1914, covered a period in which anaesthesia in Canada progressed from a menial task delegated to any qualified doctor, a medical student, a nurse or even a theatre orderly, to the status of an important medical specialty.

Bodman and Gillies relate the exciting story of Griffith's own career as it mirrors the development of his beloved specialty in clear and well documented prose. Griffith gave his first open chloroform anaesthetic as a pre-clinical medical student enlisted as a stretcher bearer in the Canadian Expeditionary Force in France in the Great War of 1914-1918. He won the Military Medal for gallantry during the carnage of the capture of Vimy Ridge by the Canadians and then transferred to the Royal Navy as an unqualified probationer Surgeon Sub- Lieutenant on a torpedo-boat destroyer. Harold Griffith was demobilised in 1918. He wrote his first paper on anaesthesia as a student and qualified in orthodox medicine at McGill in 1922 and as an MD in homeopathic medicine in Philadelphia in 1923. He then joined his father in general practice in Montreal and became the Honorary Anaesthetist to the Homeopathic Hospital of which his father was Honorary Medical Superintendent. Harold succeeded his father in this position in 1936 and his brother James became Surgeon in Chief in 1937. He continued as Honorary Medical Superintendent and Chief of Anaesthesia at the Homeopathic (later the

Queen Elizabeth) Hospital until his retirement in 1965, even after he joined Wesley Bourne's staff at McGill University in 1947. He became Chairman of the Department of Anaesthesia of that Institution in 1950, and the first Professor at McGill in 1954.

There is no doubt, reading between the lines, that Harold Griffith's appointment and family connection at the Homeopathic Hospital in Montreal gave him an independence denied to many physician anaesthetists in North America in the years before the Second World War. This enabled him to innovate without prejudicial surgical intervention and he was, *inter alia*, an early user of ethylene, endotracheal intubation, cyclopropane and controlled ventilation and, finally, he was bold enough to try the use of curare (Intocostrin) at the request of Lewis H Wright, the Medical Director of E R Squibb, after others had rejected it as too dangerous. It is interesting, however, that despite his experience with controlled respiration during cyclopropane anaesthesia, Griffith at first regarded curare as an adjuvant which could safely be employed to produce somatic muscular relaxation during spontaneous respiration.

Harold Griffith was quickly recognised by, and formed close friendships with, the relatively few dedicated specialist anaesthetists in North America in the thirties. He became a member of the famous pioneer Anaesthetists' Travel Club which included Lundy, Waters and Bourne, and he played a leading part in the establishment of various American and Canadian Societies of Anaesthesia. He was in a unique position by the nineteen fifties, with his fame as the introducer of curare and his North American, British and European connections, to be one of the principal architects of the foundation of the World Federation of Societies of Anaesthesiologists (W F S A) in 1955, and he was elected its first President.

Professor Griffith is a much honoured and respected giant in the story of the development of the specialty of anaesthesia but, as Professor Sir Gordon Robson has written in his erudite foreword to the present well-written and delightfully illustrated volume: 'Dr Harold was loved by all and for very good reason. He was known and feted all over the world, but he met the adulation with humility and remained entirely his own man'.

T B Boulton