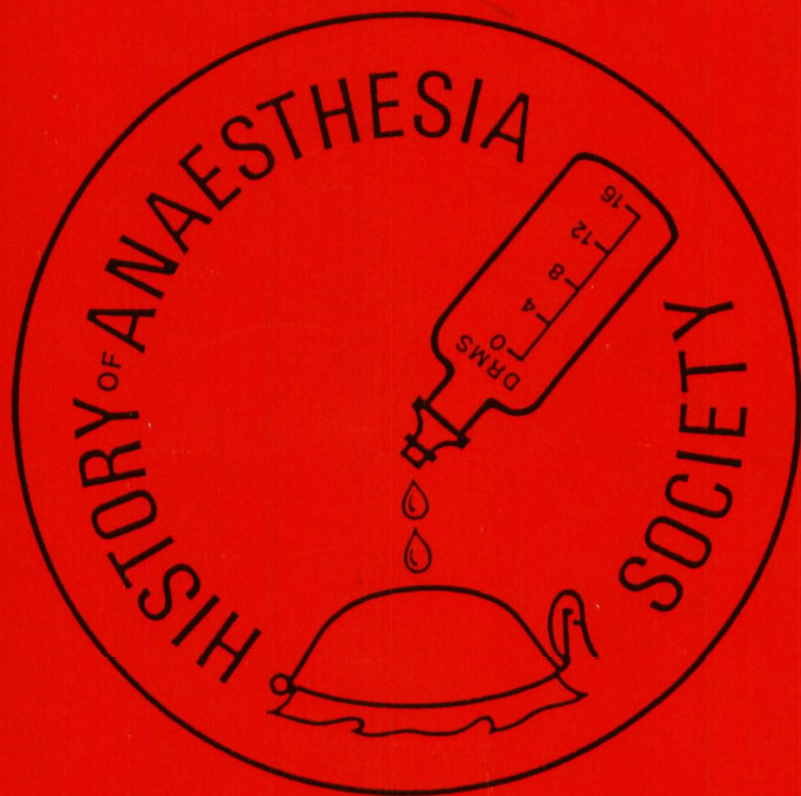


ISSN 1360-6891

THE HISTORY OF
ANAESTHESIA SOCIETY
PROCEEDINGS



Volume 34

Proceedings of the Summer Scientific Meeting
Netherwood Hotel, Grange-over-Sands
2nd and 3rd July 2004

Volume 34 - Contents

	Page
Grange-over-Sands Meeting Acknowledgements	3
Council Officers, Honorary Members	4
Editorial and Future Meetings	5
Grange-over-Sands Meeting - Speakers' photographs	6-7
Members and guests attending	8
 <u>Papers given at the Grange-over-Sands Meeting</u>	
Prof Sir Keith Sykes Fifty years ago	9
Dr M Harper The Importance of Looking at the Original Paper	16
Prof J P Payne A Queer Affair	25
Prof W T W Potts (Guest Lecture) Sir Richard Owen	28
Dr A Smith An American Tale: Professional Conflicts in Anesthesia in the United States	35
Dr M Shaffer and Dr C N Adams Nil by Mouth – A Brief History of Preoperative Feeding and Fasting	39
Dr D Counsell The Origins of Opium (Abstract only)	47
Dr D Zuck William Hooper (1818-1878) and the Early Weeks of Anaesthesia in Great Britain	48
Dr H Connor Crawford W Long - Still an Enigma	61
Dr A Florence A Surgeon's Impression of Anaesthesia - Chloroform and Ether	69
Dr J Zorab The Remarkable Case of the Execution of Anne Green	74

Dr A Padfield	
The Training Wot I Got (Academically, Not a Lot)	79
Dr D Martin and Dr D Bacon	
The early Mayo experience in pain medicine	84
Dr D Bacon	
The Anesthetists' Travel Club - Founding Organisation of American Anesthesiology	87
Mr Cedric Robinson (Guest Lecture)	
The History of Morecambe Bay	95
Dr T B Boulton	
Citation for Professor Doreen M E Vermuelen-Cranch	96

Book and TV Reviews

For Fear of Pain – British Surgery 1790 – 1850. Peter Stanley. Rodolpi, (Clio Medica 70, Wellcome Series in the History of Medicine), 2003.	100
The History of Anaesthesia. Scream - Channel 4 Television Documentary, July 2004.	
The Dressing Station – A Surgeon's Odyssey. Jonathon Kaplan. London, Picador, 2001.	
World Federation of Societies of Anaesthesiologists – 50 Years. Guito A, Ruprecht J. (Eds) Milan, Springer 2004 (49.95 Euros)	102

oooOooo

We are saddened by the announcement of the deaths of Drs Elizabeth Gibbs and Ian Verner, who were active members of the Society

Our warmest congratulations go to our **Honorary Member, Lucien Morris**, who celebrated his 90th birthday in October 2004; to our **President, Peter Morris**, on the award of the John Snow Medal; and to our expert photographer, **Geoff-Hall-Davies** on receiving a Pask Medal.

HISTORY OF ANAESTHESIA SOCIETY

2004 Summer Scientific Meeting, Netherwood Hotel, Grange-over-Sands

2/3 July 2004

Organising Committee

Dr Miles Rucklidge, Dr John R Davies, Dr Neil Adams

The Organisers are very grateful to Mrs Joanne Kitchen, Mrs Margaret Rucklidge, Mrs Linda Davies, Mrs Sue Newall and the staff of the Education Centre, Royal Lancaster Infirmary for secretarial and administrative help.

The Society would like to thank the following for generous support:

Morecambe Bay Acute Hospitals NHS Trust
Abbott Laboratories
Keymed
Smith's Medical
Tyco Healthcare
Anectic Aid
Intersurgical
Janssen-Cilag

Proceedings of the History of Anaesthesia Society

Hon Editor: Dr Peter Drury

80 Green Lane

Liverpool L18 2ER

E-mail: pmedrury@aol.com

The contribution of Dr David Gray and the Mersey School of Anaesthesia to the production of the Proceedings is gratefully acknowledged.

The Society acknowledges with thanks the photographs taken by Dr Geoff Hall-Davies.

HISTORY OF ANAESTHESIA SOCIETY

Council and Officers - July 2004

President	Dr Adrian Padfield, Sheffield
President-Elect	Dr Peter Morris, Leicester
Honorary Secretary	Dr Neil Adams, Bury St Edmunds
Honorary Treasurer and Membership Secretary	Dr John Pring, Penzance
Honorary Editor	Dr Peter Drury, Liverpool
Assistant Honorary Secretary	Dr Anne Florence, Liverpool
 Council Members	 Dr Edward Armitage, Brighton Dr Frank Bennetts, Wokingham Dr Colin Birt, Southend Dr John Blizzard, Chelmsford Dr Geoff Hall-Davies CBE TD, Birmingham Mrs Sally Garner, Leicester Dr Miles Rucklidge, Lancaster Prof Sir Keith Sykes, Devon
 Co-opted Members	 Dr Michael Palmer, Bury St Edmunds
 Honorary Members UK and Ireland	 Dr Aileen Adams CBE Dr Thomas Boulton OBE TD Professor Cecil Gray Dr Jean Horton Dr Douglas Howat Dr David Zuck
 Honorary Members Overseas	 Prof J Lassner, Paris Dr Lucien Morris, Seattle Professor John Severinghaus, San Francisco

EDITORIAL

The Netherwood Hotel at Grange-over-Sands was an attractive venue for the HAS Summer meeting, with its excellent facilities and splendid views over Morecambe Bay. There were 73 delegates to enjoy the meeting very successfully organised by Miles Rucklidge and his team. Miles also provided an introduction to Lancaster and its medical history.

There was a transatlantic flavour to six of the papers. Keith Sykes reviewed his year in America and included a portrait of H K Beecher. Andrew Smith gave a history of the relationship in the United States between the established nurse anaesthetists and the increasing number of doctors practising anaesthesia. There were two visitors from the Mayo Clinic, Douglas Bacon (on the role of the Travelling Club in the development of Anesthesiology), and David Martin (development of pain therapy at the Mayo). Henry Connor painted a broad picture of Crawford Long and Adrian Padfield, in a characteristic account of his training, mentioned his time in Denver.

The 19th century was represented by David Zuck's paper on William Hooper, a figure from the early days of anaesthesia, and by Anne Florence quoting from an address by the Liverpool surgeon Sir William Banks, who thought that surgeons were generals and that anaesthetists were brigade commanders. Mark Shaffer and Neil Adams reviewed the subject of preoperative fasting, which began with John Snow. David Counsell spoke about the origins of opium, and John Zorab recalled the case of Anne Green who survived hanging in 1650, taking us further back in history.

Jimmy Payne described his involvement as an expert witness in the case of a criminal who died following an overdose of methohexitone, and whom many people wished dead. Mark Harper reminded us of the value but also the difficulties of searching for old literature.

We were treated to two Guest Lectures. Professor Potts of Lancaster University spoke about Richard Owen, well-known in his time as a biologist but who incurred the wrath of Thomas Huxley, and has suffered neglect. The splendidly extrovert Cedric Robinson gave an account of his 40 years as Queen's Guide to the Kent Sands, Morecambe Bay.

The AGM included a warm tribute by Tom Boulton to our latest honorary member, Doreen Vermeulen Cranch.

PMED

FUTURE EVENTS

- 2005** 4th March. Joint meeting with Section of Anaesthetics, RSM
14th-18th September. Sixth International Symposium on the History of Anaesthesia, Queens' College Cambridge. Contact: Neil Adams: (adams118@keme.co.uk)
- 2006** Provisional: HAS Summer Meeting, Rochester, Minnesota. Joint Meeting with the America History Association and possible visit to Wood-Library Museum, Park Ridge, Illinois.

Speakers at Grange-over Sands



**Prof Sir Keith
Sykes**



Dr M Harper



Prof J Payne



Prof WTW Potts



Dr A Smith



Dr M Shaffer



Dr D Counsell



Dr D Zuck



Dr H Connor

Speakers at Grange-over Sands



Dr Anne Florence



Dr J Zorab



Dr A Padfield



Dr D Martin



Dr TB Boulton



Mr C Robinson



Dr D Bacon

Meeting of the History of Anaesthesia Society, Grange-over-Sands, 2/3 July 2004
Members and Guests attending

Dr Catherine Adam	Fife	Dr Alistair McKenzie	Edinburgh
Dr Neil Adams	Bury St Edmunds	Dr Kenneth Macleod	Huntingdon
Dr John Anderton	Manchester	Dr Bob Marjot	Bath
Dr Edward Armitage	Brighton	Dr David Martin	Mayo Clinic, USA
Dr Douglas Bacon	Mayo Clinic, USA	Dr Peter Morris	Leicester
Dr Moyna Barton	London	Dr James Mulvein	Bristol
Dr Frank Bennetts	Wokingham	Dr David Nightingale	Liverpool
Dr Colin Birt	Southend	Dr Adrian Padfield	Sheffield
Dr John Blizzard	Essex	Dr Michael Palmer	Bury St Edmunds
Ms Grit-Iris Boening	London	Prof James Payne	London
Dr Thomas Boulton	Reading	Dr Eric Plumptre	Hastings
Dr Elizabeth Bradshaw	London	Dr Yash Pole	Manchester
Dr Geoffrey Burton	Bristol	Dr John Pring	Penzance
Dr Peter Challen	Dolgellau	Mr Frank Pyke	London
Dr Henry Connor	Hereford	Dr Nigel Rose	Ledbury
Dr Ian Corall	London	Dr E C Rouse	Colwyn Bay
Dr David Counsell	Wrexham	Dr Miles Rucklidge	Lancaster
Dr John Davies	Lancaster	Dr Geoff Rushman	Thame
Prof Alan Dronsfield	Derby	Dr Mark Shaffer	Bury St Edmunds
Dr Peter Drury	Liverpool	Dr Janti Shah	Birmingham
Dr Christine Earlam	Manchester	Dr Andrew Smith	Lancaster
Dr Ann Ferguson	Broadstairs	Dr Ian Smith	Aberdeen
Dr Anne Florence	Liverpool	Prof Sir Keith Sykes	Devon
Mrs Sally Garner	Leicester	Dr Alistair Trench	Dunblane
Dr Elizabeth Gibbs	Billericay	Dr Yoav Tzaber	Carlisle
Dr Michael Gough	Doncaster	Dr Maureen Van Ryssen	Brighton
Dr Paul Goulden	Dewsbury	Dr Barbara Weaver	Bristol
Dr Geoffrey Hall-Davies	Redditch	Dr John Wedley	Lancaster
Dr Bill Hamlin	Blackburn	Dr David White	London
Dr Helen Hannah	Chippenham	Dr George Whitfield	Scarborough
Dr Mark Harper	Brighton	Dr B R Whittard	Teignmouth
Brigadier Ivan Houghton	London	Prof J A W Wildsmith	Dundee
Dr Douglas Howat	London	Dr David Wilkinson	London
Dr Alan Logan	Isle of Wight	Dr Tod Young	Manchester
Dr David McCallum	Edinburgh	Dr John Zorab	Bristol
Dr Colin McLaren	Swindon	Dr David Zuck	London
Dr Stuart McGowen	Dundee		

Guest Speakers: Professor W T G Potts, Lancaster and Mr Cedric Robinson, Grange-over-Sands

FIFTY YEARS ON

Professor Sir Keith Sykes
Emeritus Professor, University of Oxford

Introduction

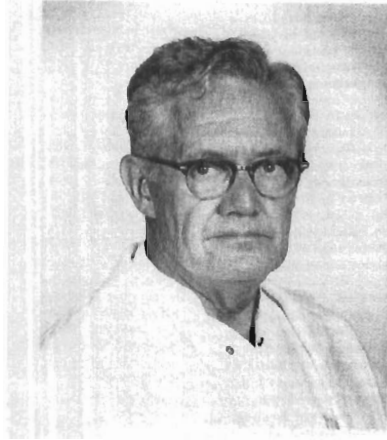
In 1954, I was in my third year of anaesthetic training at University College Hospital, London (UCH) when my chiefs decided that I should spend a year in the United States. After much correspondence and discussion, it was arranged that I should go to the Massachusetts General Hospital (MGH) in Boston, the reason being that the first ether anaesthetic for a major surgical procedure had been administered in the MGH on October 16th and in UCH on December 21 1846. And so, in September 1954, I joined the department headed by Dr Henry K Beecher, Henry Isaiah Dorr Professor of Anesthesia in the Harvard Medical School.

Contrasts

The transition from the relatively small, conservative, inward-looking, and clinically orientated environment of a London teaching hospital to the large, informal, extrovert and academically orientated department at the MGH was mind-blowing. The anaesthesia training programme in the MGH lasted for 2-3 years as opposed to our 6-7 years, and most residents would anaesthetise 400-500 cases a year, considerably less than the 1,000 or more cases per year that we anaesthetised at UCH. The difference was due to the fact that in the 12 operating rooms of the building in which the charity patients were treated, most of the surgery was performed by second or third year surgical residents who were considerably less skilled than their English counterparts. But what was most surprising was that the surgeon would prescribe the premedication, would dictate what anaesthetic should be given, would decide when a transfusion was indicated, and would prescribe postoperative fluids and drugs. Even the recovery ward was under the control of the surgeons. The reason for this state of affairs was that, in the USA, approximately 45% of the anaesthetics were given by nurse anaesthetists or by other general physicians, and the surgeon had to take full responsibility for the patient when the nurses provided the anaesthesia.¹

There was also a major difference in the anaesthetic techniques used in the two institutions. At UCH, curare, gallamine and suxamethonium were used routinely, but in the MGH, the use of curare was strongly discouraged and ether ruled, as it had for over a century. Residents induced anaesthesia with a small dose of 2.5% thiopentone and nitrous oxide-oxygen and ether was then administered with a circle absorber system, further small doses of thiopentone being given to maintain anaesthesia while the ether took effect. In Britain 5% thiopentone was used at that time and the induction dose was double that used in America. Indeed it was not uncommon for one of the UCH consultants, Bob Cope, to empty a 20ml syringe into a patient over 20-30 seconds. This action was usually accompanied by the words: 'Quietly off to sleep' or 'After all, Sykes, he's not going home to-night!' In the MGH anaesthesia was induced in separate induction rooms and as soon as the patient became unconscious several attendants would tighten the straps that held the patient supine on the trolley. The attendants would then hold the patient down until the stage of excitement had passed. With such a technique it took 30-45 minutes to achieve full abdominal relaxation. The staff anaesthetists, however, intubated after a thiopentone-suxamethonium induction and so were able to introduce the ether more rapidly. Recovery from the ether anaesthetic was always prolonged,

**Henry Knowles Beecher
1904—1976**



Dr Henry K Beecher

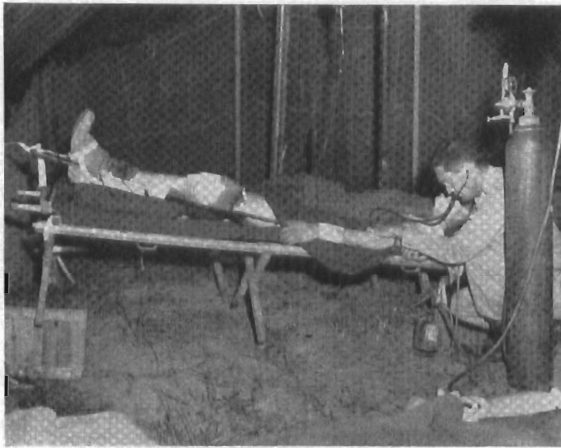


PLATE 19. Elevation of the foot of the litter, nasal oxygen, blood transfusion, gastric drainage, and watchfulness of blood pressure are all demonstrated here. All of the laces in the shoe should have been cut and the sides of the shoe slit when the splint was applied, for swelling of the foot will otherwise cause severe pain.

Beecher at work on a casualty

and frequently accompanied by nausea and vomiting, but the patients were nursed in a recovery room until they were conscious. Regional blocks, and single dose or continuous spinal anaesthetics were used for many operations, and cyclopropane, sometimes accompanied by induced hypotension, was used for operations on the liver. Ethylene was available but little used.

The Beecher and Todd study

When I queried the ban on curare I was presented with a set of the departmental reprints that included the paper just published by Beecher and Todd.² This was a 5-year study of the deaths associated with anaesthesia and surgery in 10 of the major teaching institutions in North America. The aim of the study was to establish the death rate due to anaesthesia by studying all the deaths occurring on the surgical services of the ten hospitals during the period January 1st 1948 until December 31 1952. It was a unique study because of its methodology, its scope, and the presentation of both numerator and denominator data.

The results really shook the anaesthetic community. While the overall mortality rate attributed to anaesthesia was 1 in 1,560, anaesthetists were surprised to learn that the mortality rate in patients receiving curare was five to six times higher than in those not receiving the drug. The resulting furor was exacerbated by two other facts. The first was that the paper had been published in the *Annals of Surgery*, so that surgeons saw the study before their anaesthetists became aware of it; and the second was that Beecher and Todd concluded that the increased mortality was probably due to some hitherto unsuspected toxic effect of the curare. Although this conclusion may have been influenced by Beecher's pharmacological background, most anaesthetists could not believe that a drug that they used regularly could produce such a high incidence of fatal reactions.

The controversy over the data in the paper continued for months and resulted in the publication of a 'Critique of "A study of the deaths associated with anesthesia and surgery"' which was again published in the *Annals of Surgery*.³ The sixteen anaesthetists who authored the rather weak critique claimed that the statistical analysis was inadequate and that surgical factors such as the site and duration of operation had not been taken into account. It was, however, difficult to fault the methodology and results of the study and, as Beecher and Todd said in their reply to their critics, it seemed highly unlikely that a five-to six-fold increase in mortality could have been caused by faults in the statistical analysis. It seemed to those of us who practised during this period, that the most likely cause of the high mortality rate was a failure to secure the airway at the beginning of the anaesthetic, and a failure to ensure that the patient was breathing adequately at the end of the operation. Most American anaesthetists had been trained to intubate under deep ether anaesthesia and, although it is not as easy to visualise the larynx under ether anaesthesia as it is with curare, the use of ether does ensure that spontaneous ventilation is maintained throughout the procedure. Intubation under thiopentone and curare can result in serious complications if the operator is not skilled.

Most American anaesthetists were aware of the problem of vomiting on induction but, at that time, many had little experience in the use of relaxants, and few appreciated the risk of regurgitation. The problem of postoperative respiratory inadequacy was also greater with curare. At that time there were no blood gas measurements and many anaesthetists and recovery room staff were not aware of the dangers of partial respiratory paralysis. Furthermore, the use of neostigmine to reverse the paralysis at the end of the operation was

not common in the United States because of the fear of bradycardia following its use. In England this complication was rarely seen because a large dose of atropine was routinely given before the neostigmine.

Perhaps anaesthetists should not have been too surprised by the results of the Beecher and Todd study. When we look back at the interim reports of the Association of Anaesthetists' study of anaesthetic deaths that was finally published in 1956⁴ we see that the committee had issued specific reports warning of the dangers of regurgitation on induction, of difficulties with intubation, and of postoperative respiratory inadequacy associated with the use of muscle relaxant drugs. This was the era when 'neostigmine resistant curarisation' became a topic of conversation but the 'train of four' had not been invented.

Beecher's response to the critical reaction to his study was to challenge others to prove him wrong. When I suggested that we should set up a prospective randomised controlled trial to compare the use of ether and a thiopentone-nitrous oxide-relaxant sequence for major abdominal surgery, he welcomed the idea, though he did insist that we use a continuous infusion of suxamethonium instead of curare for muscle relaxation because mortality with suxamethonium was less than with curare in the Beecher-Todd study! I believe that this was the first randomised, controlled comparison of two anaesthetic techniques used for major surgery.⁵ Some 693 patients were studied over a two and a half-year period and the results were published in 1959. We found no difference in operating conditions or mortality between the two groups, though severe hypotension occurred during surgery in 15% of the ether cases and in 6% of the relaxant group. Hypotension in the postoperative period was also two and a half times more common in those given ether. Collapse of areas of lung occurred postoperatively in 16% of the relaxant cases compared with 10% of those given ether. This was probably due to a Phase 2 block associated with the large doses of suxamethonium administered during a 4-6 hour operation. The study may not have produced very exciting results, but it taught me a great deal about the design and analysis of clinical trials.

Beecher the man

I should like to say a few words about Beecher himself. I was recruited, as were most other overseas fellows, during one of Beecher's regular European recruiting trips. I had arranged to meet Beecher at the Annual Dinner of the Section of Anaesthetics at the Royal Society of Medicine, and afterwards I offered to drive him back to Claridges. He invited me to his room for a drink, opened his brief case and produced two bottles of Bourbon. We emptied one over the next couple of hours. Not surprisingly I remember little of the evening other than that Beecher spoke with a soft voice and carefully articulated stutter, and that the conversation ranged from James Joyce, Gertrude Stein, to Boston society and his experiences at the Anzio beach-head. Although I was not sure how much of Beecher's sales talk I should believe, I decided that a year in Boston would be interesting and accepted his offer of a Fellowship.

Beecher was born near Wichita, Kansas in 1904 and changed his name from Unangst to Beecher when he was in his twenties.^{6,8,10} By 1928 he had acquired a Master's degree in chemistry from the University of Kansas, and in that year he moved to Harvard to study medicine. By 1931 he had won the Warren Triennial prize, and in 1932 he joined Edward D Churchill's surgical training programme in the MGH. In 1935 he went to work with Nobel

Prize-winner August Krogh in Copenhagen, and shortly after his return he was appointed to succeed Howard H Bradshaw as Chief Anesthetist to the Massachusetts General Hospital. During the next five years he taught himself anaesthesia, was awarded the Warren prize for the second time for his book *The Physiology of Anesthesia* and, in 1941, was appointed to the Henry Isaiah Dorr Professorship of Anesthesia that had been vacant since its inception in 1917.

With such an extraordinary beginning it is not surprising that Beecher should have become an unconventional chief. I think that the key to his career was that he was not really interested in clinical anaesthesia; he saw anaesthesia as a means of investigating problems in physiology and pharmacology. He rarely appeared in the general operating rooms but when he was in Boston he usually spent the entire morning anaesthetising patients in the private wing. He seemed to have a good working relationship with a number of prominent surgeons and relied on this source of income, for he did not take a salary from departmental funds.

Beecher's methods were somewhat unorthodox. Usually, they worked quite well, but if anything went wrong, turmoil ensued. Beecher was a great believer in two intravenous infusions, for he had been brought up in the era of metal transfusion needles that regularly cut through vein walls. He favoured very deep ether anaesthesia, given through a small uncuffed tube under a face mask and, when he did use muscle relaxants, his 'educated hand' divided its time between the correction of proofs and the reservoir bag.

At about 10.30am his faithful secretary, Miss Studley, arrived with a huge bundle of mail and took dictation while sitting on a high stool in the corridor outside the operating room. Beecher would usually spend the afternoon writing or occasionally sitting on committees, and at about 4.30pm he would preside over tea and cakes in his office. At this time he welcomed all comers and the conversation ranged over many subjects, but seldom anaesthesia.

Achievements and influence

So what did he achieve? Dr John P Bunker, who was for many years Beecher's closest colleague at the MGH, listed his achievements as follows:

He was the first to develop a research laboratory exclusively devoted to the study of anaesthetics.

The first to apply the technology of clinical anaesthesia to the care of wounded soldiers.

The first to demonstrate the feasibility of quantitative measurement of the subjective responses to drugs.

A vigorous and vocal proponent of human rights in science.

A pioneer in establishing scientific principles for the ethical study of drug effects in the human. This led to the establishment of human study committees at Harvard.

The major driving force behind the first formal enunciation of the criteria for the definition of brain death.^{7,8}

It has been claimed that Beecher had less influence on the development of clinical anaesthesia than other contemporary chairmen.⁷ This is probably true, but we must remember that Beecher's influence stretched far beyond the confines of anaesthesia, and what characterised his contributions was that they caused doctors in many other disciplines to alter their concepts and behaviour. His observations at the Anzio beach-head, and his subsequent studies on analgesic drugs led to the new theory of pain propounded by Melzack and Wall and changed the way in which we treat chronic pain. He demonstrated the importance of the placebo response, and was the first to devise methods of quantifying the effects of pain-relieving drugs in the clinical situation. He was very concerned with the ethical problems associated with clinical research that had been largely ignored by previous workers, and he campaigned strongly for the creation of properly constituted research ethics committees in every hospital. Later he catalysed the discussions that led to the definition of brain death.

Beecher was a very complex character. He was charming and intelligent and pursued his own interests with great enthusiasm. He was, however, curiously isolated, not only from other leaders of the profession, but also from other developments such as monitoring and intensive care. He seemed to cultivate controversy but was weak in debate. He was also very obstinate, and often infuriated his colleagues by failing to support a pre-arranged political move. Equally surprising was his failure to apply for independent status for his department until 1969, the year before he was due to retire.

Beecher had adopted one of the grandest of New England names, moved from a small town in Kansas to the great medical metropolis of Boston, married the well-educated daughter of a Boston obstetrician, and had a wide circle of distinguished friends. He, and his gracious wife Margaret, were very sociable and were generous hosts. They loved dancing and frequently entertained residents, staff, departmental visitors and their Bostonian friends in great style. Yet, underneath the façade, Beecher was very insecure, and he was devastated by retirement. Sadly, his wife predeceased him by three years and he died a lonely man in 1976.

Conclusion

During the year in Boston I gained extensive experience of anaesthesia for all types of surgery, including the use of hypothermia for neurosurgery, and I was also heavily involved in the care of the sixty or so patients who were treated in tank ventilators during the 1955 poliomyelitis epidemic. We were finally able to persuade the physicians to allow us to treat two of these patients with intermittent positive pressure ventilation. I was encouraged to read extensively, to contribute to the teaching programme, and to participate in a number of research projects. I was able to use my two weeks annual leave to attend meetings and to visit other centres. In June 1955 I was granted a month's leave of absence and used my travelling scholarship to fund a 10,000 mile tour of Canada and the United States, during which I visited over forty of the leading anaesthetic departments. I was always received most hospitably, and amazed that many chiefs took time off to give me a personal tour of their facilities. The organisation and staffing of the MGH department was often below par, but although I was one of the most argumentative of Beecher's overseas Fellows, he and his staff tolerated me with grace and good humour. Certainly, no one could have had a better preparation for an academic career.

References

1. Sykes MK. The American approach to anaesthesia. *British Medical Journal* 1956;i: 1148-1150.
2. Beecher HK, Todd DP. A study of the deaths associated with anesthesia and surgery. *Annals of Surgery* 1954; **140**:2-34.
3. Abajian J *et al.* Critique of "A study of the deaths associated with anesthesia and surgery". *Annals of Surgery* 1955; **142**:138-144.
4. Edwards G, Morton HJV, Pask EA, Wylie WD. Deaths associated with anaesthesia. A report on 1000 cases. *Anaesthesia* 1956; **11**:194-220.
5. Bunker JP, Bendixen HH, Sykes MK, Todd DP and Surtees AD. A comparison of ether anesthesia with thiopental-nitrous oxide-succinylcholine for upper abdominal surgery. *Anesthesiology* 1959; **20**:745-752.
6. Gravenstein JS, Beecher HK. The introduction of anesthesia into the university. *Anesthesiology* 1998; **88**:245-253.
7. Bacon DR, Henry K, Beecher HK. An historical perspective? *Anesthesiology* 1998; **89**:792-793.
8. Bunker JP. Across the ether screen. The anesthesiologist and the surgeon. Boston: Little Brown and Co, 1972.
9. Bunker JP, Beecher HK. In: Volpitto PP, Vandam LD. (Eds). *The Genesis of Contemporary American Anesthesiology*. Springfield:: Thomas,CC, 1982, 105-119.
10. Kitz RJ (Ed) "*This is no humbug*". *Reminiscences of the Department of Anesthesia at the Massachusetts General Hospital*. Published privately, 2003 but available from <http://www.bookmasters.com/marketplc/00850.htm>

THE IMPORTANCE OF LOOKING AT THE ORIGINAL PAPER

Dr C M Harper

Consultant Anaesthetist, Brighton and Sussex University Hospitals

Introduction

I acquired an appreciation of the history of medicine during a year spent studying the subject at the Wellcome Institute for the History of Medicine in London. As a consequence of my continued research in the field my reasons for valuing it have become clearer. However, my first encounter with John Snow's work '*On the inhalation of ether*'¹ was something of a revelation. It was the clarity and pertinence of this that stimulated me to go and look at a wider range of original papers. In the process I encountered a number of issues, both positive and negative, that I had not originally envisaged.

In this paper I will attempt to illustrate both the virtues and the problems associated with seeking out original papers. I will also offer a potential solution.

On the inhalation of ether

The question as to which is the first anaesthetic textbook is a controversial one. There is a strong argument² for James Robinson's *Treatise on the Inhalation of the Vapour of Ether*.³ although it has been said that this is more a series of letters describing experiences with the drug than a textbook. It is therefore possible that Snow can take the credit for the first textbook of anaesthesia.

In fact he published two books with the same title: *Observations on the Inhalation of Ether*.^{1,4} The first of these, although just ten pages long, provides a remarkable number of insights into anaesthesia which are still relevant today. Although the details have been discussed elsewhere,⁵ the book illustrates a number of principles, in regard to re-reading original papers, that can usefully be reiterated.

Faulconer and Keys, introducing a passage from this book, suggest that 'the reader can almost hear the patients breathing as Dr Snow demonstrates his degrees of etherisation'.⁶ This leads on to a number of relevant points.

The use of the word 'hear' is very significant. These days the tendency is to only listen to the 'beep' of the monitors. However, with the advent of the laryngeal mask airway (LMA), more anaesthetics are being conducted in spontaneously breathing patients than before the introduction of curare in the 1940s. Studies have shown that up to 30% of LMAs are incorrectly positioned.⁷ Despite this, the patient may remain adequately oxygenated and the monitor may show an acceptable CO₂ trace. However, the whole anaesthetic will be a struggle if the clues are not picked up from the sound (no matter how soft) and sight of the patient's breathing.

Then there is the descriptive value of such papers. These days textbooks and papers divide and sub-divide anaesthesia more and more. For the new trainee there are no readily available descriptions of the whole process. I have yet to find better descriptions of the stages of anaesthesia than those by Snow¹ and Guedel.⁸ The latter also clearly illustrated their

relevance to both patient and anaesthetist. Ignoring important and easily accessible information from clinical signs will not only prevent the optimisation of an anaesthetic, but will also lead to an over-reliance on monitors. I have heard many recollections of power-cuts occurring during anaesthesia. My own experience is of both a generator and back-up failing during a pneumonectomy.

The first monitor on the list drawn up by the Association of Anaesthetists is the anaesthetist.⁹ Not only do generators fail, but inter-hospital transfers of critically ill patients are common, ambulances break down and batteries run out with no warning. In these circumstances the only form of assessment available is clinical. As with any technique the time to start practising is not in the middle of an emergency, but during elective cases. The best way to start learning about this is to read original papers by the remarkable, and fantastically observant, early anaesthetists.

Dopamine

The issue of 'renal dose dopamine' in the prevention and treatment of acute renal failure (ARF) is now a long-running saga. Despite the *Canadian Journal of Anesthesia's* best evidence review,¹⁰ it is still widely used in the belief that it does have a positive effect on these outcomes.

There is a problem discussed by McLellan.¹¹ The trouble is that electronic medical databases do not stretch back further than 1966. This leads to the temptation of citing the citation or simply ignoring such old and therefore, presumably, unimportant papers. In the case of dopamine there are three significant papers written by Goldberg and his associates before the cut-off date.¹²⁻¹⁴ In the final paper they conclude that 'the ability of dopamine to alter the distribution of cardiac output in favour of visceral organs may find useful clinical applications'. By 1972 Goldberg could still only cite one paper investigating the use of dopamine in ARF, and therefore merely concludes that further investigation was needed.¹⁵ Further reviews¹⁶⁻¹⁹ all failed to find any evidence of its benefit.

Another issue to be addressed regarding the infusion of dopamine is the dose. I have to confess that my attempts to find a definitive answer to this question have been entirely unsuccessful. By the time I had pulled out eighteen papers on the subject (a variety of reviews, editorials, book chapters and original articles from 1963 to 2002) following-up all the leads on the dose ranges, and still finding myself no closer to the answer, I conceded defeat. The accusation may be levelled that I should have persisted. However, this was never intended as a comprehensive review of the literature on dopamine, but an illustration of the value of searching through original papers for the sources of our practice. In this case there does not actually appear to be an evidence base.

One of the reasons for my capitulation was that in neither a recent article²⁰ nor the accompanying editorial²¹ looking at the pharmacokinetics of renal dose dopamine, was an original paper cited as the source of the figure 0.5-3 mcg/kg/min. In discussing their study MacGregor et al²⁰ did quote, quite legitimately, Goodman and Gilman's *Pharmacological Basis of Therapeutics* as 'conventional teaching'. However neither the eighth edition²² (which they cite) nor even the tenth²³ of this long-lived and respected textbook produced any further leads.

In the end it was Goldberg's original, pre-1966 papers that pointed to the futility of further investigation. This finding, in the first paper, is typical of all three: 'The infusion rate of dopamine required for cardiovascular effects was extremely variable, ranging from 100-1000 micrograms/minute. Because of this variability and the dangers of producing excessive cardiac stimulation, we initially administer dopamine at the lowest infusion rate (100 micrograms/minute).'¹²

There another point about historical investigation. It could be suggested that had people taken the time to look at the original papers, rather than accepting 'conventional teaching' MacGregor et al's study would have been rendered unnecessary, but the time issue is a very big and very real problem. My institution (University College London) has a superb collection of source material, an efficient ordering system and extremely helpful librarians. However, the collation of the papers I required for this paper took hours of filling in forms (often the wrong ones thus necessitating more filling), moving between libraries (UCL has nineteen, of which twelve have medical holdings), photocopying and hiking round the stacks. Open access journals only stretch back twenty years, and the problems of tracking down relevant papers published before 1966 I have already alluded to. In the face of this, let alone the pressures of everyday clinical practice, it is hardly surprising if people choose simply to accept 'conventional teaching'.

The laryngeal mask airway

In the *Proceedings of the History of Anaesthesia Society*, Fairer notes that: 'As history is the written word of what happened in the past, it begins immediately after the event it describes. No arbitrary time has to elapse before history begins; it has already started'.²⁴ The first publication concerning the laryngeal mask airway was a mere twenty years ago,²⁵ yet I think there are aspects of this paper which clearly illustrate the process of the conception and development of a successful new piece of equipment. In this publication Brain does not detail the painstaking process of cadaveric experimentation with different shapes and materials. However the clarity of the language and the astuteness and comprehensiveness of his observations (an essential and often undervalued characteristic of innovation and research) are reminiscent of Snow.

It is not explicit in the paper as to whether the LMA was originally conceived as a device for spontaneous or intermittent positive pressure ventilation and the controversy as to employment in mechanically ventilated patients rages on. On the one hand Brain highlights the importance of the gas-tight seal. On the other, he rejected the principle of completely blocking the oesophagus, as the device would then become too bulky. In this context it is interesting to note that to overcome objections regarding its potential to insufflate the stomach and prevent aspiration he has approached the idea from a completely different direction and provided a low resistance gastro-oesophageal outlet in the Pro-seal LMA. There is an implication, from the fact that seventeen of the first twenty-three patients in whom it was used were mechanically ventilated, that the device was designed to operate in these circumstances. Just because it is easier to breathe spontaneously through an LMA than a tracheal tube, it is not necessarily always better to do so.

A perspective on the risks can be acquired by reviewing another classic paper. The concern (or at least the evidence base) for providing a protected airway can be traced back to Mendelson's 1946 paper.²⁶ As with dopamine, it is not my intention to provide a

comprehensive review of this controversial area, but to stimulate thought, debate and an appreciation of the value of looking at the original rather than just passively accepting received wisdom. In this respect it is worth noting that the two deaths described in this paper were secondary to asphyxiation as a consequence of aspiration of solids. This additional information should be factored into an assessment of its use for a starved, elective, surgical population. It will then be possible to make a balanced appraisal in an individual case, rather than just concentrating on the risks in a non-Bayesian fashion.

One final notable historical part of the development of the LMA comes from both the title and the content of Brain's subsequent paper.²⁷ In the opening paragraph there is the telling phrase 'examination of similar historical attempts'. We are rarely as original as we would like to think. Furthermore, medical and anaesthetic history, as I keep repeating, does not start in 1966. His investigation into previous attempts to solve this problem led back to 1896 and the Fell-O'Dwyer apparatus which was used to treat opium narcosis. These researches would have shortened the process of trial and error that Ackerknecht describes as 'so painful to him (the doctor or medical student) and his patient'.²⁸

Brain's 1983 paper also shows the potential of reading the original to shed light on medical myths. It is often said that the success of the LMA was mainly due to the fact that its introduction coincided with that of propofol. The ability of the latter to relax the pharyngeal muscles, unlike thiopentone, being the key. However, all of the six initial, spontaneously breathing patients in this paper received thiopentone (half with the addition of suxamethonium), none having a problem with LMA insertion, and none requiring prolonged mechanical ventilation.

Interest, information and enjoyment

Morbidity and mortality meetings are now regular features of hospital life and there is much that can be usefully learned from them. It is therefore interesting and informative to look back to the first ever report of a death under anaesthesia. Hannah Greener died under chloroform anaesthesia in Newcastle-upon-Tyne on 28 January 1848. The coroner's inquest was reported in the *Lancet*,²⁹ in itself a useful reminder that even in our litigious times there is much educational value in publicising such unfortunate events.

The report and the inquest exonerates both the surgeon and the anaesthetist (described as the surgeon's 'assistant'). In 1959 David Little, commenting on the case, observed that the 'surgical team' was only just 'becoming a reality'.³⁰ The habit had been to attribute 'all deaths that occurred during operations' to the anaesthetic. This led in time 'to the ludicrous practice, when catastrophe threatened, of hastily moving the dying (or dead) patient to the corridor'. These remarks are put into a particularly interesting light when one considers a paper published in the *British Medical Journal* in 1923. Entitled '*Anaesthetics from the surgeon's point of view*', Sir William Wheeler makes the comment, typical of the paper, that 'the responsibility for success or failure rests with the surgeon; whatever happens, the anaesthetist escapes without blemish'.³¹ Although this sheds an interesting light on the development of the surgeon-anaesthetist relationship there are more valuable lessons that can be traced from this tragic event. Snow's power of observation was one of his greatest strengths. Not only can this be inferred from his anaesthetic work, but it was also central to his famous success in halting the cholera outbreak due to a Soho water pump. However, although he subsequently collected and analysed fifty cases of death from chloroform, by

1858 he was no closer to explaining the cause of these sudden and unexpected events. The value of persistence and painstaking observation is borne out by Levy's 1914 paper in which a rational explanation is finally given.³² One of the reasons it was so long coming was that the cause turned out to be ventricular fibrillation which, until ECG recordings were made, was not describable except through direct observation of the heart.

There are any number of original papers by Arthur Guedel that merit inclusion in such a review. However, I am only going to look at one.³³ Although cyclopropane is no longer used in the developed world, the principles of anaesthesia (as can also be seen in Snow's writings alluded to above) remain remarkably similar. I have already mentioned that one of the consequences of the sub- and superspecialisation of both medicine and anaesthesia is the fact that the literature (journals and books) has become fragmented. Investigations of an inhalational agent will typically be along the lines of the '*Effects of halothane on action potential configuration in sub-endocardial and sub-epicardial myocytes from normotensive and hypertensive rat left ventricle*'.³⁴ More useful to a new trainee would be an account of the general process of anaesthesia. In his paper, Guedel presents his and his colleagues' experiences of over eight thousand anaesthetics and a comprehensive discussion of the relevant points.

I spent much of my first three months as an anaesthetist worrying about my new responsibilities and expecting patients to die at any time. Guedel would have offered some justification for my feelings: he describes controlled respiration as the process whereby 'the anaesthetist deliberately takes the function of pulmonary respiration from the patient into his own hands. This sounds formidable.' However, he is good enough to offer some comfort as well: 'As a matter of fact, it is simply the physio-pharmacological control of the respiratory center, just as we control by physio-pharmacological means the abolition of consciousness, pain and reflex response during any anesthesia.' He then goes on to carefully describe the fundamental homeostatic and physiological processes that we both utilise and undermine in the process: such as how pulmonary respiration is dependent on a balance between threshold and stimulus and how it can be advantageously manipulated. The concept of balance is important both in this particular area and in anaesthesia generally, to the new and experienced anaesthetist alike. As a slight aside, the concept of balanced anaesthesia, originally described by Lundy,³⁵ was a topic that I was particularly keen to expand upon. Unfortunately the paper where he first employs the term resides in a journal not even stocked by the British Library.

The issues Guedel goes on to discuss in more detail include apnoea, carbon dioxide, cardiac arrhythmias, abdominal relaxation, technique, emergence and the signs of anaesthesia. Although most of this can come under the classification of 'information', there is much that could be described as 'interesting' or 'enjoyable.'

Regarding the latter it is interesting to note that Guedel feels it necessary to iterate the fact that: 'We have never found it necessary in clinical anaesthesia to tolerate hypoxia'. And, although his scientific vigour was beyond reproach, his paper is all the more readable due to the fact that he does not feel it necessary to adopt the entirely dry style that is now *de rigueur*. In discussing the emergence of patients from anaesthesia, he admits to 'four notable cases' in whom the recovery of consciousness was prolonged. 'Embarrassing? Yes, but nothing to worry about', before proceeding to discuss the physio-pharmacological basis for this.

Summary

Over one hundred years ago the *Journal of the American Medical Association* carried this passage: 'The study of old medical writings is an attractive one from many points of view. It tends, for example, to give one the proper perspective for a broad estimation of the present state of development of the medical sciences. The work done by our medical ancestors should interest us as physicians quite so much as the work of our political and religious leaders should interest us as citizens'.³⁶ This still holds true today. Although anaesthetists should push the speciality forwards, doing so with an eye on the past increases their chance of success. A vital part of looking back to the future is to read the original papers and question why they were right or wrong. As wisdom becomes 'received' it gets distilled and, inevitably, distorted. In the process important facts are missed and vital insights lost.

A recent survey of anaesthetists' attitudes to the history of medicine found that over 70% thought the subject both interesting and relevant.⁵ Some of the reasons given were its direct relevance such as an understanding of current techniques, a perspective of current practice, and that learning from the past helps future development.

All this and more can be gleaned from a study of original papers. It can help our practice, remind us of important clinical skills and demonstrate the basis (or lack of it) for our practice. In the development of anaesthetic devices (and drugs) it can shorten the 'painful' period of trial and error. It should not be overlooked that such study can be both interesting and enjoyable for its own sake. Above all studying the originals has the power to make us think.

There are also the self-perpetuating problems associated with inaccurate citation pointed out by Steel.³⁷ He highlighted a case where 'long overlooked findings of exercise-induced leucocytosis (were) corrected' before printing so that the original publication date of 1893 appeared as 1983. However, my experience of pursuing original papers has shown me how difficult it is to get to the sources even when they have been reprinted. And this in an institution that is better than many in so far as it has twenty years of journals on the open shelves and has retained the older materials, whereas others dispose of theirs for want of space or money to maintain them.

Conclusions

To benefit fully from history, the issue that needs to be resolved first is that of access. There have been few successful attempts to remedy this situation. Classic papers are occasionally reprinted in the journals but not with particular consistency or in sufficient numbers. To my knowledge two good source books of anaesthetic papers exist. The first, *Foundations of Anesthesiology* was published in 1965.⁶ Although now reprinted, it is only available from the United States. This is a fantastic book with succinct introductions and a remarkably broad selection of writing that includes Paracelsus. The other, published in 1985, is *Classical Anesthesia Files*³⁰ which contains David Little's introductions to classic papers written over a period of 30 years. These are well-written and offer erudite insights. However, due to size and space constraints only summaries of the actual papers are included.

The Wood Library-Museum of Anesthesiology has a phenomenal collection of books and journals, but much of what is readily available is in limited editions. Then there is the fact that there are so many papers worthy of inclusion in a comprehensive collection of

anaesthetic literature that, although it would be possible to bring them together in a print version, the size and cost would probably be prohibitive. However, in recent years computers have revolutionised data storage and this is where a possible remedy lies. With current technology it is possible to collect together a larger number of papers and commentaries than ever before and make them available on CD, DVD and the internet.

I am organising a session at the 6th International Symposium for the History of Anaesthesia in 2005, where there will be a distinguished gathering of experts that will be able to ensure the academic success of the project. Theoretically, the task should be self-limiting as the vast majority of journals are now available in electronic form. In the future the problem is likely to become one of sifting through the ever growing and overwhelming mass of published medical papers. However, for the moment it would be best to concentrate on papers published before the Medline watershed of 1966. Steel's comments previously alluded to³⁷ were published under the title '*Read before you cite*'. An 'original paper project' will make it easier to do so and could thereby reduce the number of self-perpetuating medical myths, inaccuracies and re-inventions of the wheel. And there is no reason why such a venture should not equally benefit other branches of medicine or even science in general. Anaesthetists are very good at embracing new ideas in technology and education. This project combines the two and gives the speciality a chance to lead the way in catalysing future development by building on the past.

References

1. Snow J. *On the inhalation of the vapour of ether in surgical operations: containing a description of the various stages of etherisation*. London: Churchill, 1847.
2. Ellis RH, Robinson J. *American Society of Anesthesiologists: A treatise on the inhalation of the vapour of ether for the prevention of pain in surgical operations*. Park Ridge, Illinois: Wood Library-Museum of Anesthesiology, 1983.
3. Robinson J. *A treatise on the inhalation of the vapour of ether, for the prevention of pain in surgical operations; containing a numerous collection of cases in which it has been applied. With the names of the operators, history of the discovery*. London: Webster, 1847.
4. Snow J. *On the inhalation of the vapour of ether in surgical operations: containing a description of the various stages of etherisation, and a statement of the result of nearly eighty operations in which ether has been employed in St George's and University College Hospitals*. London: J. Churchill, 1847.
5. Harper CM. Back to the future: the relevance of the history of anaesthesia today. In: Diz JC, Franco A et al. eds, *The History of Anaesthesia*. Amsterdam: Elsevier, 2002.
6. Faulconer A, Keys TE. *Foundations of Anesthesiology*. Springfield, Illinois: Charles C Thomas, 1965.
7. Sellers WF, Waiters BR, Firkin AP. 'Sideways' laryngeal mask airways. *Anaesthesia* 1999; **54**:603.
8. Guedel AE. Third stage ether anesthesia: a sub-classification regarding the significance of the position and movements of the eyeball. *American Journal of Surgery* 1920; **34**:53-57.
9. *Recommendations for standards of monitoring during anaesthesia and recovery*. London: Association of Anaesthetists, 1994.

10. Bracco D, Parlow JL: Best evidence in anesthetic practice. Prevention: dopamine does not prevent death, acute renal failure, or need for dialysis. *Canadian Journal of Anaesthesia* 2002; **49**:417-419.
11. McLellan F: 1966 and all that - when is a literature search done? *Lancet* 2001; **358**:646.
12. Goldberg LI, McDonald RH, Zimmerman AM. Sodium diuresis produced by dopamine in patients with congestive heart failure. *New England Journal of Medicine* 1963; **269**:1060-64.
13. McDonald RH, Goldberg LI, McNay JL, Tuttle EP. Effects of dopamine in man: augmentation of sodium excretion, glomerular filtration rate and renal plasma flow. *Journal of Clinical Investigation* 1964; **43**:116-1124.
14. McNay JL, McDonald RH, Goldberg LI. Direct renal vasodilation produced by dopamine in the dog. *Circulation Research* 1965; **16**:510-517.
15. Goldberg LI. Cardiovascular and renal actions of dopamine: potential clinical applications. *Pharmacology Review* 1972; **24**:1-29.
16. Dasta JF, Kirby MG. Pharmacology and therapeutic use of low-dose dopamine. *Pharmacotherapy* 1986; **6**:304-310.
17. Denton MD, Chertow GM, Brady HR. Renal-dose dopamine for the treatment of acute renal failure: scientific rationale, experimental studies and clinical trials. *Kidney International* 1996; **50**: 4-14.
18. Kellum JA. The use of diuretics and dopamine in acute renal failure: a systematic review of the evidence. *Critical Care (London)* 1997; **1**:53-59.
19. Kellum JA, Decker M. Use of dopamine in acute renal failure: a meta-analysis. *Critical Care Medicine* 2001; **29**:1526-1531.
20. MacGregor DA, Smith TE, et al. Pharmacokinetics of dopamine in healthy male subjects. *Anesthesiology* 2000; **92**:338-346.
21. Bailey JM. Dopamine: One size does not fit all. *Anesthesiology* 2000; **92**:303-305.
22. Goodman LS, Gilman AG eds. *The Pharmacology Basis of Therapeutics*. New York: Pergamon, 1990.
23. Goodman LS, Hardman JG, Limbird LE, Gilman AG eds. *The Pharmacological Basis of Therapeutics*. 10th Edition. New York: McGraw-Hill, 2002.
24. Fairer JG. History has just begun. *Proceedings of the History of Anaesthesia Society* 2002; **30**:40-43.
25. Brain AI: The laryngeal mask--a new concept in airway management. *British Journal of Anaesthesia* 1983; **55**: 801-805.
26. Mendelson CL. The aspiration of stomach contents into the lungs during obstetric anesthesia. *American Journal of Obstetrics of Gynecology* 1946; **52**:191-192.
27. Brain AI. Historical aspects and future directions. *International Anesthesiology Clinics* 1998; **36**:1-18.
28. Ackerknecht EH. *A Short History of Medicine*. Baltimore, London: Johns Hopkins University Press, 1982.
29. Fatal application of chloroform. *Lancet* 1848; **1**:161.
30. Little DM. *American Society of Anesthesiologists: Classical Anesthesia Files*. Park Ridge, Illinois Wood Library-Museum, 1985.
31. Trotter W: Discussion on anaesthetics from the surgeon's point of view. *British Medical Journal* 1923; **792**-796.
32. Levy AG. Sudden death under light chloroform anaesthesia. *Proceedings of the Royal Society of Medicine* 1914; **7**:57-84.
33. Guedel AE. Cyclopropane anesthesia. *Anesthesiology* 1940; **1**:13-25.

34. Rithalia A, Hopkins PM, Harrison SM. Effects of halothane on action potential configuration in sub-endocardial and sub-epicardial myocytes from normotensive and hypertensive rat left ventricle. *British Journal of Anaesthesia*. 2003; **90**:501-3.
35. Lundy JS. Balanced anesthesia. *Minnesota Medicine* 1926; 9:399.
36. The study of the history of medicine. *Journal of the American Medical Association* 1901; **37**:454-455.
37. Steel CM. Read before you cite. *Lancet* 1996; 348: 144.

ACCIDENTAL DEATH OR MURDER? A QUEER AFFAIR

Professor J P Payne

Emeritus Professor of Anaesthesia, University of London

On the evening of Thursday 13th September 1979 Mr Leslie Holt, a 42 year old farmer from Wales, attended the surgery of Dr Gordon Henry Kells (a personal friend) at 146 Harley Street, London N1, for the removal of warts on his right big toe.

According to Dr Kells, at about 10pm on that evening he performed a ring block on the right big toe, using a combination of 2% lignocaine and an unspecified concentration of adrenaline. Apparently about 4ml of this solution were injected, and then Dr Kells attempted to cauterise the wart. However, Mr Holt reacted to the stimulus, and Dr Kells decided to give him an intravenous injection of diazepam 10mg. Immediately after the injection Mr Holt went ashen and collapsed. Dr Kells carried out some emergency resuscitative procedures including the passage of an endotracheal tube, called an ambulance, and escorted the patient to the Accident and Emergency Department of University College Hospital, where they arrived at about 10.25 pm.

On arrival Mr Holt was extremely cyanosed, apnoeic and pulseless. In addition his abdomen was markedly distended and resonant to percussion. Resuscitation procedures were started at once; in particular the endotracheal tube was removed from the oesophagus and re-sited in the trachea. Perhaps not surprisingly under the circumstances the junior staff decided to call for the assistance of the consultant physician in charge of the Accident and Emergency room, and he arrived at about 10.50 pm. By this time normal heart rhythm had been restored, but the patient was still unable to breathe spontaneously and he remained unconscious. However within the next hour he was attempting to breathe, and to assist him it was decided to empty his stomach. For this purpose a large bore rubber tube was inserted through the mouth into the stomach and something in excess of 500ml of brownish fluid, containing a substantial quantity of half digested food, was aspirated. Thereafter since his condition had stabilised Mr Holt was transferred to the Accident and Emergency ward for the night. Unfortunately by the following morning (Friday 14th September) Mr Holt's condition had deteriorated over the preceding several hours. The clinical picture was that of significant brain damage, and it was decided to transfer him to the Intensive Care Unit and to re-establish mechanical ventilation. The next day (Saturday 15th September) the patient's condition had deteriorated further. The Consultant was of the opinion that he was effectively brain dead, but decided, given the background, that it was important to continue to ventilate his lungs and to maintain intravenous fluid support.

Around this time members of the patient's family, friends and associates made various statements to the nursing staff of the Intensive Care Unit and to some of the medical staff, including the consultant, expressing their doubts about the cause of Mr Holt's condition. They specifically raised the question of whether or not any evidence had been found of other substances in his blood that could explain his clinical state. The consultant attempted to reassure them on this point, but apparently, on reflection, he later that day instructed the duty house physician to obtain a sample of blood from the patient for toxicological examination, should such information be needed by the Coroner in any subsequent enquiry into the cause of death.

As it happened the consultant's anxiety was misplaced. Immediately on admission the duty house physician had obtained a sample of blood from the patient for analysis, but given the fact that he had been accompanied by his general practitioner, who gave an acceptable account of what had happened, there appeared to be no great urgency in analysing the sample. However, when it was tested on September 17th, the sample contained no trace of diazepam, but a surprisingly high level of the ultra-short acting barbiturate methohexitone was detected, of the order of ten times greater than the accepted anaesthetic dose. Since no methohexitone had been given at University College Hospital it is virtually certain that Dr Kells did not inject diazepam, as he had claimed, but methohexitone.

During the days that followed the patient's condition had remained largely unchanged, and on September 20th an EEG was carried out on Mr Holt. This confirmed the absence of any cerebral activity, indicating irreversible brain damage. During the next five days that absence persisted. During the afternoon of September 25th Mr Holt's heart action gradually faded, and it became impossible to ventilate his lungs because of increasing congestion. Mr Holt was declared dead at 7.12pm that evening.

His death was reported to the St Pancras Coroner, and a post-mortem examination was carried out by a Consultant Forensic Pathologist on September 27th. The Pathologist gave as the cause of death:

- 1a Bronchopneumonia
- 1b Anoxic cerebral damage
- 1c Methohexitone overdosage
- 2 Coronary artery disease

The latter conclusion was based on the evidence of an earlier apparently silent infarct, in the substance of the left ventricle of at least one month's duration.

Having heard the evidence presented above at the inquest, the Coroner announced that he was in no position to come to any conclusion in the presence of what appeared to be irreconcilable facts. Under these circumstances he said that the most appropriate thing he could do was to adjourn the inquest for a suitable time, say 28 days, and refer the papers to the Director of Public Prosecutions.

It was at this stage that I became directly involved in the case. After Dr Kells had been the subject of police enquiries, I was asked by the Office of Public Prosecutions if I would consider the evidence in the case and provide an opinion on the medical aspect in general, as well as dealing with some specific matters. I agreed to do so, and on the basis of the evidence made available, I was of the opinion that the standard of care provided by Dr Kells was lamentably below that which Mr Holt was entitled to expect of him. In particular, Dr Kells needed to explain his use of methohexitone in the dose that he had employed.

Dr Kells was eventually charged with manslaughter and his trial took place before a jury at the Old Bailey in July 1981, at the end of which he was acquitted. His acquittal produced uproar in the court, and all sorts of threats were bandied about. But some facts also emerged. Leslie Holt was not a farmer from Wales but a cat burglar from London's East End, and it

was alleged that he had a business relationship with Dr Kells, who provided him with information about his wealthy patients and their possessions. It was further alleged that some of the material he was able to steal, such as pornographic photographs, allowed him to blackmail wealthy victims, particularly if they were in the public eye.

In addition, Leslie Holt was bisexual, and although the gay lover of Ronnie Kray of the Kray twins he had other male lovers, some well known. He also had his fair share of charming young lady friends among whom was Christine Keeler. Whatever else is to be said there were many people who were glad that Leslie was dead.

GUEST LECTURE

SIR RICHARD OWEN

Prof W T W Potts
Emeritus Professor, University of Lancaster

This year is the bicentenary of the birth of Sir Richard Owen. By the middle of the nineteenth century he was the most famous British biologist, a household name and a central figure in British society. By the end of the century, for complex reasons, he was denigrated and almost forgotten.

Early Years

Owen was born in a substantial Georgian house in Brock Street, Lancaster, the site now covered by an ugly and inappropriate Police Station. His father was a prosperous merchant but he died when Owen was only five and Owen was brought up in rather straitened circumstances. He attended Lancaster Grammar School where one of the masters later remembered him as 'lazy and impudent', though this is so at variance with his later character that one wonders whether he was remembering the same boy.

After leaving school he wished to study medicine, but lacking the resources to attend a medical school full time he was apprenticed to a succession of local surgeons. The first soon died, the second went to sea and the third was idle and fond of the bottle. This gave Owen his first chance, as his mentor was the Prison Doctor to Lancaster Gaol and was supposed to carry out post-mortems on the not inconsiderable number of prisoners who died there. He took his young apprentice to witness three post-mortems and then left him to carry on. At this time there was an acute shortage of bodies for dissection. It was the time of Burke and Hare and the average student was lucky to have a part share of a cadaver that might have already been dissected several times. The young Owen was in the unusual position of having a regular supply fresh bodies and, as an anecdote that he was fond of retelling later in life shows, was left to his own devices.

Having become interested in the differences between the races, Owen was informed that a Negro had died in Lancaster gaol. Waiting for several days until he knew that the body would have been coffined, he went to the gaol with a screw-driver, notebook, dissecting instruments and a paper bag. After the post-mortem he removed the head, replaced the coffin lid and left. Just outside the main gate he slipped, the bag burst and the head rolled down a steep path and came to rest with a bump at the door of a cottage. The elderly widow in the cottage opened the door and the head fell at her feet. The path and the cottage are still there today and there is still a step down from the street into the cottage. While the old lady fled screaming out of the back door the young Owen retrieved his prize and ran home. Years later, when Thomas Huxley argued that the African Bushman was half way between a European and an ape, Owen retorted that there was no significant difference between the brain of a European and an African.

From Conservator to Professor

After three years study at Lancaster Owen matriculated at Edinburgh where he attended a course of lectures by Dr Barclay. This gave Owen his second chance, as Barclay was so impressed with Owen's ability that he recommended him for the post of Prosector, or Demonstrator to Dr Abernathy at St Bartholemew's London. Abernathy, in turn, was equally impressed and recommended him, in 1827, for the post of Assistant Conservator to the Hunterian collection of the Royal College of Surgeons, a post he held for 29 years, though later becoming Curator. The pay was poor, he was under the direction of a cantankerous committee of elderly surgeons who had trained in the eighteenth century, and he was required to live on the premises close to the dissecting room. His wife sometimes insisted that he smoked a cigar in every room to mask the smell. However, the collection was the finest in Britain, probably in the world, as the specimens brought back by Cook's expedition to the Pacific and by Banks from South Africa, among others, had been added to Hunter's original collection. Owen's duty was to catalogue the collection, as the previous Conservator had destroyed most of Hunter's documents so that he could claim some of Hunter's discoveries as his own. Owen not only identified and catalogued the 12,000 specimens; he did far more. He greatly expanded the collection in several ways. He wrote a booklet on the importance of collecting and preserving rare or unusual specimens and had it distributed to all naval captains and as many merchant marine captains as could be persuaded. He befriended explorers, colonial servants and missionaries and encouraged them to send him specimens, living or fossil. His range of correspondence was vast.

After his death his grandson weeded out his letters but they still filled 26 printed volumes. Most importantly he opened the specimen bottles and dissected and published their contents. His industry, like that of some other Victorians, was staggering. In all he carried out 4,000 dissections and published 600 papers and 12 books.

As well as being a skilled dissector he was a good artist and illustrated his papers with fine, detailed drawings. He gave the first detailed accounts of the anatomy of marsupials and monotremes, the first account of the anatomy of the great apes and the pearly nautilus. From his wide range of contacts he obtained and described the first mammal-like reptiles from the Karroo beds of South Africa and of lemurs from Madagascar. He described *Trichina*, the cause of the tropical disease trichinosis, he described the specimens brought back by Darwin from South America and, most memorably in popular culture, he defined the dinosaurs and invented the name. Later, as a member of the committee that organised the Great Exhibition of 1851, he had life-sized model dinosaurs built and even organised a dinner party inside one. This started the dinosaur mania which continues today.

Recognising his genius, St Bartholomew's elected him first, a Lecturer in Comparative Anatomy and then, when only thirty, Professor. By this time he was a Fellow of the Royal Society and was becoming a national figure, but he retained the post of curator because of the opportunities it gave. When somebody described him as the English Cuvier he modestly replied that he would rather be regarded as the English Owen. One group that did not appreciate his efforts was the elderly committee in charge of the collection. On one occasion they even attempted to cut his stipend in order to maintain the quality of their monthly dinners but, *The Times* thundered in his support and the committee was shamed into withdrawing the proposal.

Circle of friends

In the middle of the nineteenth century English society was compact and homogenous. Owen was either a remarkably amiable character or a brilliant networker, or both. His circle of friends and correspondents reads like a Victorian *Who's Who*. They included Macaulay, Carlyle, Landseer, Holman Hunt, Frank Buckland, Gladstone, Adam Sedgwick, William Whewell, (a fellow Lancastrian), Charles Kingsley, George Elliot, the Duke of Argyll, Robert Peel, the Duke of Teck, Charles Lyell and Charles Dickens. In 1844 he became a member of the Literary Society, and later its President. This society, founded by Dr Johnson, was at the very heart of British society. Its members included such eminences as Lord Tennyson, the Earl of Derby, Lords Salisbury and Palmerston, the Archbishop of Canterbury, Lord Cardigan and General Garnet Wolsey. Some of these connections were of vital importance in supporting his project to build a museum devoted to Natural History. It is difficult to imagine a scientist today reaching such a position, and it is all the more remarkable in that Owen was not an Oxbridge man, nor had he private money. He reached this position entirely by his own merits.

The new railway system enabled him lecture all over the country. The geologist Murchison said, after hearing one of his lectures: 'I never heard a more thoroughly eloquent lecture than that yesterday.' Amongst the feats that made him famous was the prediction that New Zealand had once been populated by large ostrich-like birds, based on a short piece of bone sent to him by one of his contacts. Twenty years later complete skeletons were found. He founded the Royal Microscopical Society. When approached by the police with a bullet extracted from a murder victim and a gun recovered from a suspect, he was able to show, by comparison of the striations on a second bullet fired from the gun, that the gun had been the murder weapon.

He purchased the famous fossil archæopteryx, though Huxley claimed that it was money misspent. Owen speculated that perhaps the development of flight by both birds and pterodactyls was facilitated by a higher atmospheric concentration of oxygen in the Jurassic period, an idea recently confirmed by ingenious isotopic analysis. He was often invited to lecture to the Royal Family. No doubt Albert was the original instigator but the invitations continued after Albert's death. In 1852 the Queen granted him Sheen Lodge, a Grace and Favour house in Regents Park. His committee promptly objected that he was breaking the terms of employment by no longer living on the premises! He finally resigned the post of Curator in 1856, having dissected almost every thing in the collection.

Hypotheses

Science proceeds, ideally, first by the collection of data, then by the development of hypotheses to account for the data, which are then tested by experiment. In addition to his profound contribution to anatomical data he also made outstanding contributions to theoretical biology. In the earlier part of the nineteenth century Owen, like practically all other biologists, believed in the immutability of species. However it was clear that animals conformed to a limited number of body plans. Wrestling with this problem, continental anatomists developed what became to be known as Transcendental Morphology or Philosophical Anatomy. At Jena Owen identified five basic animal plans (vertebrate, mollusc etc.), but related these to the five senses. He also developed a theory that the bones of the vertebrate skull were derived by the modification of five vertebrae, again each related to one

of the senses. Owen introduced some of these ideas into Britain but avoided the more metaphysical relations to the senses. Comparing the vast range of vertebrates he developed the theory of the archetype. In a book on vertebrate limbs he introduced the concept and coined the word 'homologous' to describe organs that we now know to be descended from a common origin. This must be one of his greatest contributions to biology, for without a clear distinction of what is homologous and what is merely analogous, comparative anatomy would be a hopeless muddle.

While the concept of the archetype is useful in comparative anatomy, it in turn requires an explanation and was doubtless one of the factors that led Owen to accept the idea of evolution, ten years before the publication of the *Origin of Species*. Although the geological record is broken and incomplete, and any one stratum was formed over such a short part of geological time that it is difficult to detect evolutionary changes, nevertheless animals appear sequentially, first invertebrates, then fishes, amphibians, reptiles and finally, mammals and birds. Owen had first described the mammal-like reptiles of the Karroo beds and the primitive mammals of the Stonesfield slates of Oxfordshire. Later he described an Oligocene tooth as sharing characteristics of both camels and giraffes. He noted that all Australian fossils were marsupials, rejecting a single Old World origin for mammals, and speculated that the various mammals originated in their provinces, implicitly accepting evolution. The last time Owen wrote in terms of the immutability of species was in 1841. In 1844 Murchison asked him, as the leading biologist of the day, to criticise a book *Vestiges of Creation* which advocated evolution: 'A real man of armour is required, you would do an infinite service to real science'. Owen refused, though he did point out some errors. *Vestiges*, written by an amateur (Chambers), was a discursive book, covering everything from the of the solar system, on which Chambers was well informed, to the evolution of life, on which he was not, and ended with the evolution of language.

Views on evolution – the Natural History Museum

By 1849, ten years before *The Origin of Species*, Owen wrote: 'Nature has advanced by slow and stately steps from the first embodiment of the vertebrate idea in ichthyous vestments until it became arrayed in the glorious garb of human form'. In other words, man was descended from a fish! The *Manchester Spectator* attacked him furiously, complaining that Owen believed that God had peopled the globe, not by a succession of creations but by the operation of general laws. Owen obfuscated, writing that he 'never presumed to offer an opinion on the nature of the creative acts'. In his private letters, however, his view was that evolution took place by 'secondary' or natural laws, though he professed to believe that the process was divinely guided.

Owen may have been cautious in expressing his belief in evolution, because heresy might endanger the great project that was to occupy the second half of his life, the creation of the Natural History Museum. Even in the middle of the century there was no museum devoted to biology. The British Museum, already overcrowded, had a large collection of biological material, both recent and fossil; indeed in the early days of that institution the biological material was the more important. Owen's vision was remarkable. He wanted to combine the Museum and Hunterian collections in what we would now call a research institute. As well as the display halls and store rooms he envisaged well equipped and staffed research laboratories, where trained scientists would describe, name and preserve the vast variety of species then being discovered. This was at a time when professional biologists hardly

existed. He first broached the project to his friend Peel as early as 1840. The Great Exhibition of 1851 (in marked contrast to the Dome) made a huge profit, which helped to fund the Victoria and Albert Museum, Imperial College and eventually the Natural History Museum. However, to obtain support for this project Owen had to retain the favour of the 'Establishment' which still, overwhelmingly, believed in the literal truth of the Bible. Gladstone, whose support was essential, was a fundamentalist Christian. If Owen were too forthright in his support of evolution then his great project might never see the light of day.

In spite of its weaknesses *Vestiges* proved remarkably popular, and in 1854 the tenth edition appeared, quoting Owen extensively on the theory of progressive evolution. Thomas Huxley, then a rising young zoologist, poured crude abuse on the book, and by implication Owen himself. 'Pretentious nonsense', 'blunders', 'charlatan', 'whining assertion of sincerity', 'the product of course feeling, operating in a crude intellect'. He asserted that the theory of fossil progression had no foundation in fact. Only five years later Huxley had become a fanatic convert to the theory and was accusing Owen of believing in the immutability of species!

Huxley and Owen

The story of the conflict between Huxley and Owen is sad and disgraceful. It was initiated entirely by Huxley but was partly responsible for Owen's later eclipse. Huxley began his career as a biologist on HMS Rattlesnake, collecting in the South Atlantic. When he left the navy Owen wrote on his behalf to the First Lord of the Admiralty and obtained four years paid leave for Huxley to write up his results. Huxley used the time well, defining the coelenterates as a distinct phylum and developing a new theory of the skull. Owen later helped to get Huxley elected to the Royal Society. In spite of these acts of friendship Huxley immediately began a systematic attack on Owen. Every year he involved himself in some subject that Owen had made his own, claiming further discoveries or focussing on real or imagined errors. Owen sorrowfully explained: 'Huxley was like the Greek who asked the Oracle "How shall I become a great Man?". The Oracle replied 'Slay one'.

In 1858 Darwin and Wallace presented the hypothesis of evolution by natural selection to the Linnean Society. Owen was in the audience. Later that year Owen, then President of the British Association, alerted a wider audience to the idea. When the *Origin of Species* was published Owen found that, although Darwin quoted Owen extensively in the text, he was described as a supporter of the immutability of species. How Darwin came to make this mistake is difficult to fathom. Owen, who had already been violently attacked for advocating evolution, responded with an anonymous paper in the *Edinburgh Review*. While not opposing the idea, he was not enthusiastic and queried whether all evolution took place gradually. He suggested several alternative forms of evolution and used the examples of the metamorphoses between stages in life cycles, an idea derived from Darwin's own grandfather, as possible parallels to major jumps in evolution. These ideas are congruent with some modern theories. Punctuated equilibrium contrasts with the slow changes envisaged by Darwin. Larvae can become sexually mature and hind limbs can be lost as the result of just a few mutations.

To a large extent the dispute was unreal. Darwin himself ended his preface: 'Furthermore, I am convinced that Natural Selection is the main but not exclusive means of modification'. Later Darwin apologised for his mistake, writing in later editions of *The Origin*: 'I included Professor Owen with other palaeontologists as being firmly convinced of the immutability of species; but it appears ... that this was on my part a preposterous error'. Unfortunately, with

Huxley deliberately stirring, relations deteriorated further. Owen had used the term 'battle for life' as early as 1850, suggesting that small species were better adapted to withstand environmental change. When Huxley was reminded of this he responded by accusing Owen of claiming to have invented the idea of Natural Selection himself. Huxley continued his vendetta against Owen, accusing him of 'evasion and mendacity'. After a dispute at dinner Owen complained sadly: 'Huxley disgraced the discussion by which scientific differences are rectified by imputing falsehood on a matter on which he differed from me'. Owen and Huxley each forced the other into extreme positions. Owen had failed to find a small feature, the hippocampus minor in the brain of the gorilla, possibly because his specimen was not well preserved. Initially he used this supposed difference to emphasize man's uniqueness although, before *The Origin* was published, he wrote: 'I cannot shut my eyes to the significance of that all-pervading similitude of structure - every tooth, every bone, strictly homologous.' Huxley showed that the gorilla did possess a hippocampus minor and pilloried Owen but desperate to find a missing link, fatuously claimed that the Hottentot was as close to an ape as to a human. The dispute over the hippocampus was parodied in Kingsley's *Water Babies*: 'Always remember that the one, true, certain, final and all-important difference between you and an ape is, that you have a hippopotamus major in your brain'. The vendetta waged by Huxley against Owen that began long before *The Origin* prejudiced Owen against Darwinism, although he had first welcomed it. Darwin once called Owen 'his bitterest enemy'.

Later life

The Natural History Museum became Owen's main concern later in his life. In 1856 Owen took charge of the biological collection of the British Museum. With the support of Gladstone and Lord Derby, he petitioned parliament to release funds for the project. Huxley promptly organised a counter-petition opposing the idea and persuaded Darwin to sign it. It is ironic that Darwin's statue now stands in the building that he opposed. As nothing was done he later organised a petition by the trustees, led by Palmerston. In 1859 he drew plans for a building covering 12½ acres, Huxley argued that 2½ acres would be sufficient. Only in 1870 was Owen appointed Director and work finally began.

In addition to his scientific work Owen made a huge contribution to the public weal. He was a member of three Royal Commissions, including that which built the London sewerage system and another which recommended that Smithfield Market be removed to the suburbs, a project unfortunately delayed for almost a century. After the success of the new sewers in London he was invited to many other towns, including Lancaster, to advise on their sewerage problems. He was also instrumental in the reorganisation of the Royal Society, which had developed into a gentleman's club, and the development of biology as a university subject.

He had his faults. The Duke of Argyll, a friend wrote: 'To outsiders and juniors he was most charming and instructive. As long as Owen was the acknowledged expert he was a model of kindness and generosity. When interacting with equals he could be petty and failed to act with the magnanimity he could afford'. Perhaps his background and struggle for success left him feeling inadequate. Subject to Huxley's continuous harassment he became defensive and stubborn. During the second half of the nineteenth century Darwinism came to dominate biology completely and after his death Owen was largely forgotten, indeed written out of the subject. Now he and his work are being reassessed and his enormous contributions recognised. Biographies

and studies on Owen and evolution are appearing, particularly in America. When he died the Royal Society set up a committee to consider a suitable memorial. It was chaired by the Prince of Wales and contained the Presidents of the Royal Society, the Geological Society, the Linnean Society, the Zoological Society, and the Royal Microscopical Society; most of these societies he had chaired himself at some time. It included such luminaries as the Lord Chancellor and the Archbishop of Canterbury as well as representatives of scores of universities and academies from all over the world. His bronze statue, now in his Natural History Museum, was subscribed in record time. Even Huxley contributed. Before he died Owen had been awarded more than one hundred honours, university degrees, gold medals, memberships of academies, etc, probably more than any other scientist before or since.

PROFESSIONAL CONFLICTS IN ANAESTHESIA IN THE UNITED STATES

Dr Andrew Smith
Consultant Anaesthetist, Royal Lancaster Infirmary

Introduction

This paper traces the development of the speciality of anaesthesia in the United States, with particular attention to the conflicts between nurses, doctors and the hospitals in which they work.

Although the first anaesthetic to be given in the United States was administered by a doctor, there was initially little subsequent interest among American physicians in anaesthesia. It fell to nurses to learn this skill during the second half of the nineteenth century; frequently these were nuns in the many Church-run institutions of the time. For the most part this routine activity went undocumented, one notable exception being Sister Mary Bernard, who worked at St Vincent's Hospital in Erie, Pennsylvania. Her records are the earliest showing the care of anaesthetised patients by nurses, and date back to 1887. The most famous nurse anaesthetist of the period, Alice Magaw, worked at St Mary's Hospital in Rochester, Minnesota (later to become known as the Mayo Clinic). She anaesthetised for Charles Mayo and the pair demonstrated their practice to many visiting clinicians. This pattern persisted and in the early years of the twentieth century, nurses were almost the sole providers of anaesthesia. Such doctors who did practise were either those that had drifted into the speciality as a means of supplementing their income, or were eminent practitioners who had distinguished themselves by technical virtuosity in practical skills such as endotracheal intubation. The first educational programme to prepare nurses for anaesthetic practice was established in 1909 and many nurses administered anaesthesia during the First World War.

The 1920s and 1930s were marked by the beginning of a struggle to establish anaesthesia as a medical speciality, by defining the activity as medical work requiring diagnosis of disease and prescription of treatment. One of the first suggestions of change came from Ralph Waters, Professor of Anesthesia in Madison, Wisconsin. Waters is well known for his attempts to establish the scientific basis of the speciality, but he saw nurses as professional competitors. Madison was one of the few places in the USA where anaesthesia was provided by doctors. The 1930s saw the inception of the main professional organisations, possibly in response to a perceived need for stronger representation. The American Association of Nurse Anesthetists was formed in 1931, and the ASA (initially the American Society of Anesthetists) in 1935.

Financial arrangements

One of the reasons why nurses were favoured elsewhere may have been financial. As salaried members of hospital staff, they were paid the same regardless of workload. This contrasted with the usual payment method for doctors at the time, which was on a fee-for-service basis. In fact, anaesthesiologists' redefinition of anaesthesia as medical work seems to have encompassed this aspect also. An early (but unsustainable) policy of the ASA was that it was unethical for a doctor to be a salaried hospital employee, though as those most likely to be in this position were anaesthesiologists in teaching institutions, on whom the future of the speciality depended, this was swiftly dropped. In 1938 anaesthesiology was recognised as a

medical specialty by the American Medical Association. Only in 1945 did the ASA change its name to the American Society of Anesthesiologists.

After the Second World War, numbers of both nurse anaesthetists and, more particularly, anaesthesiologists, grew considerably. In the 1960s, the reforms of the public health system introduced by President Lyndon Johnson proved to be pivotal in establishing medical anaesthesiology as a force to be reckoned with. The Medicare programme, which came into being in 1966, was designed to fund healthcare from the public purse for the elderly and disabled. Whether anaesthesiologists' lobbying succeeded or whether this was coincidence is unknown. Billing for Medicare (and Medicaid, set up to cover those on low incomes) is in two parts. Part A is for hospital services (bed costs, salaried staff costs, heating etc), whereas Part B is for physicians' costs. Under Medicare billing rules, anaesthesiologists were allowed to bill the state for each procedure they were supervising. Other insurers largely adopted the same practice. This was clearly very lucrative for anaesthesiologists, who saw their incomes rise considerably in real terms compared to many other medical specialties. Another development in the early 1970s was the creation of the anaesthesiologist's assistant (AA). This role was, and is, promoted by the ASA as an alternative to nurse anaesthetists. The AA's training follows a first degree (usually in science) and consists of about 2 years' theoretical and clinical training to enable them to administer anaesthetics under the supervision of an anaesthesiologist.

The payment arrangements were widely recognised to be unfair, and in 1983 Medicare began a series of well-intentioned changes designed to redress the balance between doctors and nurses. (Further research is needed to determine how much of this was due to nurse anaesthetists' lobbying). Medicare made the distinction between medical direction, where anaesthesiologists could be involved in the care of up to four patients and bill for each, and supervision, where they were involved in the care of more than four patients simultaneously. A list of conditions was published, which had to be satisfied to meet the criterion of medical direction and claim payment (see box).

TEFRA conditions of payment for 'medical direction'

The anaesthesiologists billing for the medical direction of a CRNA must:

1. perform the preoperative assessment
2. prescribe the anesthesia plan
3. participate in the demanding parts of the anaesthetic including induction and emergence)
4. make frequent checks during the course of the anaesthetic
5. remain physically available
6. not personally administer concurrent anaesthetics
7. provide indicated postoperative care

Source: Tax Equity and Fiscal Responsibility Act 1982

Leaving aside the consideration that nurse anaesthetists could perform most of these functions anyway, the net effect of this was actually to discourage team anaesthesia. This anomalous situation persisted until 1987, when nurse anaesthetists were allowed to bill

Medicare directly. This was intended to promote competition between anaesthesia providers. However, as both were able to bill for the same operation, it tended to increase costs (nurses being typically paid at about four-tenths of the anaesthesiologist's fee for the same procedure). In 1993, a further change limited the total amount payable to 120% of the anaesthesiologist's fee and dictated that, where two providers were involved, the fee should be split equally. In 1997 this cap was further reduced, to 100% of the anaesthesiologist's salary.

Whilst this was intended to make things fairer for nurses, it did not actually improve their lot. It meant that there was now no financial incentive for 1:2 anaesthesiologist: nurse working, whereas ratios of 1:3 or 1: 4 were still worthwhile. Two consequences ensued. Firstly, anaesthesiologists who employed nurses as part of group practices encouraged their nurses to submit bills, but then paid them less than 50%. Alternatively, nurses were either employed on a salaried basis by hospitals or, in some cases, made redundant. Although at a national level nurse anaesthesia was apparently being promoted by these legislative changes, anaesthesiologists were still able to lobby hospital administrations to influence working practices. They were of course assisted by the fact that, under the Part A/Part B payment arrangements outlined above, anaesthesiologist costs lay outside the hospital element, and so allowed the hospital's direct anaesthesia costs to be less even though nurses' salaries were lower.

Unfinished business

Thus, in the early 1990s, the two main groups of anaesthetic providers were in direct conflict. Against this highly charged backdrop began the search for evidence that one provider was safer and more effective than another. In Abenstein and Warner's 1996 article¹ no new data are presented, the article being based on the authors' interpretation of older studies. This is clearly stated in the article, and an accompanying editorial² described the editor's deliberations on whether to publish or not. Despite these admitted shortcomings, it is widely cited as evidence that doctors provide safer anaesthesia than nurses.

In the last few years, as it has been generally accepted that not only is there evidence of a difference, but that such research is highly unlikely for all sorts of reasons. The focus of the debate has shifted to the professional capabilities of the main providers and the lobbying continues. In 2001, a law was passed allowing nurse anaesthetists to practice independently (that is, without supervision by a physician). Whilst this represented a victory for the nurse anaesthetist lobby, it still had to be ratified on a state-by-state basis, and at the time of writing only 12 states have done so.

In 2003, the ASA stepped up its campaign to extend the number of states where its favoured co-worker, the anaesthesiologist's assistant, enjoys practice rights, there were eight states and the number quickly rose into double figures.

Both sides have apparently recognised that such entrenched positions are untenable in the longer term and in May 2004, leaders of the ASA and AANA met to discuss 'issues of common interest related to the Medicare payment system'. Unlike most historical tales, this is thus unfinished. However, the historical aspects of this story carry a contemporary moral. The NHS Modernisation Agency's Changing Workforce Programme is currently sponsoring the 'New Ways of Working in Anaesthetics' initiative, designed to explore the possibilities for training non-physician anaesthetic practitioners in the UK. There are many possible

reasons why this might not be a desirable move for British anaesthesia, but I hope I have shown that fears of a repetition of the American experience are unfounded.

Future research in this area could usefully focus more closely on the way in which anaesthesia was reinvented as a medical specialty in the 1930s and 1940s, as this sociologically fascinating transformation is only briefly dealt with here. Likewise the reasons for the anomalous but lucrative payment arrangements under the 1966 Medicare legislation could be further explored.

Acknowledgements

The work from which this paper is drawn, a systematic review entitled *Exploring professional boundaries in anaesthetics*, was funded by the UK NHS Service Delivery and Organisation Research and Development Programme. Marie Kane, the project's research fellow, was first author on the paper below³ of which this article is an abridged version, and is published here with the agreement of the Editor of Anaesthesia.

References

1. Abenstein JP, Warner MA. Anesthesia providers, outcomes and costs. *Anesthesia and Analgesia* 1996; **82**:1273-83.
2. Miller RD. Perspective from the Editor-in-Chief: anesthesia providers, outcomes and costs. *Anesthesia and Analgesia* 1996; **82**:1273-83.
3. Kane M, Smith AF. An American tale - professional conflicts in anaesthesia in the United States: implications for the United Kingdom. *Anaesthesia* 2004; **59**:793-802.
4. Smith AF, Kane M, Milne R. Comparative effectiveness and safety of nurse and physician anaesthetists: a narrative systematic review. *British Journal of Anaesthesia* 2004; **93**:540-545.

NIL BY MOUTH - A BRIEF HISTORY OF PREOPERATIVE FEEDING AND FASTING

Drs Mark Shaffer and Neil Adams

Department of Anaesthesia, West Suffolk Hospital NHS Trust, Bury St Edmunds

Introduction

This paper will follow the history of guidelines on pre-operative fasting and feeding. Even today it is recognised that the exact period of restriction of fluids and food by mouth prior to anaesthesia and surgery remains controversial, particularly with regard to children.

Following the introduction of anaesthesia in 1846 there was interest in placing the specialty on a scientific basis. As early as 1847 Dr John Snow described a link between etherization and subsequent vomiting and also between a full stomach and a more difficult anaesthetic course,³ but it was not until 1862 that minutes of a meeting were published in *The Edinburgh Medical Journal*, which discussed the demise of a soldier who had clearly vomited and aspirated under anaesthesia. As in Snow's text, the subject of pre-operative fasting is difficult to follow over this period, especially in 19th century medical writing where the subject is often omitted from the index but included in the body of the manuscript. A review¹ of German surgical attitudes to pre-operative preparation seems to roughly mirror the developments in England and the United States of America, but focuses on notable names in Germany and Switzerland.

While the experiences of the First World War undoubtedly contributed to medical understanding, anaesthetic texts continued to offer variable and often conflicting advice which concerned various low residue diets, purgatives, enemas and excessive bed rest. This continued after the Second World War. Nevertheless from early times there was a clear recognition of the increased risks of operating on very ill patients, especially those with gastrointestinal obstruction. Preferred protective mechanisms were gastric drainage, lavage, and postural manipulations until the seminal publication by Sellick in 1961 describing cricoid pressure.²⁸ In 1951 the Association of Anaesthetists was still highlighting the issue as they reported on the preventable deaths of 43 patients.

A detailed review by John McIntyre,² concerning 20th century attitudes to prophylaxis obtained by searching the Cumulative Index Medicus (1900-1997) for aspiration-related key words shows patchy attention to risk factors and prophylactic measures. There is a marked improvement in the 1960s, but it was not until the 1980s when all text-books became comprehensive.

1846-1905

As early as 1847 John Snow noted the inter-relationship between anaesthetic, food and fasting. In his monograph entitled *On the Inhalation of the Vapour of Ether*,³ he commented that a full meal causes temporary plethora and seemed in several instances to make the operation of the ether less easy. He also noted that nausea and vomiting were rare unless a meal had been taken prior to the etherisation. This vomiting could occur either during anaesthesia or after and could take the form of passive regurgitation, or take an active form. He perspicaciously made the recommendation that the best preparation for ether was a 'sparing breakfast or luncheon from two to four hours previously'. Various forms of this

advice, probably reflecting the lack of knowledge and experience of the unregulated anaesthetist turn up in the literature over the next 100 years. In German medical literature, referred to by M Goerig,¹ the surgeon Johann Heyfelder also wrote in 1847 of the problems of anaesthetic in patients with full stomachs. He noted the increased risks of vomiting and therefore preferred anaesthesia in the morning, ie. before eating. Again like Snow he did not appear to identify the specific risk of aspiration, only that the anaesthetic was more difficult.

In 1848 JY Simpson recounted the story of the death of a 15 year old girl undergoing a minor operation under chloroform, when she suddenly blanched and spluttered as if having a seizure.⁴ The coroner's jury passed a verdict of 'death from congestion of the lungs due to the action of chloroform'. However, Simpson pointed out that the anaesthetist had immediately attempted to give the girl water followed by a mouthful of brandy while unconscious, and she was heard to 'rattle in her throat for a minute before she stopped breathing. Simpson argued earnestly using the findings of her autopsy, claiming she must have died from aspiration. Given the then unknown nature of chloroform and the sequence of events it seems more likely that the girl suffered a fatal arrhythmia before the brandy was administered.

The surgeon Albert Kreuser who worked at the Tübingen Surgical Clinic published a report in 1850 where he warned against the possible fatal consequences of aspiration during narcosis.⁵ Contrarily the German surgeon Viktor von Bruns, in a handbook of surgical practice from 1873, played down the fasting requirement and risk of aspiration claiming that it would exacerbate existing exhaustion,⁶ which seems to have been a prevailing concern cited by many.

John Snow noted in 1858⁷ that the chief drawback to the benefit conferred by chloroform was the sickness which in many cases followed its use. He pointed out that vomiting was most common after food. However 'severe faintness from loss of blood during an operation of course forms an exception to this rule; in such a case brandy and water should be given, and repeated if it should be vomited'. At a meeting of the Obstetrical Society of Edinburgh in 1862 Dr G W Balfour presented a letter from a John Balfour,⁸ field surgeon to the army in Burmah [sic], concerning a soldier who had been shot through the thigh and was haemorrhaging. While the artery was being tied the soldier, who had recently eaten, vomited while under chloroform and died. Autopsy revealed food within the trachea.

Hunt gives a report⁹ in 1876 about the near death of a 7 year old girl undergoing eye-surgery with chloroform. The girl's parents had been instructed about an unspecified period of starvation prior to elective anaesthesia. It appears that these instructions had not been adhered to and that she had also been given a teaspoon of brandy 20 minutes before chloroform administration. In summary Hunt explains that the preparation of the patient should involve clearing out the bowels with a mild purgative and enema and forbidding food for four hours prior to surgery, with the exception of a stiff glass of brandy which appeared to prevent sickness. Around the turn of the century other renowned surgeons, such as Theodor Kocher from Bern, were recommending that 45 minutes before induction the patients were given tea with red wine or Cognac.¹⁰ In particular he felt this was likely to be most effective in alcoholics. In 1885 the Swiss surgeon Otto Kappeler reported a shocking death rate of 12% in a group of 85 patients as a direct consequence of aspiration.¹¹

The Anaesthetics Committee of the British Medical Association was formed in 1891 and set about analysing cases recorded by anaesthetists in special books during 1892. Its findings

were published in 1901.¹² A total 25,920 cases were reviewed in great detail. In particular they focused on cases where severe complications or death occurred and were deemed to be related directly to the anaesthetic. Although there was no statistical analysis they clearly demonstrated that chloroform was a high risk anaesthetic when compared to ether. Confusingly, nausea and vomiting were specifically excluded from the list of complications, but the following statement appeared under the heading *Phenomena Under Anaesthesia*: 'The phenomenon retching and vomiting was frequently associated with complications. It doubtless bore a causal relation to the onset of complications'. Despite a page of conclusions no mention of the risks of vomiting, aspiration or full stomach is made. Buxton described the preparation of the patient in his book *Anaesthetics*, published 1892.¹³ Important factors included the selection of a sensible hour, avoiding a long-fast causing a lowered vitality and no solids to be given 3 hours prior to surgery, but a light meal of soft and easily digested matters to be taken three hours before the surgeon arrives. This could consist of milk foods, strong beef-tea or jellies (Brand's or Edge's essence of beef in jelly). Weakly persons should take brandy or whisky half an hour before. Bowels should be cleared with a purge. By 1920 Dr Buxton noted in the sixth edition¹⁴ that 'the experience gained in the Great War has modified and in many ways enlarged our knowledge of anaesthetics'. He expanded on the preparation of the patient but its essence had not greatly changed, although he now appeared to be in favour of up to several days' preparation including laxatives, purges and nutrient enemata of beef extract, suppositories or glucose in saline. 'Beef-tea is recommended, it is essential that it should be made at home and with great care. There must be no excess of salt.' These obsessions are widespread and repeated in various guises in most publications.

The innovative Polish surgeon Johannes Von Mikulicz, while working in Breslau around the turn of the 19th century, became convinced after analysing fatal outcomes that by far the largest number of deaths happened at induction before the operation had begun. In his book¹⁵ published in 1901 and describing methods of anaesthesia, he requested that his patients be fasted for six hours and their stomachs emptied with a 'stomach sound' especially in cases of gastrointestinal obstruction.

Dr Barber,¹⁶ a dentist, wrote that 'one of our well-known anaesthetists made the statement that the habitual drunkard is not in a normal condition unless he is full of strong drink, and should he come up without any, it is better to have him take a few drinks ... so that he will be normal'.

1905 - 1945

During this period a plethora of methods of patient preparation existed, many seemingly based on anecdotal reports. Consequently practice appears confused and contradictory.

Luke¹⁷ recommended preparation times varying from a couple of hours' abstinence from food in a healthy person to perhaps weeks or months of dieting and medicinal treatment, where a prolonged operation was indicated. In addition, a light breakfast of Cocoatina (Victorian soluble cocoa essence) with thin bread or rusks was preferred. If chloroform anaesthesia was planned an ounce of good brandy would be given 20 minutes before operation. He also observed: 'I have seen even Bovril taken several hours before reappearing practically unchanged after the operation. Milk is to be regarded as solid food'.

Examples of practice taken from some anaesthetic textbooks 1905 – 1941
(Grey highlight – see specific comment below)

	Luke ¹⁷ 1905	Blomfield ¹⁸ 1922	Mason ¹⁹ 1938	Maxson ²⁰ 1938	Dogliotti ²¹ 1939	Macintosh ²² 1940 <i>Ambulatory Patient</i>	Macintosh ²² 1940 <i>Hospitalised Patient</i>	Minnitt ²³ 1941
Patient Prep. Time	Hours to months	1 -2 Days	16 to 36+ Hours	Variable		None	1 -2 Days	2 Days
Aperient	Yes	Depends	No	No		No	Mild	Yes
Enema	Yes	Depends	Yes	No		No	Mild	Yes
Light Diet Day Before	Yes	Yes	Yes	Low Residue		No	Yes	Yes
Preop Rest	Yes	Yes				No	Yes	Yes
Pre-op food Tea, Soup or Bovril	Yes	Yes	Yes	Special		Yes	Yes	Yes
11am food for PM op.	Yes	Yes		No			Yes	Yes
Recommends NBM (Food)		4 Hours	3 Hours	Allowed		3 Hours	3 Hours	3 Hours
Recommends NBM (Liquid)			Allowed	Allowed		2 Hours	?	3 Hours
Preferred op time	AM	AM?				No		Early
Aspiration Risk					Yes			?
N+V due to anaesthetic					Yes			
Special		Mouth Care						

Silk, Lecturer on anaesthetics at King's College Hospital wrote in 1914,²⁴ 'The well-being of the patient ... will be materially increased if some care is devoted to the preparation of the patient,' and 'It is a well-known fact that patients who take anaesthetics best ... are those who have led "invalid lives" and the most troublesome case are the emergency cases.' Therefore in order 'to place our patients in the most favourable position, we should encourage them to undergo ... at least a week (in an average case) of what may be termed "hospital regime". This does not of necessity mean entire rest in bed, though that is good in many cases.' He also makes reference to Professor Kocher,¹⁰ stressing the importance of preparing the patient both physically and mentally. Again this is a common theme of 'physical and psychic' preparation:

'It is a generally accepted axiom that from 6 to 12 hours before the administration only very little food, of the lightest kind should be taken and absolutely nothing but a few sips of water for about 5 hours... a brisk purge on the previous evening is essential and this should be followed by an enema within an hour or two of the operation, if there be any doubt as to the 'briskness' of the purge. The best time for the operation is undoubtedly the early morning ... the next best time is 2 pm ... [when] I prefer the patient to have a very light breakfast, with little or no milk, and between 10 and 11 am a cup of broth or beef tea ... to prevent the feeling of exhaustion.' He also recommended the following in old and feeble patients: 'give a couple of nutrient enemata, one four hours before the operation and second about 10 minutes

before. These may be composed of 2 ounces of hot beef-tea, the yolk of one egg, and 1 ounce of brandy; it may with advantage be peptonised.⁷

Blomfield¹⁸ felt that particular attention should be paid to the cleansing of the mouth, the teeth being brushed after every meal on the day before, the mouth well rinsed, and the throat gargled with Listerine or some similar antiseptic. He explained that such measures probably helped to avoid post-operative sepsis and the occurrence of parotid inflammation during convalescence.

Dr Lukis wrote an essay about anaesthesia in general practice²⁵ that won the Sir Charles Hastings Prize of the British Medical Association in 1934. She took a very pragmatic view and dismissed or diluted many of the above pre-operative preparations. She suggested that the normal emptying time for the stomach is 4 hours and that this period of starvation would normally be sufficient, but then gives an example of a nine year old child who vomited lumps of food 15 hours later. She goes on to say that 'many minor operations and quite a number of major ones in this series were undertaken on improperly prepared patients'. She appears to play down the significance of this.

Mason¹⁹ believed a light diet was in general appropriate the day before. The exact menu depended on the nature of the operation. He wrote: 'the diet should be calculated to leave but a small residue and one which will be quickly absorbed. The diet ordinarily given is the "soft-solid" diet from which milk, productive of bulky residue, is omitted. Orange juice, to which a teaspoon of lactose may be added, is given with each meal.' He also suggested that, 'Male patients are asked to employ the urinal while lying bed to accustom themselves to its use. Similar practice with the bed pan is of value.' On the morning of the operation an 'ether breakfast' consisting of a black cup of coffee, with sugar, or a cup of tea without milk, could be given, but was not urged upon the patient.

Maxson²⁰ took a rather surprising view by today's standards; while conducting spinal anaesthesia he recommended: 'if the case requires it, the administration of food and fluids can be continued up to the time of the operation; indeed, fluids can be and frequently are, taken in small quantities while the operation is going on. In emergency ... all preparation may be omitted without incurring any great risk'. Indeed he was so concerned about lack of pre-operative nutrition that he suggests extra fluid and carbohydrate during the previous 24 hours. Up to 3500cc should be given by mouth although a smaller amount might be given intravenously. He explained that consuming half a pound of good candy, or crackers and honey were easy ways of achieving the desirable carbohydrate intake. He was also a proponent of the wine enema or proctoclysis, which would provide fluid, sugar, alcohol, tannin and volatile oils. He recommended 'a heavy sweet wine such as port, which is absorbed less rapidly than a thin bodied white wine; 300cc are given by retention enema about fifteen minutes before the anaesthetic'. Maxson also provided a detailed pre-operative breakfast, snack, dinner, tea and supper menu which included the following in various unappetising combinations: fruit juice, heavy cream, egg, butter, rice, arrowroot cookies, coffee, candy, broth and gelatine in various amounts.

Dogliotti (1939)²¹ warned that very frequently he had cause to regret breaking teeth or dentures and the consequent danger of aspiration into the trachea. Macintosh (1940)²² with particular regard to nitrous oxide anaesthesia in ambulatory patients said: 'Purgation is neither necessary nor advisable. Unfortunately the old-fashioned prejudice in favour of

starvation before anaesthesia still persists, and the patient may, in consequence come weak to the dental chair from lack of food... starvation is in fact a much more frequent cause of post operative complications such as nausea, retching ... The patient should take an average meal 3-4 hours before the operation or if less than 2 hours, before some sugar-containing food ... eg. a cup of tea with sugar, once of barley sugar or orange juice.' For hospitalised patients he considered that: 'no special diet is necessary beyond the regime to which a poor sailor would subject himself before facing a rough sea crossing'. Minnitt²³ was still prescribing, in 1941, a light diet that might consist of fish and milk pudding in the middle of the day and a little soup at night.

1945 Onwards

With the knowledge gained through treating Second-World War casualties and a growing appreciation of the need for evidence-based medicine, a more coherent picture began to emerge. In 1946 Curtis Mendelson published his seminal paper²⁶ on the aspiration of stomach contents. He examined the records of 44,016 pregnancies at the New York Lying-in Hospital between 1932 and 1945 and identified 66 instances (0.15 %) of aspiration of stomach contents. There were only 2 deaths, and these occurred immediately from complete obstruction in the subgroup of 5 patients who aspirated solid food. There were no recorded deaths in the group who aspirated liquid and developed pneumonitis, which manifested itself with features akin to a severe asthma attack. Mendelson claimed that gastric emptying time was often prolonged during labour and it was not uncommon to vomit food ingested up to 48 hours previously. The primary detrimental mechanism for liquid aspiration was the action of hydrochloric acid. He concluded that 'the dangers of fluid aspiration have been overlooked, for it is common hospital practice to urge water, tea and fruit juices throughout the first stage of labour. The necessity of feeding the parturient has been over-emphasised. Misinformed friends and relatives often urge the patient to ingest a heavy meal early in labour before coming to the hospital...the danger could readily be avoided by emptying the stomach prior to the administration of a general anaesthetic. The time-honoured 'finger in the throat' method is always available, but the oral administration of a warm alkaline solution would in all probability produce the same desired effect.'

In 1951 the Association of Anaesthetists published a comprehensive report,²⁷ which was the culmination of 18 months investigation by a committee into 43 cases of fatal aspiration. Two members, Morton and Wylie, concluded that most deaths were preventable, and were due to inexperienced anaesthetists and lack of precautionary measures even when indicated. Additionally they deliberately presented a didactic argument, because most text-books of anaesthetics failed to deal with this subject in a way likely to be helpful to the beginner. They explained the clinical situations which required precautions to be taken such as trauma, gastro-intestinal obstruction and obstetric cases, and stated that if it was certain that there was material in the stomach 'non-urgent operations for which a general anaesthetic is required should be postponed. This is a rule which should be strictly enforced. Any exceptions to it will be taken as precedents by unintelligent and uncooperative surgeons.' Furthermore 'nurses in training cannot be expected to appreciate the importance of pre-operative preparation if this rule is frequently broken'. They stated that if an immediate general anaesthetic is required that the stomach must be emptied via an oesophageal tube, using repeated washings.

Sellick referred to Morton and Wylie's comments when he published his brief but ground-breaking paper²⁸ on cricoid-pressure in 1961. He made no comment about pre-operative

fasting per se but reiterated the regurgitation risks in obstetric and emergency general surgery cases. He also suggested that a Ryle's tube be passed, but removed before cricoid pressure, that the patient be intravenously cannulated and pre-oxygenated before induction, and intubated following an intravenous barbiturate and muscle-relaxant.

The triennial reports of the *Confidential Enquiry into Maternal Mortality* do highlight the risks of aspiration of stomach contents. For example, during the period 1973-1975 there were 37 anaesthetic deaths of which 13 were due to aspiration of stomach contents. Eight out of the nine who died from Mendelson's syndrome had been given antacids, yet in seven no cricoid pressure had been applied and in five it had done incorrectly,²⁹ thus indicating the supreme importance of cricoid manipulation in protecting the patient.

In 1990 reports^{30,31} have shown that there is no difference in gastric volume or pH in healthy children even if allowed free clear fluids up to 2 hours pre-operatively. Consequently there has been a relaxation in the guidelines regarding fasting in children to the extent that glucose fluid may be encouraged.³²

Conclusions

Since the very first anaesthetic induction there has a wide disparity in recommendations concerning the optimum pre-operative feeding and fasting of a patient about to undergo anaesthesia and surgery. For a period of approximately 100 years a morass of conflicting reports and variable practice existed. A consensus about what constitutes good practice began to emerge after the Second World War. Subsequently the growing recognition of the importance of evidence based medicine, and influential works by Mendelson and Sellick resulted in a consolidation of good-practice. Textbooks now recognise the fundamental importance of minimising aspiration risk and are largely in agreement about how to achieve this. However, there still remain variations in method as regards children, and exact periods of starvation where issues of dehydration and hunger are also significant.

References

1. Goerig M. Ursprunge des Nuchternheitsgebots. *Anesthesiologie Intensivmedizin Notfallmedizin Schmerztherapie* 1996; **31**:245-247.
2. McIntyre JWR. Evolution of 20th century attitudes to prophylaxis of pulmonary aspiration during anaesthesia. *Canadian Journal of Anaesthesia* 1998; **45**:1024-1030.
3. Snow J. On the inhalation of the vapour of ether. *London Medical Gazette* 1847; **39**:28 & 43-44.
4. Simpson JY. Remarks on the alleged case of death from the action of chloroform. *Lancet* 1848; **1**:175-176.
5. Kreuser E. *Versummungsbericht Württembergisches Medicinisches Correspondenzblatt* 1850; **20**:289.
6. von Bruns V. *Handbuch der Chirurgischen Praxis Band 1*. Stuttgart: Enke, 1873.
7. Snow J. *On chloroform and other anaesthetics. Their action and administration*. London: Churchill, 1858.
8. Balfour GW. New cause of death by chloroform. *Edinburgh Medical Journal* 1862-1863; **8**:194-195.
9. Hunt JW. Sudden arrest of heart's action and respiration during chloroform inhalation: recovery. *British Medical Journal* 1876; **1**:141.
10. Kocher T. *Chirurgische Operationslehre*. Jena: Fischer, 1907.

11. Kappeler O. *Anaesthetica*. Stuttgart: Enke, 1880.
12. Eastes G. Remarks on the conclusions of the Anaesthetics Committee of the British Medical Association. *British Medical Journal* 1901; ii:441-446.
13. Buxton DW. *Anaesthetics*. London: HK Lewis, 1892.
14. Buxton DW. *Anaesthetics, their Uses and Administration*. London: HK Lewis, 1920.
15. von Mikulicz J. Die Methoden der Schmerz Betaubung und ihre gegenseitige Abgrenzung. *Bruns Beitt klin. Chir.* 1901; **64**:785-790.
16. Barber ES. *Practical Anesthetics with Nitrous Oxide and Oxygen*. Chicago: National Dental Publishers
17. Luke TD. *A Guide to Anaesthetics*. Edinburgh: Green, 1905.
18. Blomfield J. *Anaesthetics in Practice and Theory*. London: Heinemann, 1922.
19. Mason RL. *Preoperative and Postoperative Treatment*. Philadelphia and London: WB Saunders, 1937.
20. Maxson LH. *Spinal Anaesthesia*. Philadelphia: Lippincott, 1938.
21. Dogliotti AM. *Anesthesia. Narcosis, Regional, Spinal*. Chicago: Debour, 1939.
22. Macintosh RR. *Essentials of General Anaesthesia*. Oxford: Blackwell, 1940.
23. Minnitt RJ. *Handbook of Anaesthetics*. Edinburgh: Livingstone, 1941.
24. Silk JF. *Modern Anaesthetics*. London: Edward Arnold, 1914.
25. Lukis DH. *Problems of Anaesthesia in General Practice*. London: Hodder & Stoughton, 1935; 111-114.
26. Mendelson CL. The aspiration of stomach contents into the lungs during obstetric anaesthesia. *American Journal of Obstetrics and Gynecology* 1946; **52**:191-205.
27. Morton HJV, Wylie WD. Anaesthetic deaths due to regurgitation or vomiting. *Anaesthesia* 1951; **6**:190-201, 205.
28. Sellick BA. Cricoid pressure to control regurgitation of stomach contents during induction of Anaesthesia. *Lancet* 1961; **2**:404-406.
29. HMSO. *Report on Confidential Enquiries into Maternal Deaths in England and Wales*. London: 1973-1975.
30. Splinter WM, Stewart JA, Muir JG. Large volumes of apple juice preoperatively do not affect gastric pH and volume in children. *Canadian Journal of Anaesthesia* 1990; **37**:36-39.
31. Splinter WM, Schaefer JD. Unlimited clear fluid ingestion two hours before surgery in children does not affect volume or pH of stomach contents. *Anaesthesia and Intensive Care* 1990; **18**:522-526.
32. Taylor TH, Major E. *Hazards and Complications of Anaesthesia*. Edinburgh: Churchill Livingstone, 1993.

THE ORIGINS OF OPIUM

Dr David Counsell (Abstract)
Maelor Hospital, Wrexham

The area from which opium originates is frequently cited as Mesopotamia, based upon pictorial reliefs and cuneiform texts from ancient Sumeria *circa* 3000 BC. The identification of a plant named 'joy plant', ascribed by Nelligan in 1927 to be opium is now disputed, with scholars generally agreed that the mistranslated glyphs refer to a cucumber type plant. Pictorial reliefs from Sumer and subsequent Mesopotamian civilisations such as Assyria and Babylonia frequently depict a poppy-like plant, yet again its identification is disputed, with some favouring pomegranates as an alternative.

The opium poppy (*papaver somniferum*) is not a naturally occurring plant; it is by definition cultivated, having lost the ability to self-seed and requiring the intervention of man to split the capsule and spread the seeds. The closest poppy is *P.stigerum*, which is the only other poppy to produce morphine and other opium alkaloids, though in much smaller quantities than *P.somniferum*. It is thought that *P.stigerum* is the precursor from which the opium poppy was originally cultivated.

The earliest clear description of opium is provided by Dioscorides Pedanius of Anazarbus in his *Materia Medica*, a collection of pharmacological agents compiled during his travels with the Roman legions during the first century AD. Prior to this the history of the drug is unclear, and many of the theories regarding its use in societies such as ancient Egypt are at best speculative.

Finds in La Cueva de los Murcielagos (Cave of the Bats) near Albuñol, in the foothills of the Sierra Nevada in Southern Spain, suggest a re-evaluation of the origins of opium. Discovered in the mid-19th century, the cave contained a female 'royal' burial with accompanying retainers laid out in a semicircle around the queen.

Accompanying the dead were a number of Esparto grass bags containing small cultivated poppy capsules, which botanists agree are an early form of the opium poppy. The finds have been radiocarbon dated to the late Neolithic period *circa* 4500 BC. It is also of note that *p.stigerum* occurs naturally in that area. The finds are now housed in the Museo Archeologico in Madrid.

WILLIAM HOOPER (1818-1878) AND THE EARLY WEEKS OF ANAESTHESIA IN ENGLAND

Dr David Zuck
Past President, HAS

The discovery of a complete Hooper ether inhaler (Figure 1) and the need to test the claim that it was the very apparatus used by James Robinson to anaesthetise Miss Lonsdale at the Gower Street house of Dr Boott on 19th December 1846 for the extraction of a firmly rooted molar tooth, was the cause of this enquiry into exactly what vaporizers were used during the first few days of general anaesthesia in London, and into the place of Hooper's apparatus in the sequence of events. It was immediately obvious that the account of this period in Dr Duncum's book is not sufficiently detailed.¹ It relies largely on selective quotes from Boott, Robinson, and Liston, and a little research showed that it contains some inaccuracies.

The first thing to be established is the exact design of the apparatus that Robinson used on the morning of Saturday 19th, and who made it. The apparatus illustrated by Duncum, which all will recognise, is shown in Figure 2, but this is not the apparatus that Robinson used on that first occasion. In the letter that Boott received from Bigelow, Morton's inhaler is described as 'a small two-necked glass globe',² and one would have expected Robinson, knowing that it worked, to devise something similar, which is what he did.

Figure 3 is the illustration of Robinson's first ether inhaler that appeared in the *Medical Times*.³ It was described as: 'merely the lower part of Nooth's old soda-water apparatus, at the bottom of which are placed twenty or thirty pieces of sponge, cut in a triangular shape, so as to present as many surfaces for the evaporation of the ether as possible'. Added to this was a mouthpiece with two valves, a breathing tube and stopcock, and a nose clip. Miss Lonsdale apparently had a painful unerupted wisdom tooth, and the ether worked so well that one wonders whether she had been taking something to relieve the pain; perhaps she was already premedicated with the readily available laudanum. In any event, this inhaler did not work so well subsequently.

What exactly happened next is uncertain. William Squire, the medical student who actually administered the ether at University College Hospital while Robert Liston amputated a leg the following Monday, 21st December, published his account much later, on almost the forty second anniversary,⁴ and some details are not entirely clear. William was the nephew of Peter Squire, who was pharmacist to the Queen, and a friend of Liston. William reminisced that he heard about Morton's use of ether from Liston on Saturday, December 19th. It seems that Liston was already aware that Robinson had successfully extracted a tooth without pain, but that a second trial had not been a success. So Liston had taken some ether from the hospital to either Boott's or Robinson's house, in case the fault lay with Robinson's ether; but William's impression was that the glass vessel used was too small, and he thought that Robinson had gone on to try a sponge covered with a cloth, with more success. Liston then took William to Peter Squire's establishment in Oxford Street, where he says that ether was given on a sponge to one of the assistants. There was coughing, some excitement, then insensibility, but not of long duration. Also there was a strong smell of ether, and it seemed better if a stronger store of vapour were built up and contained in a vessel. So Peter Squire improvised a suitable inhaler, and William described it, forty two years later, in accordance with this illustration, (Figure 4) which is taken from Duncum.⁵

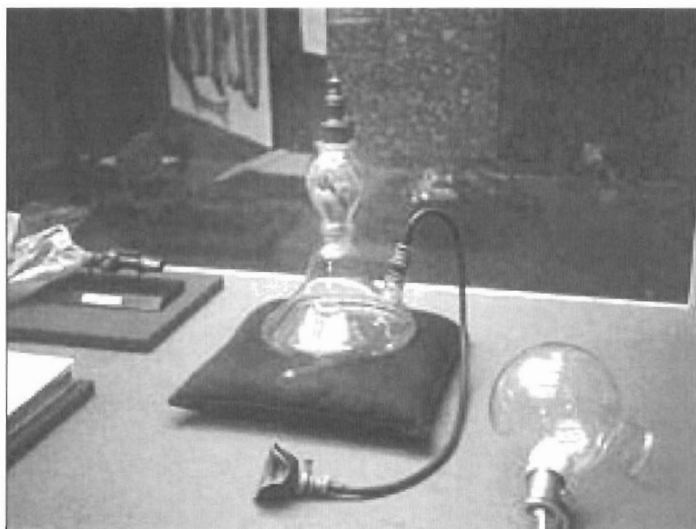


Figure 1

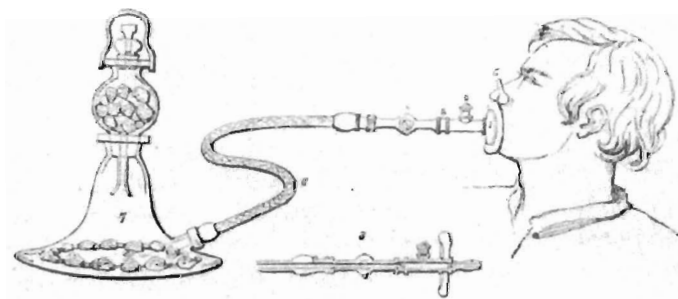


Figure 2

This illustration first appeared in the *Pharmaceutical Journal*,⁶ and Duncum says that it was the apparatus used on December 21st; but in early January 1847 Peter Squire himself published a rather different illustration (Figure 5). Squire was president-elect of the Pharmaceutical Society of Great Britain, and this apparatus was depicted in the *Pharmaceutical Journal*.⁷

According to the description it 'resembles a Nooth's apparatus – a sponge wetted with ether being placed in the upper part ...' The vapour, being heavier than air, descended to the lower vessel, to which was attached a flexible tube, a valve to prevent the expired air re-entering the vessel, and a mouthpiece. Squire stipulated that the ether should be washed with water to purify it.

So this was the inhaler used on December 21st. It has always seemed strange that the two earliest apparatuses used in London, Robinson's and Squire's, both made use of Nooth's apparatus, and a case could be made out that William Squire described Robinson's inhaler to his uncle, and that Peter improved its vaporizing properties by the addition of the upper vessel. If that were so, we have to grant priority to Robinson. Squire, some three weeks later, said of his first inhaler that 'the temporary apparatus, which I hastily put together for Mr. Liston ... was afterwards much improved ...'. The improved version was demonstrated at a meeting of the Pharmaceutical Society on January 13th 1847 and illustrated in the *Journal*. It is the one (Figure 4) we are familiar with.⁸ Returning to 19th December, in a letter to the *Lancet*, dated December 21st, referring to Miss Lonsdale's anaesthetic, Boott wrote:

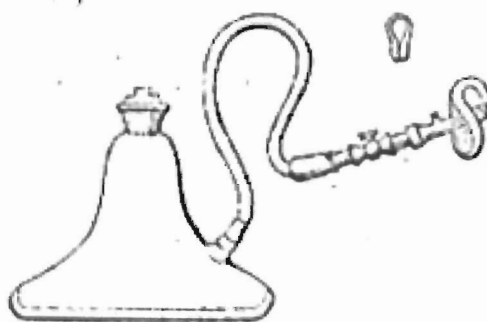
'... the same apparatus was used in three or four cases afterwards, and failed in each case to produce insensibility. I attribute the failure to the defect of the valve in the mouthpiece, by which the expired air was returned to the bottle, instead of passing into the room. The valve was a ball and socket one, and required a very strong expiration to make it act freely'.⁹

From this one would understand that these failed attempts followed immediately, but Robinson, describing these same incidents, (the first two trials in England), wrote:

'that on Dec. 19th, by myself, in the case of Miss Lonsdale, in which I used a very imperfect apparatus, hastily got up, and which was condemned for its ill success in the cases on the 20th and the memorable operations of Mr Liston on the 21st at the Hospital of University College, in which he was assisted by Mr Squires (sic), who used an apparatus of his own construction to induce the state of insensibility into which the patients were thrown'.¹⁰

This raises the question of whether there were failures on both the 19th and 20th. Also, nowhere does Robinson suggest that Squire copied from him. Having got the preliminary history out of the way, Robinson continued his account: 'having had another apparatus constructed ... I tried it for the first time on my servant ...'. In a letter to the *Medical Times*¹¹ he wrote that it was made for him by Mr Elphick of Castle Street, Oxford-Street (which, before the introduction of numbered postal districts was the way of distinguishing this Castle Street, now Great Castle Street, from others). Finding that the inhaler worked perfectly he proceeded to use it for some weeks at least, in his practice, and in several hospitals, in the presence of a number of eminent observers, medical and lay. John Snow was among them.

PAINLESS SURGICAL OPERATIONS.
DESCRIPTION OF ROBINSON'S INHALER.



The above woodcut represents the apparatus, invented and employed by Mr. Robinson, for the inhalation of the vapour of ether.

Figure 3

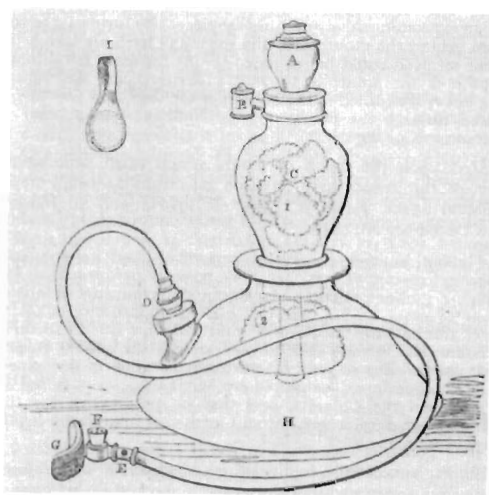


Figure 4

On December 28th Robinson described and illustrated his inhaler in his treatise (Figure 6), and form, is now manufactured by Mr. Hooper, Operative Chemist, of Pall Mall East'.¹² he added a footnote: 'An apparatus constructed on similar principles, but of more elegant Nowhere does Robinson say that he had an inhaler made for him by Hooper, and since he already had Mr Elphick's that worked perfectly, why should he go to the expense of another?

The first appearance of Hooper in the literature of ether anaesthesia was actually in the *Illustrated London News* of January 19th, 1847.¹³ (Figure 2) As related by Duncum, this reported that the apparatus used by Robinson on December 19th had been made by Hooper of Pall Mall, to the specification of Dr Boott and Mr Robinson. It is on the basis of this statement that the claim for the Hooper inhaler was first made.

The Association of Anaesthetists library has the 1847 volume of the *Illustrated London News*, and when one examines exactly what was said it becomes clear that in the crucial third paragraph two separate pieces of information have been conflated. The article gives a general account of the introduction of ether anaesthesia from Boston to London, and a specific description of Miss Lonsdale's anaesthetic as described by Boott. In the crucial third paragraph, the first sentence, in the past tense, refers to Miss Lonsdale, while the second, mentioning Hooper's apparatus, in the implied present tense, relates to the general account and the continuing use of ether; but Dr Duncum misleadingly added the words '*on this occasion*', which do not appear in the *Illustrated London News* report at all. So putting all this together, it is clear that the Hooper inhaler was not used by Robinson on 19th December, or even during the following week; and the claim has now been withdrawn.

William Hooper

William Hooper died at the age of 60 on September 24th 1878, so he was born in late 1817, or the first eight months of 1818. He was registered as a member of the Pharmaceutical Society in 1842, at the age of 24, and had a business as an 'Operative Chemist' at 7 Pall Mall East. (Pall Mall East is at the north-west corner of Trafalgar Square). It was developed during the early 1830s, and Hooper's establishment was well sited, being opposite the newly-built Royal College of Physicians.

Hooper made a couple of contributions at meetings of the Pharmaceutical Society in 1843, and his next was at the meeting of the Society held on January 13th 1847. This was fully minuted in the *Pharmaceutical Journal*, but the description in *The Lancet* is best for giving the sense of occasion:

'The lecture-room of the Society was crowded this evening with members of the Society and medical men, to hear a paper on Mr. Squire's instrument for the inhalation of the vapour of ether, and to see and hear descriptions of other instruments for the same purpose.'¹⁴

It continued with an account of Squire's paper and his appeal for reports and analyses of any failures to anaesthetise, or of ill effects. He stressed the importance of using washed ether rather than the ordinary unrectified product, and of ensuring that the patient breathed only through the mouthpiece and not also through the nose.

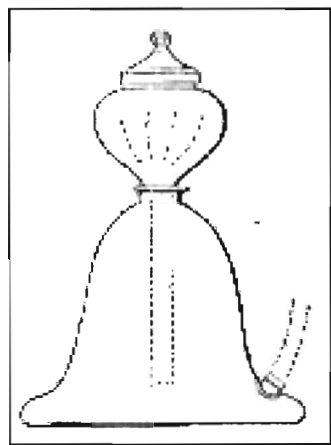


Figure 5

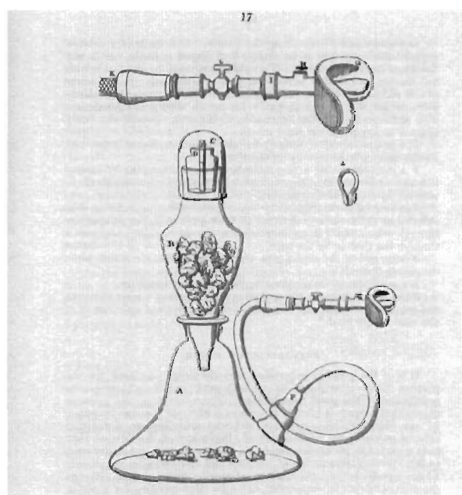


Figure 6

The next speaker was Hooper, who 'gave an account of his apparatus, or rather, of improvements which he had made in the instrument suggested by Dr. Boott and Mr. Robinson, and which had received their sanction.' It had since been modified and improved, had been used in a great many cases, and had never yet failed to produce the desired effect. It resembled Mr Squire's apparatus, but had a double stopper, which could be used to modify the amount of air being drawn through the apparatus. He had improved the valve in the breathing tube, and devised a more flexible mouthpiece, which could be applied closely to the mouth. He considered it important that the patient should not breathe free atmospheric air under any circumstances, but only that which had been mixed with ether vapour in the inhaler. He enumerated a number of cases at various hospitals in which he had used the apparatus with success.¹⁵ The *Lancet* report concluded, entertainingly, that:

'It would be unprofitable to follow the various remaining describers of instruments which were exhibited, many of which had not been tested in practice: they were really so numerous, that it would appear that the whole scientific portion of the members of the Society, as well as that of many others, had been employed in inventing and contriving means for administering the vapour of ether. The modifications attempted were from the most elaborate and complicated pieces of machinery to mere bladders with an elastic tube and stop-cock, the latter having the advantage of not being protected by either 'caveats' or 'patents.' Whatever the form of instrument, however exhibited, it was remarkable that each and every one had answered the purpose for which it was intended; and in this respect, the mere bladder and pipe had been as efficacious as the patented and more expensive items. The object of the exhibition at least was answered, for each had an opportunity of exhibiting his adopted, and, like a fond parent, saw advantages in his own offspring which he failed to find in that of others.'

During discussion it was mentioned that for many years the vapour of ether had been used with the same intention, and the same effects, as nitrous oxide, and a member reminisced that he had known instances in which the ether had been inhaled from a bladder with the effect of producing intoxication, by boys in the street, and the proceeding was only checked by a coroner's inquest.

The President summed up that while each piece of apparatus exhibited appeared to answer the purpose for which it was intended, the simplest, if effective, must eventually be the most useful.

Hooper's Apparatus

Hooper published an advertisement in *The Times* three days later on January 16th.¹⁶ Reports in the journals show that he sold a number of his inhalers very quickly. Outside London it was in use in East Retford on January 14th, Spalding round about the same time, Beccles and Maidstone before January 20th, Derby, Strood, Newcastle Infirmary, and Bristol Royal Infirmary. At the Queen's Hospital, Birmingham, what was described as Professor Parker's modification of Robinson's apparatus was in use. Hooper himself anaesthetised a patient for the extirpation of an eye by Mr Lawrence on January 15th. The following day, Saturday 16th, he anaesthetised at St Bartholomew's for the removal of a finger, but without much success, the patient subsequently admitting to being a heavy drinker. Hooper's assistant, Mr Griffin, gave an Anaesthetic at the Western Institute for Diseases of the Eye, (it appears that Robinson had sent

PORTABLE ETHER INHALER OF MR. WILLIAM HOOPER (7, FINE MALL EAST).

1. Cuspidor for the mouth.
2. Nasal syringe.
3. Horizontal valve.
4. Vertical stop valve.
5. Windway stop-cock.
6. Vulcanized India Rubber Bottle.
7. A capped tube.

The ether is supplied by being poured into the vulcanized India rubber bottle, through the tube No. 7, the cap of which should be removed during inhalation.



[Mr. Hooper has contrived an inhaler for horses, of which we intend to give a cut next month.]

Pharmaceutical Journal, 1847

Figure 7

HORSE INHALER.

BY MR. W. HOOPER, 7, FINE MALL EAST.

1. Muzzle.
2. Expiring valve.
- 3 & 4. Hayscot joint & sealing valve.
5. Vulcanized India-rubber bag.
- 6 & 7. Breathing tubes.

Directions.—The 12-ounce vulcanized India-rubber (connected by a hayscot joint) should be detached before being applied.

The muzzle is fixed to the horse by means of a head-piece similar to a bridle, and a tight India-rubber band placed over it near the top.

The moveable brass piece underneath the muzzle should be closed, and the expiring valve kept open by the bent wire being placed underneath whilst fixing it.



Figure 8

out a circular asking for reports of etherizations. He collected and published a number of replies and newspaper reports in his treatise, but some are undated).¹⁷

Most of this activity by pharmacists, and even by dentists, faded away soon after John Snow demonstrated his metal ether inhaler,¹⁸ and made his debut as a hospital anaesthetist on Thursday, January, 28th at St George's Hospital; and there the Hooper story would have ended, but that the report of his remarkable communication to a meeting of the Pharmaceutical Society, dated April 14th, indicated that he was a man worth spending some time researching.¹⁹ Robinson, as early as the third week of March 1847, had started to investigate the effect of giving a few breaths of oxygen at the end of the anaesthetic.²⁰ He found that patients recovered more quickly and fully. At the meeting on April 14th Hooper described and demonstrated a modification that he had made to his inhaler at Robinson's request, so that oxygen could be given or not, as required, during the anaesthetic. He said he was happy that physiologists were beginning to take an interest in the matter, and although in his opinion there was no danger in inhaling ether vapour in air, he has no doubt that 'every operating Surgeon and Dentist will adopt' the use of additional oxygen. There is no information about how the oxygen was prepared or stored.

Hooper continued with a remarkable statement. Many fully etherised subjects had reported a mental sensation analogous to drowning, with memories of childhood coming to mind. But his personal experience and observations had brought him to believe that full etherisation is not necessary for the relief of pain:

'I look on this fact as of the greatest importance, and which will cause ether to be a greater blessing to mankind than we originally contemplated - the idea of losing the mind having been a great impediment to its use. The five senses appear to be peculiarly independent of each other, as far as the effect of ether is concerned, inasmuch as that of smelling is the first we are deprived of, then that of taste, followed by that of feeling, whilst the sight and hearing remain, and the mind of the patient is perfectly quiescent. At this stage the operation should be commenced by the patient's direction. I quite expect the day will arrive when patients will conduct the inhalation themselves ...'

The sort of unpleasant experience that was putting people off general anaesthesia was described by Robinson's supplier of dental equipment, W Dixon, in a letter of December 29th:

'The sensation of giddiness now came on rapidly ... thoughts of home and its little inmates came, and from them it seemed as if some power was tearing me away My thoughts now became fixed on a great struggle which seemed going on between a good and evil principle ... there was a straining of every faculty towards the supposed contest, my eyes seemed as though they would burst from my head.'²¹

For this early period, Hooper's observation about the stage of ether analgesia and the possibility of self-administered inhalational analgesia is a very remarkable one. At the end of his communication Hooper observed that ether acts more efficiently and pleasantly on an empty stomach, and that a meal shortly after its use prevents nauseating and depressing effects.

CHLOROFORM INHALER.

BY MR. WILLIAM HOOPER, 7, Pall Mall East.

This inhaler is constructed in the form of a large mouthpiece, enclosing a sponge (1) and having a pad (2) round the edge to ensure close contact. The cut represents the inner view (1) of the inhaler, with the case, which is provided with a bottle of chloroform, enclosing all that is required in a small compass. (3) is a ridge of metal to confine the sponge, and prevent the chloroform from running into the mouth.

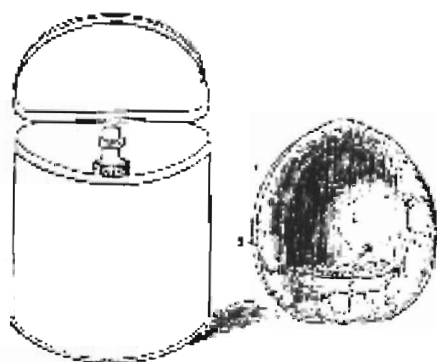


Figure 9

HOOPER'S
ELASTIC MATTRESSES
OR CHILLED BEDS.
FOR WARM AT ANY TEMPERATURE
FOR THE PREVENTION AND CURE OF RHEUMATISM.

HOOPER & CO. LTD.
7, PALL MALL EAST, LONDON.

Figure 10

During the next few months Hooper designed a portable ether inhaler²² (Figure 7), an etheriser for veterinary use²³ (Figure 8), and towards the end of the year a chloroform vaporizer²⁴ (Figure 9), but by then his attention was probably becoming far removed from anaesthetics. A serendipitous enquiry on the World Wide Web showed that his career had taken an astonishing change of direction.

Hooper had become interested in the chemistry and technology of the very recently invented process of vulcanising India rubber, and he wanted to introduce this compound into medical equipment. The effect on natural India rubber, (or latex as we now call it), of sulphur or metallic sulphides, was discovered by 1842 in New York by Charles Goodyear, as a result of some serendipitous experiments. The effect was that the rubber became impervious to the usual solvents, unaffected by temperature change, much more elastic, and mouldable. A process based on Goodyear's discovery was patented in the UK by Thomas Hancock in 1843.

So Hooper was very quick off the mark. In 1845 he established a factory for introducing this new material into the manufacture of medical equipment, in Mitcham, Surrey. Mitcham, at that time an idyllic village celebrated for its lavender fields, and a centre for perfume production, was beginning in the face of strong local opposition to become industrialised, with the spread of the railways across the south of England. Without rubber, breathing tubes for anaesthetic inhalers would have been a problem, so the invention and its exploitation came at just the right time.

Hooper's inventiveness continued to flourish. Those who remember the battle against bedsores during the late 1960s and early 70s, and the innovative introduction of the water bed and the ripple mattress, will be surprised by the advertisement shown in Figure 10. Hooper's hydrostatic bed was introduced during the 1850s, and was still in production at least until the mid-70s. It was exhibited at the 1862 International Exhibition together with a hydrostatic cushion and bed lift for invalids about which, unfortunately, no information is available.²⁵ But the most far-reaching result of Hooper's interest in vulcanised rubber was a complete surprise. Apart from its medical applications, he somehow became interested in the use of rubber to insulate electrical cables and developed a process for manufacturing them in continuous lengths. This took him into the cable industry, and eventually into the laying of submarine telegraphy cables.

Submarine Telegraphy

The history of the development of telegraphy runs closely parallel to that of inhalational anaesthesia. Morse, after some ten years of effort and lobbying of Congress,²⁶ really got telegraphy going in 1845. The first attempt to lay a trans-Atlantic submarine cable was in 1857, but it failed disastrously. The official electrician, Dr Edward Whitehouse, a surgeon and self-taught telegraphist, had formed the idea that signals should be sent through small diameter cable at very high voltage.²⁷ When the cable laying was completed in August 1858, and signals started to be sent, what happened could have been predicted by any schoolboy. The cable overheated, the gutta percha insulation melted, and the system stopped working within less than a month.

The situation was rescued by William Thomson, later Lord Kelvin, who showed that what was needed was to transmit at low voltage through large diameter cables. The next trans-Atlantic cable was completed in July 1865, but there were still problems with the gutta

percha, and Hooper's rubber-insulated cable was proved to be superior.²⁸ This brought him contracts from the Indian Government for connecting with Ceylon and the Persian Gulf. In 1870 he formed Hooper's Telegraph Works Limited in Mitcham. Probably his biggest contract was producing and laying the 2,300 nautical miles of cable connecting Vladivostok to Shanghai and Hong Kong. In 1873, to lay cable off the coast of Brazil, Hoopers built their first cableship, the C S Hooper. At the time it was the second largest cableship in the world, second only to Brunel's Great Eastern. In all, Hoopers built four cableships before the end of the 1870s.

Hooper died on September 25th 1878, after what was described on his death certificate as an obscure disease of the brain of some months duration. He was aged sixty, and had accomplished a great deal during his life. His estate was valued at £85,000, a very considerable fortune in those days. In his will he mentions ten surviving children. He appears to have been the perfect example of an inventive, enterprising Victorian entrepreneur.

Two conclusions can fairly be drawn. The Hooper inhaler was not used by Robinson on December 19th; and that while the history of surgery is just the history of surgery, the history of anaesthesia has no bounds.

Acknowledgements

I am grateful to Michael Bennett-Levy, for making me think; to Briony Hudson and Bryony Kelly of the Royal Pharmaceutical Society; to Anna Macdonald for researching the files of the *Morning Chronicle*; to Richard Foreward, archivist, Institution of Electrical Engineers; to Trish Willis and Iris Boening (Association of Anaesthetists); to the Royal Society of Medicine librarians; to Neil Adams; and to Bill Burns and Bill Glover, for much more information than I could ever use, about the history of submarine telegraphy, a fascinating subject in which, much against my will, I became deeply involved.

References

1. Duncum B. *The Development of Inhalation Anaesthesia*. London: Oxford University Press, 1947. Reprinted by the History of Anaesthesia Society, London: RSM Press 1994.
2. Bigelow HJ. In Robinson J. *A Treatise on the inhalation of the vapour of ether*. London: Webster, 1847, 2.
3. Painless Surgical Operations. *Medical Times* 1847; 290.
4. Squire W. *On the introduction of ether inhalation as an anaesthetic in London*. *Lancet* 1888; 2:1220-1221.
5. Duncum B. op.cit, 131.
6. Squire P. On the inhalation of the vapour of ether and the apparatus used for the purpose. *Pharmaceutical Journal* 1846-1847; 6:350-352.
7. Squire P. Apparatus for inhaling ether. *Pharmaceutical Journal* 1846-1847; 6:338.
8. Squire P. op.cit. ref 6.
9. Robinson, op.cit, 6.
10. Robinson, op.cit, 5.
11. Robinson J. *Medical Times* 1847; 271-273.
12. Robinson, op.cit, 16-18.
13. The New Means for Rendering Surgical Operations Painless. *Illustrated London News* 9 January 1847; 30.

14. Pharmaceutical Society – apparatus for inhaling the vapour of ether. *Lancet* 1847; 1:73.
15. *Pharmaceutical Journal* 1846-1847; 6:353.
16. *The Times* 16 January 1847; 12 column 2.
17. Robinson, op. cit.
18. Snow J. Apparatus for Inhaling Ether – Dr Snow's Apparatus. *Pharmaceutical Journal* 1846-1847; 6:423.
19. Inhalation of oxygen for resuscitating etherised patients. *Pharmaceutical Journal* 1846 1847; 6:508-509.
20. Robinson J. Agent for resuscitating patients after inhaling the vapour of ether. *Medical Times* 1847; 16:122.
21. Dixon, W. Copy of a letter to Mr J. Robinson. *Medical Times* 1847; 6:274.
22. Portable Ether Inhaler. *Pharmaceutical Journal* 1847-1848; 7:13.
23. Horse Inhaler. *Pharmaceutical Journal* 1847-1848; 7:33.
24. Chloroform Inhaler. *Pharmaceutical Journal* 1847-1848; 7:313.
25. *Catalogue of the 1862 International Exhibition*. Class XVII, Surgical Instruments and Appliances.
26. Standage T. *The Victorian Internet*. London: Weidenfeld and Nicolson, 198.
27. Standage T. op. cit. reference 24, 75-76.
28. Haigh, KR. *Cableships and Submarine Cables*. London: Adlard Coles, 1968; 78-79.

CRAWFORD W LONG - STILL AN ENIGMA

Dr Henry Connor

Honorary Research Fellow, Centre for the History of Medicine
University of Birmingham

This paper describes what is known about Crawford W Long and of the circumstances in which he worked, in an attempt to explain why he delayed publishing his work on the use of ether vapour as a surgical Anaesthetic.

Long's work on etherisation

If William Clarke really did give a successful dental anaesthetic in January 1842,¹ then Crawford Long of Jefferson, Georgia (USA) was not the first person to use anaesthesia, but he was the first to give ether for a surgical operation, and was certainly the first person to accumulate a series of surgical anaesthetic successes. There is documentary evidence that between March 30th 1842 and prior to October 16th 1846 (the date of Morton's demonstration at the Massachusetts General Hospital), Long had used ether successfully on at least eight occasions.² According to his wife, he was also the first to practise obstetric anaesthesia when he gave ether to her during the delivery of their daughter, Frances, on December 27th 1845.³ Frances Long Taylor gives the year as 1847 (reference 7), but was perhaps being vain about her age.

Long made no secret of his use of anaesthesia but he did not publish his work until 1849,⁴ when friends eventually persuaded him to lay claim to the priority in its use. There has been much speculation over this delay in publication. At the very least, Long might have been expected to write a short paper, or even a letter, after he read, as he tells us,⁴ an editorial on the operation at the Massachusetts General Hospital in the *Medical Examiner* of December 1846. Long stated that he did start a communication to the editor of the *Medical Examiner*, but 'was interrupted when I had written but a few lines, and was prevented by a very laborious country practice, from resuming my communication' and that, after reading the January edition of the *Medical Examiner* which contained several more articles on surgical etherisation, he decided to wait a few months to see if anyone would lay claim to having used the technique before March 30th 1842.⁴ He goes on to say that he then delayed further, due to the competing claims of Jackson, Morton and Wells, before he could definitely establish the date when ether was first used. Some years later, when Jackson visited Long on March 8th 1854, Jackson asked Long why he did not make known the results of his own work when he had heard the news from Boston. According to Jackson, Long replied that: 'when he saw my dates, he perceived that I made the discovery before him, and that he did not suppose that anything done after that would be considered of much importance, and that he was awakened to the idea of asserting his claim to the first practical use of ether in operations, by learning that that such claims were set up by others for this merit'.⁶

By 'made the discovery' Jackson meant having first had the *idea* of using ether vapour to relieve pain, rather than having actually used ether for this purpose. He was still trying to claim to priority as late as 1854. Young quotes from a letter written by Long to show that Long did not accept Jackson's claim. Long also stated that, before publishing, he wanted to try ether 'in a sufficient number of cases to fully satisfy my mind that anaesthesia was

produced by the ether and was not the effect of the imagination, or owing to any particular insusceptibility to pain in the persons experimented upon'.⁴ In fact he already had good evidence on this point in two patients by January 1845. On September 9th 1843 he had removed three tumours from one patient on the same day, using ether for one of these operations but not for the other two. The operation under ether was painless, but 'the patient suffered severely' during the others.⁵ Then on January 8th 1845 he amputated two fingers, again on the same day, on a boy with neglected burns. One operation, which was done under ether, was painless whereas the other, without ether, caused pain.⁶ Long also said that he was keen to use ether 'in a more severe surgical operation'⁴ before he published, but of course capital operations were very infrequent in his practice. He must have known that it could be years before such an opportunity arose, so why did he not publish the very considerable evidence which he had accumulated by early in 1845? Perhaps an answer can be found in a study of the man himself and of the circumstances in which he was working.

Crawford Long: The Man

It is evident that Long was intellectually very bright because he entered college at the unusually early age of fourteen, and graduated second in his class when only nineteen.⁷ He then returned to his home town of Danielsville as principal of the town's academy, before moving to Jefferson as a pupil of a Dr Grant. He then studied for one year in the medical department of Transylvania University in Lexington, Kentucky, followed by a further year in the medical department of the University of Pennsylvania in Philadelphia. After graduating in 1839 he spent a further eighteen months of study and training in hospitals in New York where, according to his daughter, he was held in high regard. He appears to have been ambitious because he wanted to set up in practice in a large city, but deferred to his father's wish that he should return to Georgia. Here he bought the practice of his old teacher, Dr Grant, in what was then the remote and isolated little town of Jefferson, and a far cry from his ambition of practising in a large city, though his daughter says that he regarded it as a temporary post until a better opening came up.⁸ He did move, first to Atlanta, Georgia in 1850, and then in 1851 to Athens, Georgia where he was in partnership with his younger brother.

First hand accounts which tell us much about Long's character and personality have survived from Joseph Jacobs, his pharmacy student in Athens,⁹ Dr I M Goss, who was in practice in Jefferson after Long,¹⁰ the Chancellor of the University of Georgia who gave the address at Long's funeral,¹¹ the editors of the *Southern Medical and Surgical Journal*,⁵ two professors at the University of Georgia,⁵ Charles T Jackson,¹³ and from his wife and daughter.¹⁴ Although one must be cautious about the objectivity of opinions expressed by his wife and daughter, they make no claims about his character which are not corroborated by others. Long is described as a devoted family man,⁹ quiet and unassuming, gentle and gracious,⁹ even-tempered and gentlemanly,¹⁰ a dignified man who scorned boastfulness and pretension,¹⁴ thoroughly truthful,¹¹ and honorable in all respects.¹³ However, the attribute which is most striking, because it is mentioned time and again, is his modesty. Jacobs describes him as 'retiring and modest',⁹ Jackson as 'very modest and retiring',¹³ and the editors of the *Southern Medical and Surgical Journal* as 'exceedingly modest in his pretensions'.¹² In the oration at his funeral it was said that he was 'modest, even to the verge of timidity' and 'reticent of his own merit, reticent, too, of his troubles, lest he should disturb the happiness of others'.¹¹ Although described by Jacobs and Jackson as 'retiring', this adjective must apply to his aversion to self-pretension, for he was certainly gregarious,² was

an excellent host in the 'old-fashioned Southern tradition'¹⁴ and had many friends.⁹ He was fond of dancing and of hunting and fishing, enjoyed horse racing (but did not bet) and was a fine whist player.¹⁴ He was also a man of 'extensive erudition',¹⁰ with a considerable knowledge of Shakespeare's plays, from which he often quoted.⁹ He was fond of poetry, especially Burns, Byron, Shelley and Keats, of the novels of Scott, Thackeray and Wilkie Collins, and of Macaulay's historical works.⁹ Under the pen name of 'Billy Muckle' he wrote humorous sketches for a local newspaper, often gently poking fun at the local politicians, who he never named but who were usually recognisable to those 'in the know'.⁹

Long owned a few domestic slaves who he regarded as 'wards of his care and benevolence'.¹⁵ One of his letters, written when he was away from home, showed considerable concern for one of the slaves who had fallen ill during his absence.¹⁶ He believed that 'the great body of slaves should gradually be emancipated under regulations that would be beneficial to them and equitable to their owners'.¹⁵ He opposed Georgia's secession from the Union but, when secession was announced, an event which he described as 'the worst day of my life',¹⁷ he cast in his fortunes with his native state and took charge of a military hospital.¹⁵

Long was 'beloved and respected by all classes'¹⁴ and 'esteemed by everyone'.¹⁰ He was a man of great energy¹⁰ and worked hard.¹⁴ In business, as the co-owner of the largest pharmacy in northeast Georgia at the start of the Civil War,¹⁸ he was 'exacting and particular in business details' and required order and system in the day-to-day management.⁹ It was said of him that he 'assumed nothing',¹¹ an observation which may be relevant to his experiments with ether. As a doctor, he was always abreast of improvements¹⁰ and read both the American and British journals.¹⁹ In Jefferson he built up a large and lucrative practice and, because he was recognised as a skilful surgeon, was often asked by colleagues to travel long distances to assist in difficult operations.¹⁷ Goss wrote that: 'Long's opinion is sought far and near by the profession from the fact that the people are satisfied with any physician, if he but procure Dr. Long's opinion'.¹⁰ Goss also described Long as: 'a very eminent practitioner and a surgeon of as high repute as any of his age in the South', adding that he was also one of the best pathologists in the South.¹⁰

Public and professional attitudes to Long's work with ether

Although the local people evidently respected Long's abilities as a physician and surgeon, they were unsettled, even frightened, by his work on anaesthesia. Dr J K Groves, who was Long's first student and who entered his office in May 1844, later wrote that: 'Owing to the prejudice and ignorance of the local populace, Dr Long was prevented from using ether in as many cases as he might have'.²⁰ Long's daughter described the 'fears of the people, who had become very much excited over the powers of ether',²¹ and that 'Long was considered reckless, perhaps even mad. It was rumoured throughout the country that he had a strange medicine by which he could put people to sleep and carve them to pieces without their knowledge'.²² His daughter also claimed that friends urged him to stop his work with ether for fear that he would be lynched if a fatality occurred,²² though this was never mentioned by Long or any other contemporaneous source. Two people, one a doctor and the other a doctor's wife,²³ described Long's use of ether as having been 'notorious' throughout the district, but this adjective was probably used to mean that it was well known without necessarily implying any unfavourable connotation. Long's wife wrote that he used anaesthesia 'whenever he could induce his patients to submit to the "dangerous drug"',¹⁴ and Long himself wrote of his first case that 'As an inducement to Venable to allow himself to be

the subject of such experiment, my charge for the operation was merely nominal, \$2.00, ether 25 cents'.²⁴

If Long had hoped that his discovery might engender a more enthusiastic response from his professional colleagues in Georgia, he was to be disappointed. One college student in Athens, Georgia, later recalled that the wonderful discovery of anaesthesia was the talk of the town and was the subject of a lecture by the professor of chemistry, Dr Le Conte, in 1845,²⁵ but there is little evidence that practising doctors were prepared to try ether. In May 1843 Dr R D Moore and Dr Joseph B Carlton of Athens discussed using ether in an operation but, as they had none immediately available, they went ahead without.²³ Subsequently, in November or December 1844, Carlton did use ether for a dental extraction²³ but, as this was done in Long's office, it is likely that the administration was supervised by Long. There is no recorded instance of any other doctor in Georgia using ether before 1847, and indeed Long's daughter was to write later that: 'To my father's disappointment, the older medical men of the vicinity and neighbouring towns were sceptical of his claims, all the while expecting a fatal result from one of his experiments'.²⁶

Long described how, at this time: 'there were physicians high in authority, and of justly distinguished character' who were advocating mesmerism for the prevention of pain during surgery.⁴ Long was not impressed by the reports which he had read on the use of mesmerism for this purpose, but the early to mid-1840s were the high tide of enthusiasm for this technique. Elliotson published his results in 1843²⁷ and Esdaile in 1846.²⁸ More importantly, from Long's perspective, there was considerable enthusiasm for mesmerism among senior practitioners in the southern states of America. In particular, as Boland has pointed out, two of the proponents, who Long described as 'high in authority', were L D Dugas and P F Eve, professors of surgery in the Medical College of Georgia in Augusta and co-editors of the *Southern Medical and Surgical Journal*.²⁹ Both published reports on painless surgery in mesmerised patients, including two mastectomies by Dugas in 1845.³⁰ The extent of the confidence in mesmerism in the southern states is reflected in an editorial, quoted by Buxton,³¹ in the *New Orleans Medical and Surgical Journal* in 1846 following publication of the successful use of ether in Boston: 'Why, mesmerism, which is repudiated by the savants of Boston, has done a thousand times greater wonders and without any of the dangers here threatened. What shall we see next?'. The lay public were also familiar with mesmerism through the exhibitions given by itinerant lecturers and, as Long's daughter recorded: 'It was difficult to persuade the people... that the inhalation of a drug could produce insensibility to pain: that this unconsciousness must be from the mesmeric powers of the young surgeon, they could believe'.²¹

Long's quandary

Having established some facts about Long himself and about the circumstances in which he was working, let us now try to put ourselves in his shoes. It is, let us suppose, the spring of 1844. Long is a bright and ambitious 28 year old. Three years ago he had set up in independent practice in a very rural area, not perhaps what he had been hoping for, but his practice is expanding, he has just taken on his first student, and it cannot be long before a better opportunity comes up. He has been married for two years and he and his young wife have just started a family. It is also two years since he discovered that the inhalation of ether could be used to produce insensibility to pain during surgical operations. Opportunities to substantiate this wonderful discovery have been few and far between, but he has now

accumulated four or five cases - surely enough to make people sit up and take notice. Although Long has not published his results, neither has he made any secret of his work which is well known in his native state of Georgia. But there has been no acclaim, no-one is clamouring on his door to congratulate him and to ask how it is done; indeed, quite the opposite. The local people are frightened of this mysterious and powerful drug and unfounded rumours, based on ignorance, are fuelling their anxieties.

One or two of his younger medical colleagues have expressed some interest, but none of them has tried using ether. As for his senior colleagues, they are sceptical of his claims and are predicting that, sooner or later and probably sooner, one of his patients will die from the effects of the ether. Moreover, most of them can see no need for it, because the work being done in the local medical college by two of the most respected surgeons in the state is confirming that mesmerism is not only effective for the relief of surgical pain, but is also perfectly safe. Long is in a quandary. He is as sceptical of the value of mesmerism as his older colleagues are of his use of ether. A less reticent man would publish his results and set the scene for what might well prove to be a bitter argument, rather than a scientific debate, with the older men; but this is not a scenario which the modest, unpretentious Long can contemplate with equanimity.

There is also, still, a nagging uncertainty at the back of his mind. Perhaps his small group of patients is, by chance, in some way atypical in their responses to either pain or to the ether itself. There was, of course, the lady from whom he had removed three tumours in the fall of last year and in whom only the operation done under ether had been painless. That had made an atypical response to pain improbable, but it was only the one case. Long is a man who assumes nothing and one who is particular and exacting in matters of detail. His mind is made up; he must collect more cases before he can publish.

Long has to wait from the spring of 1844 until January 1845 before he is again able to test the effects of ether, but the case which then presents is ideal for his purpose. It is the boy who requires amputation of two fingers. Long amputates one finger, painlessly, under ether and the other, without ether, but with considerable suffering. Now, surely, he has irrefutable evidence of the efficacy of ether but, as he prepares to start writing he receives news which causes him further uncertainty. Only a fortnight or so after he has amputated the boy's finger, Long hears of Horace Wells' disastrous demonstration of nitrous oxide which took place in late January 1845.³² Southern courtesy forbids that the advocates of mesmerism should taunt Long about the failure of this pharmacological method of inducing insensibility to pain, but Long knows that they are triumphant. Yet it is not Wells' failure in itself which haunts Long,³³ but the fact that Wells had previously used nitrous oxide successfully on fifteen occasions. For Long, who has still only used ether on five or six occasions, the lesson is obvious; he must collect still more cases and preferably at least one capital operation.

Then, sometime in December 1846 or early January 1847, when he still has only eight cases, Long reads the editorial in the *Medical Examiner* on Morton's use of *Letheon*, described as an 'ethereal solution of some narcotic substance'.⁴ Long knows that it is ether itself which is the active agent. He starts writing a letter to the editor of the *Medical Examiner*, but tells us later that pressure of work prevented him from completing it.⁴ Can this really be so? We know that Long has a busy practice, but he is an energetic, hard working 31 year old and this is a subject on which, in the face of considerable local opposition, he has been working for the last three and a half years. It would not take long to write the letter. He has only to say that it

is ether itself which induces the insensibility to pain and that he has used it on eight occasions, giving some brief details of his cases. I suggest that it is not pressure of work but disappointment, bitter disappointment, which prevents Long from completing his letter. He does not admit this, of course, this man who is always 'reticent, too, of his own troubles'.¹¹ Inwardly, however, he is brooding and frustrated. If only he had had the courage of his convictions and had published his results sooner, if only the local people had not been so irrational in their fear of ether, he would have been able to accumulate the necessary experience so much more quickly; if only he, too, had had access to a major teaching hospital where colleagues would have understood and appreciated his work, if only...

A few days later Long receives the January number of the *Medical Examiner* which contains accounts of further etherisations. He decides that he will wait a few months to see if anyone will lay claim to having used ether before March 30th 1842.⁴ Perhaps he is also aware of some of the failed attempts with ether, and he certainly knows that the proponents of mesmerism are still scornful of the benefits of ether.³¹ At this stage, Long decides there is nothing further to be lost by waiting. As he waits, the dispute over Morton's patent is followed by the bitter squabble over priority between Jackson, Morton and Wells. All of this is intensely distasteful to Long, a man who is honourable in all respects¹³ and who detests pretension.¹⁴ He wants no part in this unseemly debacle, and comes to accept that he has missed his chance of fame. The retiring and unassuming Long learns to be content with his own knowledge of what he achieved, and is fully occupied with his thriving practice and growing family. As etherisation becomes an established fact his patients, once so fearful and suspicious of his experiments with ether, now treat their clever and able young doctor with growing respect and affection; this alone is sufficient reward for the innately modest young doctor.

It is not, however, sufficient for his previously unsupportive medical colleagues, who tell him repeatedly that he will not be doing himself justice if he does not press his claim for priority in the use of etherisation. Perhaps they are also keen to see that honour bestowed on a fellow Georgian rather than on a cocky northerner. Long initially resists their persuasion but then, sometime in 1848, he is invited by Professor Paul Eve, one of those 'high in authority' and co-editor, with Dugas, of the *Southern Medical and Surgical Journal*, to visit him in Augusta to discuss how he might prosecute his claim.²⁹ There is no record of their meeting but Long is persuaded and his paper is published by Eve the following year,⁴ bringing, no doubt, a certain kudos to Eve's journal as well as to Long. Subsequently Long gives at least two further lectures in Georgia to re-inforce his claim,^{34,35} but they contain no new information.

Ironically, Long's work is now forgotten, at least by those who do not know him, until a year before his death when it is revived by Dr J Marion Sims (of the Sims speculum) in a paper in the *Virginia Medical Monthly* in 1877.³⁶ This paper causes Long some annoyance because, through no fault of Sims, it contains a claim by Dr P A Wilhite, one of Long's former students, that it was he who first suggested to Long that ether could be used as an anaesthetic. This would have been impossible because Wilhite had not entered Long's office until at least two years after Long first used ether. Long writes to Wilhite to point out his mistake for which Wilhite subsequently apologises, but neither of them writes to correct it in the *Virginia Medical Monthly*, and as Sims has by this time left for Europe, the error is not publicly corrected until 1893.³⁷ In the meantime Wilhite's claim is reiterated by Foy in 1889³⁸ and subsequently perpetuated by Nevius in 1894,³⁹ Burroughs Wellcome in 1907⁴⁰ and Eulop-Miller in 1938.⁴¹

A Final Conundrum

We shall never know whether the suppositions in the preceding section are correct. They are, perhaps, as near as we shall ever get to the truth, and the story of Crawford Long will always remain an enigma. Three of his biographers have left us with a further conundrum. Young, writing in 1897, stated that a statue had been erected to his memory in Paris.⁴² In 1908 Goss wrote that 'a report has been circulated that a statue to the honor of Dr Long has been placed in the City of Paris, France, but I am not informed as to the accuracy of such report',⁴³ and in 1912 Buxton stated that there was a memorial to Long in Paris.⁴⁴ Was there ever a statue or memorial to Long in Paris? If so, where is it now? It is unlikely that there had been confusion with the statue of Horace Wells in Paris because Young was writing thirteen years before the statue of Wells was unveiled on March 27th 1910.⁴⁵

References

1. Wolfe RJ. *Tarnished Idol: William Thomas Green Morton and the Introduction of Surgical Anesthesia: a Chronicle of the Ether Controversy*. San Anselmo, California: Norman Publications, 2001; 498-500
2. Young HH. Long, the discoverer of anaesthesia: a presentation of his original documents. 22pp. Reprint from *John Hopkins Historical Bulletin* 1897; **77-78**. (Wellcome Library pamphlet WZ 6:29:6): 2-3.
3. Boland FK. *The First Anesthetic: the Story of Crawford Long*. Athens: University of Georgia Press, 1950; 60.
4. Long CW. An account of the first use of Sulphuric Ether by Inhalation as an Anesthetic in Surgical Operations. *Southern Medical and Surgical Journal* 1849; **5(NS)**:705-13. Reproduced in Boland *op cit*; 35-37.
5. Young *op. cit*, 13.
6. *ibid*; 22.
7. Taylor FL. *Crawford W Long and the discovery of ether anesthesia*. New York: PB Hoeber 1928; 25-40.
8. *ibid*; 33.
9. Jacobs J. *Some Personal Recollections and Private Correspondence of Dr Crawford Williamson Long*. Atlanta, Georgia, 1919. (Wellcome Library pamphlet WZ 6:29:7); 4.
10. *ibid*; 9-10.
11. *ibid*; 16-17.
12. Nevius LW. *The Discovery of Modern Anesthesia: by Whom was it Made? A Brief Statement of Facts*. New York: GW Nevius, 1894; 24-25.
13. Jacobs *op cit*; 43-45.
14. *ibid*; 5-6.
15. *ibid*; 14.
16. *ibid*; 8-9.
17. Taylor *op cit*; 118.
18. *ibid*; 119.
19. *ibid*; 55.
20. Young *op cit*; 21-22.
21. Taylor *op cit*; 52
22. *ibid*; 49.
23. Boland *op cit*; 64-65.

24. Taylor *op cit*; 47.
25. *ibid*; 68.
26. *ibid*; 67.
27. Elliotson J. *Numerous Cases of Surgical Operations Without Pain in the Mesmeric State*. London: H Bailliere, 1843.
28. Esdaile J. *Mesmerism in India and its Practical Application in Surgery and Medicine*. London: Longman, Brown, Green and Longmans, 1846.
29. Boland *op cit*, 53.
30. Young HH. Crawford W Long: the pioneer in ether anesthesia. *Bulletin of the History of Medicine* 1942; **12**:191-225. (This paper contains references to publications on mesmerism by Eve and Dugas).
31. Buxton DW. Crawford Williamson Long (1815-1879). *Proceedings of the Royal Society Medicine* 1912; **5**:19-45. (Wellcome Library pamphlet 6:29:8); 4.
32. Wolfe RJ. I sleep to awaken: an appreciation of Elizabeth Wales Wells in: *I Awaken to Glory: Essays Celebrating the Discovery of Anesthesia by Horace Wells*, R J Wolfe and LF Menczer (Eds). Massachusetts: Boston Medical Library, 1994; 227.
33. American Dental Association, Horace Wells Centenary Committee. *Horace Wells, Dentist, Father of Anesthesia*. Hartford, Connecticut: 1948; 3.
34. Jacobs *op cit*, 13.
35. Boland *op cit*; 47.
36. Sims JM. The Discovery of Anaesthesia. *Virginia Medical Monthly* 1877; **4**:81-100.
37. Young *op cit*; 16-17.
38. Foy G. *Anaesthetics, Ancient and Modern*. London: Bailliere, Tindall & Cox, 1889, 51-52.
39. Nevius *op cit*; 4, 10-12.
40. Anonymous. *Anaesthetics, Ancient and Modern: an Historical Sketch of Anaesthesia*. London: Burroughs Wellcome, 1907; 47. See also: Wellcome Library MSS WA/HMM/CO/Ear/284, which contains correspondence relating to the error.
41. Fulop-Miller R. *Triumph over pain*. Translated by E and C Paul. New York: Literary Guild of America, 1938; 265.
42. Young *op cit*; 18.
43. Goss IH. Long and his discovery. Reprint from *Record of Medicine*, Athens, Georgia: November 1908. (Wellcome Library pamphlet WZ 6: 29:5); 6-7.
44. Buxton *op cit*, 13.
45. Foure J. *Horace Wells and his Paris Statue* in: *I Awaken to Glory: Essays Celebrating the Discovery of Anesthesia by Horace Wells*. RJ Wolfe and LF Menczer (Eds). Massachusetts: Boston Medical Library. 404-417.

A SURGEON'S IMPRESSION OF CHLOROFORM AND ETHER

Dr Anne Florence
Retired Consultant Anaesthetist, Liverpool

In 1765 Matthew Turner, a chemist and erstwhile surgeon of Liverpool, prepared sulphuric ether for local physicians to use in the treatment of a variety of ailments. Later, in the early 1840s following the purification of chloric ether by David Waldie in the laboratory of Liverpool's Apothecaries' Hall several physicians found this new chemical, chloroform, excellent for the treatment of such conditions as hysteria and trigeminal neuralgia. However, despite the high quality of academic discussion of scientific and medical knowledge within the city as the anaesthetic potential of these chemicals gathered momentum, the majority of the surgeons remained sceptical. An attitude of caution and extreme conservatism prevailed into the 20th century, punctuated by controversy over the relative merits of chloroform and ether.

There was one exception, Sir William Mitchell Banks (1842-1904), Senior Surgeon at the Royal Infirmary. Concerned that the surgical death rate in England and Wales had doubled in the last decade of the 19th century out of all proportion to the increased use of anaesthetics, he chose to present his impressions of anaesthesia as the theme of a lengthy, rather dogmatic, address to the 14th Ordinary Meeting of the Session at the Liverpool Medical Institution on April 25th 1901. His message was essentially, that any drug that can take such hold upon the nervous system to produce insensibility to pain and abolish the power of movement must be so potent that it will *ipso facto*, imply danger. There follows a shortened, edited version of this lecture, in his words:



Sir William Mitchell Banks (1842-1904)

'I am confident that my comments are entirely justified as I have now had considerable experience of anaesthesia. While a fourth year medical student in Edinburgh, I was appointed chloroformist to Professor James Syme and anaesthetised all his patients for six months. After my arrival in Liverpool I gave chloroform to most of Mr Edward Bickersteth's private patients over a period of six years. Since becoming surgeon at the Royal Infirmary I must have seen thousands of cases of both chloroform and ether administration both in that institution and in my private practice.

'Physiological research in animals is useless in the search for the best anaesthetic agent as the results of such experiments cannot be directly extrapolated to humans. There might be a case for the volumetric analysis of the percentage of the drug in the body fluids and organs at varying depths of anaesthesia but such analysis is, alas, not practicable. We must accept that no two humans will react identically to any drug. To some a glass of whisky at dinner can be a wholesome stimulant facilitating digestion, while continued quaffing of large quantities will, in time, lead to unconsciousness, loss of motor power and ultimate anaesthesia. We all know that excessive consumption of whisky has led to many unhappy wretches dying of alcohol poisoning. Chloroform acts in the same way but with greater rapidity.

'Continued speculation about the relative safety of chloroform is fatuous. Physiologists have found chloroform to be infinitely more dangerous in animals while clinical statisticians have shown that chloroform is nine times more lethal than ether. The drug is undoubtedly toxic but the real danger lies, specifically, in the hands of the administrator. As I see it the major problem is failure to appreciate the potency of the drug and to recognise the precise moment when the boundary line between safety and danger has been crossed. The administrator is the only person who can regulate the dose of chloroform, therefore the safety of the potion depends entirely on his knowledge of its properties and his judgment of the power of the patient to tolerate varying quantities. The impressions of a sensible man with good powers of clinical observation, gained by experience, are more important than any *a priori* physiological deduction.

'As I, personally, have the ability to beat a retreat in time I am rarely frightened by a surgical procedure but have always held anaesthesia as a source of serious dread. I have only had two fatalities in my practice, which I accept were unavoidable. There have, however, been numerous hairbreadth escapes completely attributable to the carelessness of the chloroformist. In some cases it seemed as if life had really gone requiring energetic measures to bring it back, measures which required coolness and fortitude and left me utterly exhausted with mental and bodily strain. As the care of my patient is my ultimate responsibility, I have always watched the progress of the anaesthetisation carefully. I am not prepared to countenance the anaesthetist who considers himself to be supreme and will not take heed of the surgeon. After all, a serious operation is a kind of pitched battle between the surgeon and death, with the surgeon as general while the anaesthetist is the mere brigade commander. If the anaesthetist so mismanages the brigade that the battle is lost the disgrace falls upon the surgeon, who has to face the humiliation of the coroner's court. The surgeon must, therefore, be master over the management of both the anaesthetic and every other detail of the operation.

'I am extremely sceptical about the most frequently reported cause of fatality with chloroform. Sudden collapse after the administration of astonishingly small amounts of chloroform is, in my opinion, impossible. The patient must have been dangerously depressed

for some time, collapsing because the anaesthetist or the person giving the anaesthetic has been unable to recognise the early signs of danger and thus avert it. In my opinion there are two distinct causes of sudden death during chloroform anaesthesia. In the first instance the anaesthetist has failed to adopt the axiom of 'plenty of air, plenty of anaesthetic' draining out his chloroform drop by drop, failing to appreciate that the patient is struggling because the volume being supplied is insufficient. As the struggle continues so the supply of chloroform is continued until he suddenly collapses, poisoned by the large total volume of chloroform received.

'On the other hand the patient goes quietly to sleep and lies motionless with shallow breathing. In this situation, having failed to appreciate that the patient is not responding to surgical stimulation as he is adequately anaesthetised, the anaesthetist keeps pouring on the chloroform. This continued, unnecessary administration of chloroform is a very grave mistake. It puts the patient in the most critical position possible. Even if rescued from immediate death he will remain in a very dangerous condition for many hours until superfluous chloroform has been got rid of by exhalation. Some surgeons, unlike myself, who are angered by patient movement may contribute to this unhappy state. I firmly believe that the great secret of success in anaesthetic management is to keep the patient just on the point of coming out. After all does it matter if he does cry occasionally? He will never remember anything about it afterwards, and meantime you know that he is alive and well.

'There is, alas, the additional risk of inadequate oxygenation because the anaesthetist has failed to recognise that the patient is no longer breathing fully and freely because his respiration has been depressed by excess chloroform. This can lead rapidly to 'Coroner's Court Collapse'. Alternatively, the previously quiet patient starts making frantic efforts to breathe because the anaesthetist has failed to recognise that the airway has become obstructed, most usually, because the tongue has fallen back. This is a far more salutary event as it can be immediately relieved by opening the jaw wide and pulling the tongue forward with a tongue forceps but rapid action is essential.

'Why is there a period of struggle? Some patients sink quietly into anaesthesia without sound or movement while others fight and struggle as if they were possessed. The latter group are in grave danger of either being poisoned or being in a distressingly lively condition which is a further bar to progress and safety. The most satisfactory approach is to allow the patient to move freely, surface and start again. When I was a student the usual practice was that a gang of dressers and nurses would forcibly restrain the patient while chloroform administration was continued. This undoubtedly accounted for many patients sinking back on their pillows dead at the end of the struggle.

'In summary, I firmly believe that the great dangers of chloroform are:

1. absolute, unnecessary overdosing to the point of poisoning
2. omitting to ensure that the patient freely gets an abundance of air into his lungs
3. violent repression during the stage of excitement, combined with continued dosing with chloroform.

‘Ensuring safety is not easy. No two individuals handle anaesthetics in the same way. A good anaesthetist should be able to judge just how much his patient needs so that the appropriate volume is supplied, while maintaining a high level of care during the induction of anaesthesia as fatalities are always more frequent at this time. Those who administer chloroform should never let their eyes stray from the patient’s face for one instant during the first six to ten minutes of anaesthesia. If pallor appears the patient must be instantly revived. If there is the slightest difficulty with breathing the tongue should be instantly pulled out. Attention to these minor details should dramatically reduce the incidence of sudden collapse. Furthermore, as the operation proceeds the patient tends to require less chloroform. It is essential to be aware of this to prevent an overdose and improve safety.

‘Now I would like to say a few words about ether. Ether is neither as pleasant to take nor as easy to give as chloroform but its safety is superior. It is indeed more difficult to kill a man with ether than with chloroform. One particular problem during induction is the tendency for some patients to secrete a vast quantity of frothy, sticky mucous from the mouth, fauces and larynx increasing the risk of aspiration and consequent cyanosis - the creation of a Blue Man.

‘For some reason, we always examine the heart, a strange practice as the only potentially dangerous conditions, dilatation or fatty degeneration cannot be detected by perfunctory examination while easily identifiable valvular disease is of little account for anaesthesia.

‘Some people object to stimulants being given before anaesthesia as they always cause vomiting but I personally favour the use of neat brandy, one and a half to two ounces for a woman and three ounces for a man gulped down just before the anaesthetic is to be given. They will not be sick.

‘No bronchitic or asthmatic should be given ether. One other point, as sphincter relaxation may be difficult to achieve with ether it should be avoided for operations on the anus or urethra. As infants and young children do get horribly pale under chloroform they should be carefully watched but they take it easily, although they often require a great deal. I do believe that chloroform is by far the best anaesthetic for very old people. With a little previous brandyfying, they take it quite sweetly and recover quickly. After all the really old are usually undergoing operations that can be speedily executed and therefore should not require much chloroform. Finally, chloroform should not be given in the presence of albumin or sugar in the urine. These patients are probably better to have local anaesthesia.

‘The apparatus by which either drug is to be administered should always be simple. There should be absolute silence while the patient is prepared for anaesthesia. The inhaler should not be held too closely to the face and should always allow a free flow of air. In my mind there is no doubt that the safest position for induction of anaesthesia is the recumbent position on the left side. To be upright in a chair is certainly the worst and has undoubtedly contributed to the many fatalities which have arisen during dental operations.

‘Now, here is some advice for revival. To begin with I do not believe that galvanism is of the slightest value. Galvanic batteries are never in order and even if they were they take so long to be activated that the patient will either be dead or in safety again. If the patient has been both poisoned and choked two things must be done to get air into the lungs and blood into the brain. The tongue must be pulled forward and someone must jump onto the table to hold the patients legs up with his head dangling over the end while Sylvester’s method of artificial

respiration is resorted to. With ether the danger is almost entirely due to choking. Mopping out the sticky mucous from the throat and mouth is the great thing and soon the patient will retch and strain leading to complete recovery. However, if this fails, the larynx should be opened, a tube inserted so that air can be blown into the lung while Sylvester's method is introduced.

'In conclusion, I believe that if we are to avoid the misfortune of a patient dying we must ensure better instruction in the art of anaesthetisation amongst our students. By far the most important factor in the safe administration of anaesthetics is the experience of the anaesthetist.'

Reference

Banks WM. Impressions about Chloroform and Ether. *Liverpool Medico-Chirurgical Journal* 1900-01; **20-21**:370-97.

THE REMARKABLE CASE OF THE EXECUTION OF ANNE GREEN

Dr John Zorab, Bristol

Thus saith the Lord God: I will cause breath to enter into you and ye shall live. (Ezekiel 37. 5)¹
Thus saith the Lord God: Come from the four winds, O breath, and breathe upon these slain, that they may live. (Ezekiel 37.9)¹

The 18th and 19th centuries were vintage years for judicial executions during which there were 1158 judicial hangings.² Sentence of death by hanging was given for a wide range of crimes and a hanging was always a popular public spectacle. Death from hanging at that time was by strangulation; that is, there was no 'drop'. There have, therefore, been a number of instances recorded in which, on being taken down from the scaffold, an individual was found still to be alive. Cecil Howard Turner tells of several cases of the recovery of those, thought to have been 'hanged until they were dead' and who then were found to be still alive. Some recovered and some died later.³ There was the singular case of a certain Margaret Dickson, who was hanged in 1728, was revived and subsequently married and lived for another thirty years. It is of some interest to note that with those judged to be exceptionally wicked, such as Dick Turpin, the sentence of death often included that the body should be given to the anatomists for dissection. Perhaps surprisingly, with these villains, this part of the sentence often produced far greater terror than the sentence of execution.⁴

Anne Green was a young woman who, in 1650, was sentenced to death by hanging in Oxford. There was an eyewitness who, it appears, was an Oxford medical student, and who wrote a detailed account, not only of the circumstances surrounding the hanging, but also of her subsequent recovery. A second account of the same incident was written by another eye witness. I have, however, had to be selective and have drawn mainly on one of these although they are very similar. Both original accounts are in the Bodleian Library along with a woodcut of the scene and some 70 verses, of various lengths, concerning the event, some in English and some in Latin.⁵

Note that in many, but not all words, the letter 'f' is used instead of the letter 's' as was the custom at the time and which I have retained in the extracts below. The cover page of one of the accounts is shown in Figure 1 and, as can be seen, this account is by a writer who describes himself as a 'Scholler in OXFORD', for the satisfaction of a friend, who desired to be informed concerning the truth of the business.

The account begins as follows:

'... In the house of Sir Thomas Read, at Duns-Tew in Oxfordshire, there lived a maid named Anne Green, born at Steeple-Barton, in the same county, being about 22 years of age, of a middle stature, strong fleshie, and of an indifferent good feature, who, being (as she said) often follicited by fair promises and other amorous enticements of Mr Jeffery Read, grand child to the said Sir Thomas, a youth of about 16 or 17 years of age, but of a forward growth and stature, at last consented to satisfy his unlawful pleafurr. By which act (as it afterward appeared) she conceived and was delivered of a Man-child: which, being never made knowne, and the Infant found dead in the house, caused a suspicion that she being the mother had murdered it, and throwne it there on purpose to conceale both it and her shame together ...'.

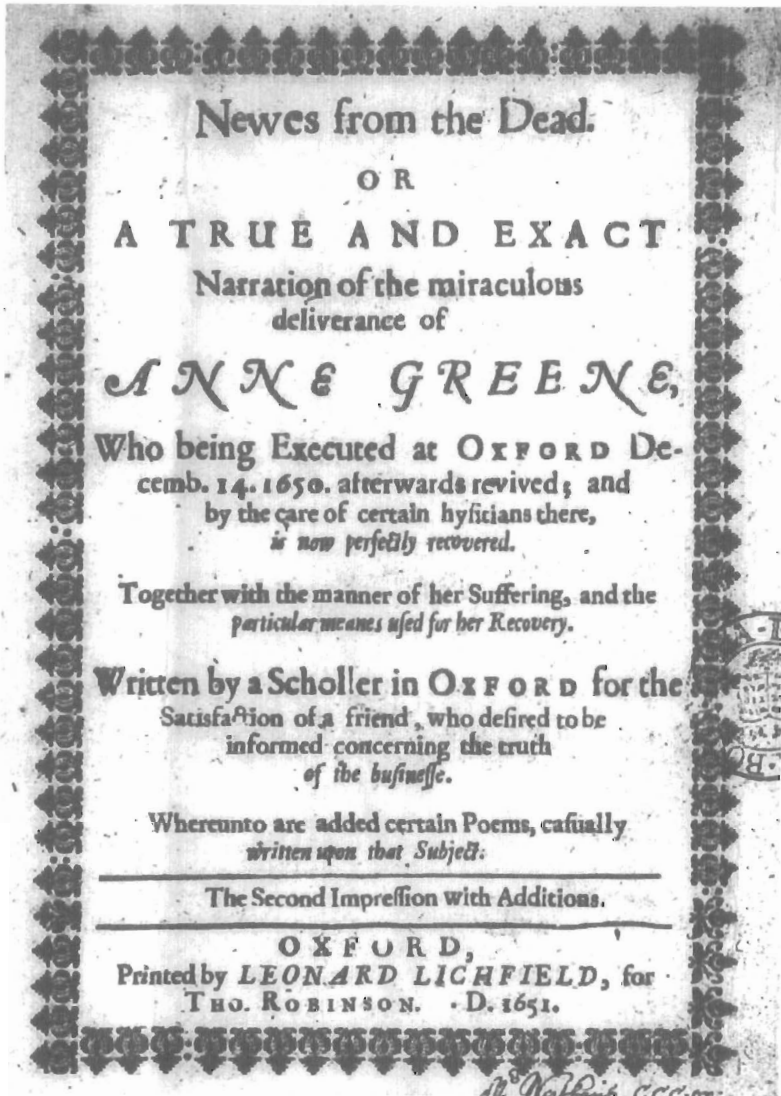


Figure 1

The original continues:

'Thereupon, she was immediately taken into examination, and carried before several Iustices of the peace in the countrey; and soon after, in an extreame cold and rainy day, sent unto Oxford Gaole, where, having paffed about three weekes more in continuall affrights and terrours, in a place as comfortleffe as her condition, she was at a Seffions held in Oxford, arraigned...'

At the sessions, she pleaded not guilty, but after a short trial, was condemned to death and sentenced to be hanged on Oxford Gallows, the sentence being carried out on Saturday December 14th 1650. The technique of hanging used involved the prisoner in climbing up a ladder and the rope, after having been tied round the prisoner's neck, was attached to the scaffold. The task of the Executioner was then to turn the prisoner off the ladder, leaving him or her hanging by the neck. (Figure 2) Thus, death was due to strangulation and took some time. On this occasion, while still on the scaffold, Anne Greene made a speech which she closed with the following words:

'... One thing more I desire, and to you dear Cousin, (being a young man at the foot of the Ladder), that when the doomful turn off the Ladder comes, that you would use all possible means to dispatch me of my pain. And then, breathed forth her last Words saying, "Sweet Jesus receive my soul". Upon the uttering of which words, the Executioner performed his office: And being turn'd off the Ladder, her Kinsman took hold of her feet, and hung on them, so that he might the sooner rid her of her pain. In addition, a soldier standing by, gave her four or five blows on the breast with the butt end of his Musket...'

The cousin and soldier can be seen in Figure 2 with, probably, her mother on her knees, praying for her daughter's soul.

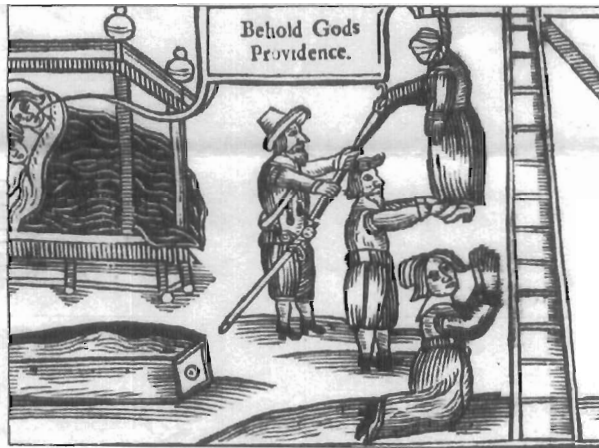


Figure 2

The original continues:

'After hanging by the neck for the space of almoft halfe an hour, fome of her friends started thumping on her breaft, others hanging with all their weight upon her legges; sometimes lifting her up, and then pulling her down againe with a fuddaine jerke, thereby fooner to difpatch her out of her pain'.

At length, when everyone thought she was dead, her body was taken down, and put into a waiting coffin, and carried into a private house, where some physicians had gathered to make a 'Dissection', it being the custom then for the bodies of executed criminals to be made available to the anatomists. However, when the coffin was opened, she was observed to breathe, and in breathing, she was noted to 'rattle' which, being perceived by a lusty fellow that stood by, he, (thinking to do an act of charity in ridding her of the remains of a painful life), stamped several times on her breast and stomach with all the force he could.

Then Dr (later Sir William) Petty, the anatomy Professor, and a Mr Thomas Willis arrived. At their arrival, she continued to rattle as before, meanwhile still lying in the coffin in a cold room. Dr Petty, perceiving some life in her, started to act to aid her recovery. First, she was sat up in the coffin. Then they wrenched open her teeth and poured some hot and cordial spirits into her mouth; whereupon she rattled more than before and seemed to cough. They then opened her hands (her fingers being stiffly bent). They also tickled her throat with a feather, at which she opened her eyes. Next, they ordered her to be laid in a well warmed bed. After that they persuaded a woman to go to bed with her, and to lie very close to her, and gently keep rubbing of her (Figure.2). Whilst the Physicians were busy recovering her, the Under Sheriffe was soliciting the Governor and the other Justices of peace to obtain a Reprieve so that, in case she should recover, she should not have to go back again for Execution.

The original continues:

' ...Whereupon thofe worthy Gentlemen, confidering what had happened, weighing all the circumftances, they readily apprehended the hand of God in her prefervation, and being willing rather to co-operate with divine providence in faving her, than to overftrein juftice by condemning her to double flame and fufferings, they were pleas'd to grant her a Reprieve until fuch time as her Pardon might be completely obtained'.

The doctors continued their efforts to revive her with various lotions, oils, enemas and, inevitably, in those times, bleeding her on two or three occasions. They also asked her what she remembered of her Execution but she remembered nothing at all that had been done to her. However, two weeks later, she remembered something of a fellow wrapped up in a blanket, which indeed was the habit of her Executioner. It is noted, however, that her neck was still sore, as was her breast and belly. This is hardly surprising in view of the various efforts made to accelerate her death. Anne Greene however, was a very tough young woman and proceeded to make a full recovery. She was soon able to walk about the town, eat, drink and sleep as well as before so she repaired to her friends in the country, taking with her the coffin wherein she lay, as a trophy of this, her wonderful preservation. Thus, within the space of a month she was wholly recovered. And in the same room where her body was to have been dissected for the satisfaction of a few, she became a great wonder, being revived, to the satisfaction of multitudes that flocked thither daily to see her. Indeed, the number of visitors became so great that, despite a guard on the door, some had to be denied admission. The doctors however, thought it a reasonable

opportunity, for the maid's benefit, to invite them to exercise their charity, or at least to pay for their curiosity. Therefore, those that came in were asked to give, everyone what they pleased, her father being there to receive it. After a few days, even the Governor came himself to see her and contributed in a liberal manner. By this means, a sum of many pounds was collected whereby not only the apothecary's bill but also the other necessities for her diet and lodging were met with some over which was used to meet the costs of her Pardon. It was finally agreed, to the satisfaction of all, that Anne Greene did not murder her child but had had a miscarriage which she, understandably had wished to conceal.

And so the story had a happy ending. Anne Greene recovered, married, bore three children and lived for another 15 years. Meanwhile, William Petty and Thomas Willis achieved considerable fame from their conduct of the case.⁶

References

1. *The Holy Bible* (authorised edition)
2. The Newgate Calendar website.
3. Turner, CH. *The Inhumanists*. London, Alexander Ouseley, 1932.
4. Linebaugh, P. *Albions Fatal Tree* Allen Lane, 1975.
5. *Newes from the Dead or a true and exact Narration of the miraculous deliverance of Anne Green who, being executed at Oxford afterwards revived. Written by a Scholler in Oxford.* Oxford: Printed by Leonard Lichfield for Tho. Robinson, 1651.
6. Hughes, JT. Miraculous Deliverance of Anne Greene. *British Medical Journal* 1982; **285**:1792-3.

Acknowledgements

The permission to quote from reference 5 (shelfmark Wood 516(7), and to reproduce Figure 2 (shelfmark Bliss B 65 (2)) from the Bodleian Library, Oxford, is acknowledged.

THE TRAINING WOT I GOT (ACADEMICALLY NOT A LOT)

Dr Adrian Padfield
Past President, History of Anaesthesia Society

As President of HAS I hoped to encourage some of our older members to talk about recent history of which they had been part. This is a self-indulgent swansong as I retire from the Presidency. It may remind older members of their own training and be an eye opener for younger ones. I apologise to David Zuck and John Zorab for plagiarising their College Bulletin exam title; imitation is the sincerest form of flattery.

Decision for Anaesthesia

I'm not sure when I decided to do anaesthetics; perhaps during 2nd MB Pharmacology in 1956/7 when several anaesthetic drugs featured in the practical experiments. My first paper in *Anaesthesia*¹ was based on one of these experiments. In 1959/60 when I was a clinical student we were paired for our month of anaesthetics, but my group had an odd number and I arranged to be the spare man to do more. Strong memories included Hedley White being quite upset because I injected the atropine/neostigmine mixture too quickly, and anaesthetising for a gynaecology list with George Ellis (Grimsdyke in Doctor in the House), injecting thiopentone intravenously into an ante-cubital fossa vein and holding the mask on with N₂O, O₂ and Trilene or halothane. He would reappear from reading *Motor Sport* in the changing room to take the patient out of theatre while I went to do the next one. On qualification in 1961, I did an orthopaedic house job at St Bartholomew's (a bit specialised), so I felt I ought to do a general surgical house officer's job, and in July 1962 I went to the Royal Devon & Exeter Hospital (R D & E). I had a delusion about being a surgeon then but the Senior Registrar put me off. I did a few general anaesthetics in the Accident & Emergency department there with Tony Adams. I applied for London anaesthetic posts, but I learnt an early lesson; you rarely get jobs you don't apply for. I was put off applying for a Junior House Officer's job at St Thomas's by the (ex St Thomas's) Resident Medical Officer at the R D & E, who said it was bound to go to a St Thomas's man; Mike Pemberton, an old St Bartholomew's bridge partner, got it! There were Junior House Officer posts at other London teaching hospitals and I was interviewed at the Middlesex, perhaps because Peter Dinnick practised in private with Derrick Coltart, my old orthopaedic boss at St Bartholomew's.

I left the R D & E in my open Alvis between snowstorms after Christmas 1962. January and February 1963 were very frustrating. At interviews I was told they wanted someone with previous experience to go on-call at once (this included St Bartholomew's); Catch 22 if ever there was. I did two locums in general practice, which didn't enthuse me. After failing to get a job at the Royal Free on February 25th I was appointed at the West London on the 28th, and the next day had a letter from Addenbrooke's inviting me for interview, from which I withdrew. I think I started on March 4th; I had a little tuition from my predecessor because being unemployed I was able to go in before he left. There were two dishes of ampoules, one of atropine and one of neostigmine, and he said I should always check the ampoule before use; picking out atropine it turned out to be neostigmine! As the one SHO with only two registrars, they were quite keen to get me on-call as soon as possible, so I was on-call within a few weeks. I clearly remember an emergency patient who'd been stabbed in the chest in a pub brawl. I needed both hands free to put up the drip (few cannulae then) so after induction

with thiopentone and gallamine into the ante-cubital fossa, I ventilated him with an Aintree machine. Someone was smiling down on me; the patient was bleeding into his right chest from a divided internal mammary artery.

I don't recall any formal teaching, only apprenticeship when attached to a consultant; I remember Bill Grindley best, who had competed in motor sport in the 30s with an Alvis similar to mine. He told me about the tragedy of a child who had died because the anaesthetist was addicted to nitrous oxide. There were sociable meetings, with speakers, at Charing Cross (of which West London was a part) run by the Brigadier, Dr Ashworth, and I remember watching Macintosh demonstrating ether and air with an Oxford inflating bellows, while Norman Tanner did a gastrectomy using diathermy on the other side of the screen. I went to weekly medical electronics evening classes in Walthamstow (I passed the Radio Amateur's exam in October 1955 two days before starting at St Bartholomew's), and made a pulse meter to a design described by H J V Morton in *The Lancet*. The transducer was an Army surplus tank commander's throat microphone on the patient's finger. It was derided by older anaesthetic and surgical consultants but was useful for blood pressure measurement. In a 1963 diary, I found entries for evening lectures at the Royal Free but I can't remember if I went. I realised I must study and so I decided to enter the DA exam in November and I bought the first edition of Wylie and Churchill Davidson. In it halothane was described as a dangerous agent only to be used by experienced anaesthetists. I'd been using it from my first day; textbooks may be out of date on publication.

St Bartholomew's

I started a Senior House Officer job at Barts in September with enough experience (about 400 anaesthetics at the West London) to go on call at once. There were three Senior House Officers, two or three Registrars, one Senior Registrar, a part time Lecturer and six consultants.

We worked hard; at the end of 12 months, stimulated by Eric Plumpton, another SHO, I counted up the number of General Anaesthetics I'd given; it was 1,107 (actually it was over 10 months; I'd had 4 weeks holiday and 5 weeks off with fractured lumbar transverse processes from playing rugby). I took the DA paper on November 5th and spotted all but the first question; how to anaesthetise a child with face burns on Guy Fawkes' day; the Brigadier was Chair of Examiners. I had passed the ECFMG two weeks earlier so I could work in the United States in the future. Again teaching was by apprenticeship when attached to a consultant or a more senior trainee but there were convivial evening meetings. I recall two of the visiting speakers; Dickie Fairer, then working in a Gulf State, who kept the only bottle of halothane there for himself; and the Chief Vet at the Zoo. He questioned how we gauged the induction dose without knowing our patients' weights. There were free Faculty lectures at 6 pm on Mondays for Primary and Wednesdays for Final at the Royal College of Surgeons, but on call duties interfered with regular attendance. We were also recommended to go to Charles King's shop for equipment demonstrations, but it depended on getting the afternoon off. Sadly a pregnant patient died after regurgitation (Sellick had only recently described cricoid pressure) and we were told to anaesthetise at-risk patients 30° head up. I have a vivid memory of Colin Birt leaping on to a stool behind the patient's head, with a laryngoscope in his left hand and an endotracheal tube between his teeth!

Pharmacology Demonstrator

While recovering from my back fractures, I saw an advertisement in the *British Medical Journal* for a post as Pharmacology Demonstrator in Cambridge. It seemed a good way to study for Primary so when I got better I went to see Professor Quilliam, Head of Pharmacology at St Bartholomew's Medical College, for advice. A position quickly appeared in his department and Tom Boulton sponsored me for an Aylwen bursary. I started in October 1964 and for two years I became a full time academic (belying the title of this paper so I won't dwell on it), but I got married in 1965 (no on call!). One thing I discovered was the regime for steroid cover at the time was useless, which led to the paper by Plumpton, Besser and Cole.² In the university vacations I kept my hand in by helping out in the hospital. I thought I'd have a rehearsal go at the Primary, but to my surprise I passed. Cecil Gray was one of my viva examiners (no details). I got a CIBA Royal Society of Medicine Research Fellowship and went to meetings of the Anaesthetic Section on Friday evenings. At the time the Section was the forum for research and discussion; the specialist societies had barely started. Trainees were told to scrutinise the RSM Proceedings to spot possible examination topics in the run up to Finals. Some of the more memorable meetings were (i) Pask's Presidential *Hunt the Signal* in February 1965, (ii) *Debate on Intensive Care* in April 1966 with Robinson, Dornhorst & Geoffrey Spencer, (iii) in November 1966, Bunker on the *National Halothane Study* and (iv) in April 1967, *Impurities in Nitrous oxide*. I went on the Faculty two week Final course in March 1966 costing 30 guineas; no study leave or expenses and it didn't help!

Rotating Registrar

I did a two week Senior Registrar locum at The Brompton in October 1966 (Maghdi Yacoub was also a locum then), and on November 1st became a rotating Registrar at St George's. I began at the Royal Dental Hospital, Leicester Square where Mike Coplans had a couple of sessions but after one month I realised that six months would be too much. I was able to change and after 3 months, having anaesthetised over 750 dental patients as well as on call cases at Hyde Park Corner, I went to the Atkinson Morley Hospital to do neuroanaesthesia. Living in Islington meant a long drive but I was told I could claim travel expenses as if from Hyde Park Corner (not a lot for a Fiat 500; Carshalton where I would have gone after six months was even further). Again, teaching was mainly by apprenticeship but Dai Davies and another young consultant did weekly tutorials at 8pm. It wasn't always possible to get to them because of on call or fatigue. I anaesthetised more than 300 neuro-surgical patients in six months and got my first private anaesthetic fee: £10 (intermittent intravenous methohexitone for alcohol injection into the trigeminal ganglion).

In April 1967 I went to the 4th Junior Anaesthetists Meeting in Leeds. I got study leave and expenses but I had to write a report. It was very stimulating; John Nunn was the leading light amongst many other names (very good and cheap was Tzigany's nightclub). I gave a paper at a NE Metropolitan Region meeting in June but I can't recall the subject (steroid cover?). I know Morton was there and I discussed the pulse meter with him. In August 1967, I rotated to the Royal National Orthopaedic Hospital and worked at both Stanmore and Great Portland Street. The Final Fellowship was proving elusive; I was tired and depressed so I resigned and left St George's on November 30th. I did a 4 week locum at Harefield where there were some interesting obsolete anaesthetic techniques being used, but I got a Registrar post at the Royal Free and started on January 1st 1968. This was closer to home in Islington and with

less strenuous work and on-call (only about 650 anaesthetics in the year but I don't recall a lot of teaching); I managed to pass the Fellowship examination in July. If I hadn't I was going to emigrate. At Hampstead General Hospital (part of the Royal Free) I had my first experience of mentoring, although nobody called it that then; Dr Massey Dawkins guided and encouraged me and later had a profound effect on my career (I also became adept at epidurals). I applied for Senior Registrar posts in London without success but there was a big expansion in Senior Registrar posts elsewhere. It was a time of change; I distinctly recall a registrar with the Fellowship getting a consultant post in a desirable area like Hereford, and I was told by Tony Deacock, when I got a job in Bristol and the SW Region in the autumn, that it was more difficult to become a senior registrar than a consultant. Perhaps this related to the chief assistant post as head of a pyramid. Bristol agreed to my putting off going there for 4 months, so that I could rotate to The Brompton Hospital in January 1969 for cardio-thoracic experience. Dr Ian English was a superb practical teacher and instilled useful skills. Three important things I learnt there; cannulating the radial artery and the internal jugular vein, and how to remove beer caps with a spoon! I first heard the saying 'Experience is as to intensity not as to duration' about then; I'm still not sure who originated it. However I never wanted to do cardiac work again.

Senior Registrar

There was no orientation or introduction on my first day at the Bristol Royal Infirmary in May 1969. The consultant to whom I was attached carefully explained how the Magill attachment worked. He hadn't been told who I was, didn't ask and thought I was a new senior house officer. There had been excellent papers at the Royal Society of Medicine and Leeds by Kain and Nunn,³ who showed it was much more efficient than previously thought and taught. Most of my work in Bristol was straightforward, but a new experience was attending the anaesthetic services committee, though I was completely ignorant of local politics. I helped to arrange for Massey Dawkins to talk about epidurals for labour at the Bristol Anaesthetic Club where he was criticised by the Professor of Obstetrics. As far as anaesthesia was concerned I felt I was polishing my techniques but learning little new; I had done the specialities as a registrar.

This changed when the Colorado General, Denver needed another Senior Registrar to be a guest lecturer. I had passed ECFMG in October 1963, so I was available and went for six months in November 1969. At a Royal Society of Medicine Anaesthetic Section meeting some years before, a visiting American professor (was it Lucien Morris?) had castigated British anaesthetists for poor monitoring, and John Powell had come back from Denver saying the same thing. I found out why; anaesthesia residents gave 600 anaesthetics in their two year stint (I'd done at least 4,500 in 6 years) so anaesthetic protocols were rigid. Teaching, however, was formidable and I was doing a lot of it. The day started at 7am with coffee and doughnuts and a short presentation by a resident on a pre-selected topic, followed by discussion. Then a review of the day's operations: about 20 in the 10 Operating Rooms. Induction started about 7.30am, the chart being carefully completed with respiration, pulse and blood pressure, and then five minutes oxygen before induction. Patients were rarely ready for surgery before 8am. I supervised 2 or 3 residents (in six months I gave three or four anaesthetics only), and taught. About 3pm, there was another teaching session, sometimes with readings from Wylie and Churchill Davidson by the Professor. At a meeting I attended I met Professor Mushin, who asked if I was enjoying the experience. I said 'Yes, I have written

one paper and I am into a second, but I miss giving anaesthetics'. His comment was: 'What will it be like in a few years if you stayed and were teaching but not doing?'

Conclusion

At the time, British anaesthesia was second to none, but training was long and the hurdles (examinations) not always relevant. I became a consultant having had good experience in all branches of anaesthesia, and confident I could cope with any situation (but I had nearly reached that point as a registrar!) It can't be the same with less practice and more theory in today's shorter training, which is perhaps more like the American system?

References

1. Padfield A. The intradermal local analgesic action of prilocaine: a controlled double blind comparison with lignocaine and procaine. *Anaesthesia* 1967; **22**:556-561.
2. Plumpton FS, Besser GM, Cole PV. Corticosteroid treatment and Surgery. 2: The management of steroid cover. *Anaesthesia* 1969; **24**:12-18.
3. Kain ML, Nunn JF. Fresh gas economics of the Magill circuit. *Anaesthesia* 1974; **29**:964-974.

THE EARLY MAYO EXPERIENCE IN PAIN MEDICINE

Professor David P Martin* and Professor Douglas R Bacon**

*Assistant Professor of Anesthesiology, **Professor of Anesthesiology
and The History of Medicine, Mayo Clinic, Rochester, Minnesota

Modern pain medicine traces its roots back to the multidisciplinary pain clinic of John Bonica, M.D. Bonica published his seminal work *The Management of Pain* in 1953¹ and subsequently established the International Association for the Study of Pain. How was the foundation set for Bonica's contribution? This paper explores the historical background leading up to the establishment of modern pain medicine and specifically, the involvement of the Mayo Clinic and John Lundy. Our thesis is that the work of Gaston Labat, John Lundy, and Emery Rovenstine, among others, set the stage for modern pain medicine in America during the 1920s and 1930s.

Early History

The early history of pain medicine has been reviewed elsewhere.² It was not until the mid-1800s that pharmacologic tools for the management of pain such as morphine and aspirin became available. Towards the end of the 19th century, spinal anesthesia became available as an alternative to deep ether anesthesia for abdominal surgery. Spinal anesthetics offered the advantage of profound muscle relaxation while preserving pulmonary function and avoiding complications of atelectasis and pneumonia. However, many surgeons remained sceptical. One of the sceptics was William Mayo who visited Theodore Tuffier in 1903. At that time Mayo witnessed spinal anesthetics, but was concerned about neurotoxicity and hypotension that were associated with the procedures. Initially, cocaine was the only local anesthetic available for spinal injection and it presented several untoward side effects unique to the drug.

Gaston Labat

Approximately 20 years later, Charlie Mayo visited Paris once again and witnessed the practice of Victor Pouchet. Pouchet's assistant, Gaston Labat, had mastered the techniques of regional anesthesia. These included not only spinal anesthetics, but a variety of regional nerve blocks as well. The availability of the newer local anesthetic, procaine, combined with the percutaneous techniques pioneered by Pouchet allowed effective regional anesthesia. Charlie Mayo convinced Gaston Labat to come to the Mayo Clinic to introduce the European techniques of regional anesthesia.

Gaston Labat came to Rochester, Minnesota, to work at the Mayo Clinic in 1920. During his one-year stay at the Mayo Clinic, he completed his textbook entitled, *Regional Anesthesia: Its Technique and Clinical Application*. The book was immediately popular and in fact remains relevant even today. Labat's text is an expanded translation of Pouchet's textbook of regional anesthesia.³ After one year, Labat left Mayo to take a job at Bellevue Hospital in New York City.

Meeker, Lundy and McCuskey

William Meeker was a surgeon at Mayo Clinic who learned the regional anesthesia techniques from Labat. Meeker continued to lead the Section of Anesthesia at Mayo from 1921 to 1924. Meeker remained a surgeon throughout his career, and William Mayo recruited John Lundy to replace him as head of the Anesthesia Department in 1924. Lundy adopted the regional anesthetic techniques passed on from Labat to Meeker. Lundy also brought on Charles McCuskey and the two expanded the repertoire of regional anesthetics offered at Mayo Clinic. They also developed a three-month course in regional anesthesia.

From 1925 to 1935 the percentage of cases done under regional anesthesia at Mayo Clinic doubled, increasing from 15% to 30%.⁴ During this time, Mayo Clinic was a prominent source of postgraduate medical education, and a large number of practicing physicians as well as trainees came to witness the Mayo's surgical techniques along with the concurrent anesthetic practice. As a result, the demand for regional anesthesia began to increase. Ralph Waters attended the three-month course in regional anesthesia offered by Lundy and McCuskey in 1926. He later went on to create and chair the Department of Anesthesiology at the University of Wisconsin in Madison.⁵

Vision for Pain Medicine

It is our proposition that this proliferation of regional anesthetic techniques provided the substrate upon which the vision for pain medicine was established. As anesthesiologists witnessed the ability of peripheral nerve blocks to selectively render areas of the body insensitive to pain while preserving consciousness, it was a natural extension to consider applying these techniques to problems of chronic pain outside the scope of surgery.

The American Society of Regional Anesthesia (ASRA) was established in honor of Labat in 1923. This organization was instrumental in establishing training guidelines, and introducing pain and anatomy questions into the American Board of Anesthesiology certification examination.⁶ ASRA also had a role in establishing reimbursement guidelines for pain services (such as workers compensation regulations).

Rovenstine

Labat died in 1936 and Emery Rovenstine, Ralph Water's student in Wisconsin, was selected to assume the chairmanship at Bellevue Hospital. Rovenstine carried on Labat's tradition of regional anesthesia and established the 'first' pain clinic in 1936. He later devoted 100% of his time to pain medicine.⁷ These early pain clinics were essentially 'block shops'. Lundy's experiences with the pain clinic involved the injection of both local anesthetics and neurolytic substances near a variety of somatic and sympathetic nerves. Unfortunately the destruction of nerves occasionally increased pain rather than providing relief. These experiences led to a new appreciation of the complexities of pain perception and its control.

Bonica

The next step occurred as a result of World War II. There was an increased need to train physicians in anesthesia rapidly to support the war effort. In the 1940s Lundy was instrumental in establishing 90-day short courses in anesthesia. It was important to include

regional anesthesia in the training program because regional techniques allowed the anesthesiologist to provide care for several patients at one time. These '90-day wonder' programs were established at Mayo (Lundy), Wisconsin (Waters), Bellevue (Rovenstine), and other locations.

John Bonica entered the Army in 1942 and later was head of the anesthesia department at Madigan Hospital, Fort Lewis, Washington. He would have been exposed to the military emphasis on regional anesthesia. Progress in technical and pharmacological approaches to pain problems created a hope in both physicians and patients for the future control of chronic and cancer pain. The development and dissemination of these tools inspired a shift in expectation by the general public. These factors combined in the person of John Bonica and provided the substrate for his landmark text *The Management of Pain*, which was published in 1953.¹

Acknowledgements

The authors thank Renee Ziemer at the Mayo Foundation Archives, and Patrick Sim at the Wood Library of Medicine for their help in obtaining original source material.

References

1. Bonica J. *The Management of Pain*. Philadelphia: Lea and Febiger, 1952.
2. Meldrum M. A capsule history of pain management. *Journal of the American Medical Association* 2003; **290**:2470-2475.
3. Côté AV, Vachon CA, Horlocker TT, Bacon DR. From Victor Pauchet to Gaston Labat: The transformation of regional anesthesia from a surgeon's practice to the physician anesthesiologist. *Anesthesia and Analgesia* 2003; **96**:1193-1200.
4. Kopp S, Horlocker TT, Bacon DR. The contribution of John Lundy in the development of peripheral and neuroaxial nerve blocks at the Mayo Clinic: 1925-1940. *Regional Anesthesia and Pain Medicine* 2002; **27**:322-326.
5. Bacon DR, Ament R. Ralph Waters and the beginnings of academic anesthesiology in the United States: the Wisconsin template. *Journal of Clinical Anesthesia* 1995; **7**:534-543.
6. Bacon DR, Lema M. To define a specialty: a brief history of the American Board of Anesthesiology's first written examination. *Journal of Clinical Anesthesia* 1992; **4**: 489-497.
7. Bacon DR, Darwish H, Emery A. Rovenstine and regional anesthesia. *Regional Anesthesia* 1997; **22**:273-279.

THE ANESTHETISTS TRAVEL CLUB - FOUNDING ORGANISATION OF CONTEMPORARY AMERICAN ANESTHESIOLOGY

Dr Douglas R Bacon
Professor of Anesthesiology and Medical History
Mayo Clinic, Rochester, Minnesota, USA

In October 1929 John Lundy invited seventeen physician anesthetists* for a week of clinical demonstrations and an informal yet thorough discussion of some of the newer concepts of anesthesia at the Mayo Clinic in Rochester, Minnesota. The group encompassed both the United States and Canada, and bridged both countries from coast to coast.¹ As conceived, the meeting was created for the host physician to demonstrate the anesthetic techniques in use at the facility in which he practiced. The idea was a success, and the group met for almost twenty-three years. It remained small and exclusive, although outgrowing the original notion that the entire assembled members could fit in one elevator.² For so modest an organization, the Anesthetists' Travel Club had a tremendous impact on American anesthesiology. Was the group necessary for the development of the specialty in the United States? Quite simply, did the organization matter historically, and if so, how did it matter? Created in 1929, was it in response to the politics of more established organization, or did Lundy intend this to be a group simply interested in the latest scientific advances?

American Anesthesia in 1929 - An Organizational Perspective

In 1929, there was a national anesthetic organization, the Associate Anesthetists of the United States and Canada (AAUSC). Created in 1926 from the Associated Anesthetists of America, the organization had five associated regional societies: the Canadian Society of Anesthetists, the Eastern Society, Southern Association, Pacific Coast Association and the Midwest Association of Anesthetists. The International Anesthesia Research Society was associated with the AAUSC through their mutual founder and secretary-general, Francis Hoefer McMechan. Independent of the physician only organizations, the International Anesthesia Research Society was also dominated by McMechan. He was the editor of *Current Researches in Anesthesia and Analgesia*, the only American journal devoted to the specialty of anesthesiology. Annual meetings, called Congress of Anesthetists, were held annually in conjunction with the American Medical Association (AMA).³

Two small organizations existed outside of McMechan's organization. The American Society of Regional Anesthesia (ASRA), formed in 1924 to honor Gaston Labat, held joint meetings with the AAUSC throughout the 1920s, yet never obtained the status of a subgroup. The New York Society of Anesthetists (NYSA), an outgrowth of the Long Island Society, was centered in New York City. Although McMechan was a member, he had little to no influence in the organization and was referred to as 'the Little Corporal'.⁴ It was the NYSA that Lundy and members of the Travel Club transformed into the American Society of Anesthesiologists.

The Anesthetists' Travel Club

The December 1929 initial meeting of the Travel Club was designed to be an informal, yet

* 'Physician anesthetists' was used to denote physicians who practiced anesthesia. The term anesthesiologist was not commonly used until after World War Two.

thorough discussion of some of the newer concepts of regional and general anesthesia. Laboratory demonstrations were planned. Originally, Lundy had planned this as a two-city meeting with the second city being Madison, Wisconsin and Ralph Waters being the other host. However, Waters wrote to Lundy saying that he wanted to enjoy the initial meeting of the Travel Club more as a traveler than as a host.⁵

The person other than Lundy who was most responsible for the Anaesthetists' Travel Club was its oldest member, Lincoln Sise. Sise had stopped over at the Mayo Clinic in June of 1928 after the AAUSC meeting in Minneapolis and this visit deepened his friendship with Lundy. Sise agreed with Lundy that the members of the new group should be the leading young anesthetists of the United States and Canada. They both felt that continuing education was important to this group.⁶ Lundy commented to Sise, with reference to the concept of an anesthetist's club, that 'I am making some inquiries at the present time of the various men here [Mayo Clinic] who have had a hand in organizing such clubs.'⁷

Whom to Invite?

Who were the physicians that Lundy invited to come to the first meeting? He asked Royal Adams, John Blezard, Wesley Bourne, W Easson Brown, Ansel Caine, David Freeze, Arthur Guedel, Robert Hammond, Charles LaRoque, Charles Robson, Henry Ruth, Harry Shields, Lincoln Sise, Charles Stewart, Brian Sword, Evert Tyler and Ralph Waters. Charles McCuskey, Lundy's 'partner' at the Mayo Clinic served as co-host. Ralph Tovell was the anesthesia resident at the time, and played an integral role during the clinical demonstrations at the meeting. Interestingly, eight of the seventeen were Canadians: Blezard, Bourne, Brown, Freeze, LaRoque, Robson, Shields, and Stewart. They bridged Canada from Vancouver to Montreal.¹ Significantly, there was also a group of well known anesthetists who were missing from this meeting. They included John Evans, who at the time was the president of the Board of Governors at the International Anesthesia Research Society; Adolph Erdmann, who had founded the Long Island Society of Anesthetists and had long been active in organized anesthesia in the New York City area; Paluel Flagg, who was noted for the Flagg ether can and forming the Society for Prevention of Asphyxial Death; Charles Wells, a long-time physician anesthetist and organizer in the McMechan associations especially on the East Coast; Eleanor Seymour,⁸ who was running the Pacific Coast Association of Anesthetists when Lundy left Seattle to come to the Mayo Clinic and who corresponded with Lundy well after his departure; and Gaston Labat.⁹ Perhaps the most interesting exclusion was Francis Hoeffler McMechan, although he had been informed of the group's meeting.¹⁰ Many of these physicians were older and more established and were very prominent in 1929, or just before that date, in the McMechan organizations.

Of the original seventeen invited, twelve came. The five who did not were Royal Adams, who died in 1935 and never joined the organization; David Freeze, who never joined the organization; Wesley Bourne and Charles LaRoque, who both joined in 1931 and were hosts for the combined Toronto-Montreal meeting; and Evert Tyler, who joined in 1932 and was a host at the meeting in Philadelphia that same year.²

Present for the initial Travel Club meeting in December 1929 (Figure 1) at the Mayo Clinic were John Blezard, W Easson Brown, Ansel Caine, Arthur Guedel, Robert Hammond, Charles Robson, Henry Ruth, Harry Shields, Lincoln Sise, Charles Stewart, Brian Sword, and Ralph Waters. Hosts for the initial meeting were John Lundy, Charles McCuskey, and Ralph

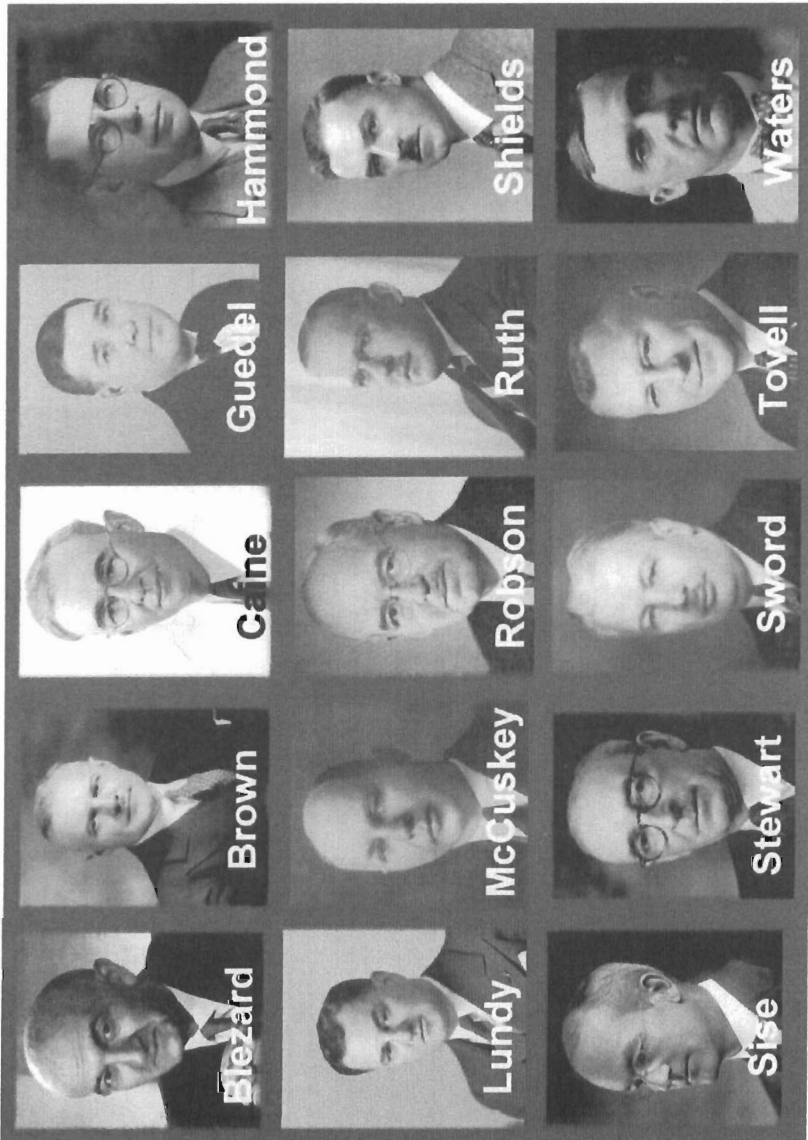


Figure 1.

Photographs of Lundy and Waters by permission of Mayo Historical Unit, Mayo Foundation, Rochester, Minnesota, all other photographs by permission the Wood Library-Museum, Park Ridge, Illinois.

Tovell. The average age of the group was 41. The youngest was Tovell at age 28, second was Henry Ruth at 30, with John Lundy third at age 35, and the oldest was Lincoln Sise at age 55. Thus, these gentlemen were indeed the young men of anesthesiology.

Analysis

Was the Travel Club a political reaction to the existing 1929 hierarchy in organized anesthesia? Only six (35%) of the seventeen invited held offices in national or regional societies. The highest office holders were Ansel Caine who was president of the Associated Anesthetists of the United States and Canada, and Harry Shields who was first vice-president. Interestingly, Lundy did not hold any office. Waters was on the Council on Teaching and Hospital Service of the Associated Anesthetists of the United States and Canada, and Sword was president-elect of the Eastern Society of Anaesthetists.¹¹ Lundy, in writing to Sise in January of 1929, stated that the purpose of the new organization was 'so that in the years to come, the organization would become very useful even though not large, and ultimately would hope to see its opinion respected by both the American Medical Association and the College of Surgeons. This you know is not the case at the present time.'¹² The program of the first meeting of the Anaesthetists' Travel Club cannot be easily reconstructed. Lundy asked each participant to request what he wished to see while at the Mayo Clinic. Through correspondence with the various attendees, a list of thirty-one subjects was developed. Some were vague, such as 'practical work' suggested by Easson Brown, whereas others were quite specific, like Ralph Waters' desire to see 'Laboratory or clinical evidence pointing toward the explanation of fundamental cause of circulatory depression accompanying anesthesia, either block or general. That is, proof that drop in blood pressure accompanying spinal is due to sympathetic paralysis'.¹³

The program lasted a full week; mornings were spent in the hospitals, with an emphasis on observing regional anesthesia, as many of the invitees had questions about Lundy's methods and how he obtained the results that he did. Afternoons were laboratory sessions. For example, on Monday December 16 the group saw Dr Markowitz demonstrate a perfused isolated dog heart and the action of a substance released by the stimulated vagus in another dog that stopped the heart. Dr Boothby's metabolism laboratory was also prominent in the first program of the Anaesthetists' Travel Club, with a visit on Tuesday afternoon. On Thursday morning at St Mary's Hospital, the visitors observed Lundy doing spinal anesthesia with a tray specifically made up for this procedure. Lundy discussed the management of blood pressure and position during and after spinal anesthesia. There was a tour of the newly opened Plummer Building. Evenings were devoted to dinners and conversation.¹³

Wednesday night, December 18, was an exception. The group was invited to attend the weekly Mayo Clinic staff meeting. Both William and Charles Mayo spoke at the meeting, welcoming the visitors and describing the advances in anesthesia that they had witnessed over their careers. As an introduction to the night's papers, Charles Mayo spoke first, and gave a brief although well reasoned account of the history of anesthesia.¹⁴ William Boothby spoke on oxygen therapy,¹⁵ while W C Foster spoke about 'Certain anatomic aspects of spinal and sacral anesthesia'.¹⁶ H L Parker discussed post dural puncture headache,¹⁷ and J L Bollman presented a paper on 'The effect of anesthetics agents on the liver'.¹⁸ John Lundy addressed the group three times, presenting a review of the intravenous and rectal use of Avertin¹⁹ and along with R M Isenberger presented 'A study of the minute volume of respiration in experimental anesthesia: the effects of combinations of procaine, sodium iso-

amyl-ethyl barbituric acid, morphine, scopolamine, ether and carbon dioxide'.²⁰ Lundy's last presentation, with A E Osterberg, was a review of the literature on the derivatives of barbituric acid.²¹ Dr William J Mayo closed the evening's discussions by relating the account of how John Lundy was recruited to the Mayo Clinic some six years prior to the meeting.²² The presentations and discussion were published in two special supplements to the *Proceedings of the Staff Meetings of the Mayo Clinic* for 1929.

Politics and the Travel Club

In the United States the 1930s brought the issue of who was qualified to give anesthetics to the forefront of the medical political agenda, at a time when all branches of medicine were beginning to establish criteria for specialization. The issue was of importance in America because there were several different professionals who gave anesthetics and the specialist physician was often ignored. Surgeons would often allow the general practitioner that referred the case to give the anesthetic. Thus, the general practitioner could charge for his work without being unethical. Surgeons hired nurses to administer anesthesia and help in the office. The anesthetic fee charged by the surgeon was in excess of the salary of the nurse, and the surgeon made a profit. Finally, hospitals hired nurses to give anesthetics, and collected anesthetic fees in excess of the nurses' salaries.²³ Thus, during the Great Depression, anesthesia became a source of income for several different groups in medicine.

When the first Travel Club gathered at the Mayo Clinic, the American Board of Anesthesiology (ABA) may not have even been a dream in the heads of the most forward-looking physician anesthetists. The American Medical Association (AMA) asked the national anesthesia organization at the time, (the AAUSC), to help form a section within the AMA Annual Meeting, a necessary prerequisite for a specialty board. The organization refused, on the grounds that the AMA supported nurse anesthesia over physician specialists. Waters wrote to Flagg on November 12 1935: 'I think they have wished to get in shape some scheme which could at a later date be acceptable to the Advisory Board for Medical Specialties. It would, of course, have been much better if the National Board could have been organized two years ago when the opportunity could have afforded. Unfortunately, the old organization of anesthetists did not approve of such an organization and in order to avoid a split in the only representation of organized anesthesia at the time, nothing was done about it'.²⁴

During the 1930s, the creation of specialty certification for anesthesiologists was uppermost in the mind of the Club's founder, John Lundy. He wanted the American Medical Association (AMA) to 'sign off' on the certification process so that in the United States the designation would have meaning. In 1935,²⁵ Lundy attempted to take the first step in this process by modifying the Section on Pharmacology and Therapeutics to include anesthesiology. (A section on a subject was part of the Annual Meeting of the AMA). Scientific papers were presented which helped delineate the special nature of the subject matter. These sections were the first prerequisite in obtaining a specialty board in the 1930s in the United States. The AMA eventually denied the idea that at first was universally hailed. The exact reasons why were verbally communicated from Frank Lahey, the surgical colleague of Philip Woodbridge, at the 1935 Travel Club meeting in New Orleans. A letter from Philip Woodbridge unfortunately does not contain Lahey's comments, which must have been spoken to Lundy at the meeting and were not recorded.²⁶

Lundy and his small cadre of physicians in the Travel Club began to work toward transforming the group into the nucleus of a specialty board. Using Paul Wood's connections with the New York Society they created a new class of membership called 'Fellows' in 1935. By 1938, most of the Fellows would be the first Board certified anesthesiologists in the United States.²⁷ The Travel Club dominated the fellowship committee; so much so that Paul Wood as Secretary of the organization felt compelled to comment about the high number of members on the committee.²⁸

When the board was finally incorporated in 1938 as a sub-board of the American Board of Surgery, all of the directors, with the exception of H Boyd Stewart were Travel Club members.²⁹ Perhaps even more interesting was the fact that six of the nine were members in the first two years of the club, while Wood and Rovenstine joined in 1933 and 1934 respectively. Thus, these men had known each other for some time, and had had the opportunity to see each other's work in the Travel Club. Knowing in advance the clinical opinions of each member of the ABA must have made the first definition of the specialty easier. After the original board was determined the Travel Club continued to have some influence on the ABA. Of the first 20 directors of the ABA, 12 (60%) were Travel Club members, and 11 of the first 12 directors (92%) were Travel Club members. In 1955, Edward Tuohy was the last of the Travel Club to be appointed as an ABA director.

The American Society of Anesthesiologists

Just as the Anaesthetists' Travel Club was a catalyst for the formation of the ABA, the creation of the American Society of Anesthetists, which evolved into the American Society of Anesthesiologists (ASA) in 1945, was also largely the work of members of this group. On February 13 1936, the New York Society became the American Society of Anesthetists.³⁰ The last Travel Club member to become ASA President occurred in 1953, when Ralph Knight assumed office. Of the 17 ASA Presidents from 1936-1953, 13 (76.5%) were Travel Club members. The Distinguished Service Award (DSA) of the ASA, inaugurated in 1945, has also had a number of Travel Club winners. Of the first 16 DSA's awarded, 12 (75%) went to Travel Club members. Thus, amongst the movers and shakers of the ASA, the Travel Club has had an enormous influence.

In 1940, the journal *Anesthesiology* was published. It was the official publication of the American Society and ended a long secret agreement between the ASA and McMechan. Paul Wood wrote to McMechan: 'With you, we agreed to make no publication until such time as *Anesthesia and Analgesia* should not be published or some other individual is editor. In the same manner we promise to hold no congresses as long as the International or Associated Societies held theirs'.³¹ The Travel Club and later Academy heavily influenced the editorial board, in a manner similar to the ABA. The four named editors of the first issue, Henry Ruth as editor-in chief, Ralph Tovell and Emery Rovenstine as associate editors and Paul Wood as business editor were all Travel Club members. Of the editorial committee, six of fifteen (40%) were members of the Travel Club. Two thirds (66%) of the contributing foreign editors were Travel Club members.

Conclusions

A small group of physician anesthetists, never numbering more than forty between 1929 and 1940, were the leaders of specialty certification in the United States. Along the way, they created the American Society of Anesthesiologists, the American Board of Anesthesiology

and a journal, *Anesthesiology*, all of which are still functioning strongly in the USA today. Without the Travel Club, its intimate meetings and close friendships, American anesthesiology would not have developed into a mature specialty prior to the Second World War, nor been able to take advantage of the precipitous growth in the immediate decades after the conflict.

References

1. Letter from John S Lundy to R Stuart Adams, October 28, 1929. *The Collected Papers of John Lundy*. Mayo Foundation Archive, Rochester, MN.
2. Stephen CR. *Anesthetists Travel Club 1929-1952: An Historical Review*. Privately published by the Academy of Anesthesiology. Wood Library-Museum of Anesthesiology Collection, Park Ridge, Illinois, 1-5, 29-59.
3. Betcher AM, Ciliberti BJ, Wood PM, Wright LH. The jubilee year of organized anesthesiology. *Anesthesiology* 1956; **17**:226-264.
4. Minutes of meeting of New York Society of Anesthetists March 9, 1922. *The Collected papers and Minutes of the Long Island, New York and American Societies of Anesthetists*. Wood Library-Museum Collection, Park Ridge, Illinois.
5. Letter from Ralph Waters to John Lundy, March 9, 1929. *The Collected Papers of John Lundy*. Ibid.
6. Letter from John Lundy to Lincoln Size, November 5, 1928. *The Collected Papers of John Lundy*. Ibid.
7. Letter from John Lundy to Lincoln Size, November 18, 1928. *The Collected Papers of John Lundy*. Ibid.
8. Letters to Eleanor Seymour through 1932. *The Collected Papers of John Lundy*. Ibid.
9. Letters between Gaston Labat and John Lundy, 1924-1934. *The Collected Papers of John Lundy*. Ibid.
10. Letter from John Lundy to FH McMechan, April 12, 1929. *The Collected Papers of John Lundy*. Ibid.
11. Letter from the Officers of the Eighth Annual Congress of Anesthetists, 1929. *The Collected Papers of John Lundy*. Ibid.
12. Letter from John Lundy to Lincoln Size, January 24, 1929. *The Collected Papers of John Lundy*. Ibid.
13. Topics of interest, first meeting of the Travel Club. *The Collected Papers of John Lundy*. Ibid.
14. Mayo CH. Remarks on anesthesia. *Proceedings of the Staff Meetings of the Mayo Clinic* 1929; **4**:365-366.
15. Boothby WM. Note on treatment by oxygen. *Proceedings of the Staff Meetings of the Mayo Clinic* 1929; **4**:366.
16. Foster WC. Certain anatomic aspects of spinal and sacral anesthesia. *Proceedings of the Staff Meetings of the Mayo Clinic* 1929; **4**:366-369.
17. Parker HL. Headache following diagnostic spinal puncture. *Proceedings of the Staff Meetings of the Mayo Clinic* 1929; **4**:369.
18. Bollman JL. The effect of anesthetic agents on the liver. *Proceedings of the Staff Meetings of the Mayo Clinic* 1929; **4**:369-370.
19. The general anesthetic tribromoethyl alcohol (avertin; E-107): review of the literature on its rectal and intravenous use. *Proceedings of the Staff Meetings of the Mayo Clinic* 1929; **4**:370-380.

20. Isenberger RM. A study of the minute volume of respiration in experimental anesthesia; the effects of procaine, sodium iso-methyl barbituric acid, morphine, scopolamine, ether and carbon dioxide. *Proceedings of the Staff Meetings of the Mayo Clinic* 1929; **4**:382-385.
21. Lundy JS, Osterberg AE. Review of the literature on the derivatives of barbituric acid. *Proceedings of the Staff Meetings of the Mayo Clinic* 1929; **4**: 386-416.
22. Mayo WJ. Remarks on anesthesia. *Proceedings of the Staff Meetings of the Mayo Clinic* 1929; **4**:381.
23. Haines FH. Economic problems in anesthesia. *Current Researches in Anesthesia and Analgesia* 1927; **6**:26.
24. *The Collected Papers of John Lundy*. Ibid.
25. Bacon DR. 1935- a disappointing year for American anesthesiology. In: Diz JC, Franco A, Bacon DR, Ruprecht J, Alvarez J (eds). *The History of Anaesthesia*. Amsterdam: Elsevier, 2002, 371-376.
26. Letter from Philip Woodbridge to John Lundy, December 20 1935. *The Collected Papers of John Lundy*. Ibid.
27. Bacon DR, Lema MJ. To define a specialty: A brief history of the American Board of Anesthesiology's first written examination. *Journal of Clinical Anesthesia* 1992; **4**:489-497.
28. Letter from Paul Wood to John Lundy, March 16 1936. *The Collected Papers of John Lundy*. Ibid.
29. The directors, with the year of their joining the Anesthetists Travel Club were: Thomas D Buchanan (1930), John S Lundy (1929), Emery A Rovenstine (1934), Henry S Ruth (1929), Ralph M Tovell (1929), Ralph M Waters (1929), Paul M Wood (1933) Philip D Woodbridge (1930). H Boyd Stewart was known to the group and became a Travel Club member in 1940, the same year as the death of Buchanan.
30. Letter from Paul Wood to John Lundy, February 14 1936. *The Collected Papers of John Lundy*. Ibid.
31. Letter from Paul Wood to Francis McMechan, February 8 1937. *The Collected Papers of Paul Wood; Wood Library-Museum Collection, Park Ridge, Illinois*.

GUEST LECTURE - SUMMARY

THE HISTORY OF MORECAMBE BAY

Mr Cedric Robinson

Queen's Guide to the Kent Sands of Morecambe Bay

Cedric Robinson was appointed Queen's Guide in 1963. Three generations of his family had worked the sands, gathering cockles for their livelihood, and all he ever wanted to do was fish. Because of the nature of the tides and the sandbanks they could not use a boat, but got to their destination by horse and cart.

The first record of a guide was in 1501 when the area was administered by the Duchy of Lancaster. The distance of 10 miles across the Bay from Hest Bank to Ulverston was a short cut for a more roundabout journey by road. Many famous people have crossed the Bay, including John Wesley, the Quaker George Fox and Thomas Gray (Elegy in a Country Churchyard). A stagecoach ran from the late 16th century to 1880. Recent tragic events are a reminder that the Bay is a dangerous place and has cost lives. The sea recedes several miles twice a day, and high tides and heavy rain mean that the sands move constantly and leave a mixture of firm sand and quicksand.

Cedric Robinson first organised a walk from Hest Bank to Grange-over-Sands in 1964 for a party of paratroopers on a military exercise. Increasing interest has meant that there are now about 30 carefully planned walks a year, mostly at week-ends but some in mid-week, and in season there are about 10,000 visitors. Some well-known ones include the Duke of Edinburgh, David Bellamy, Melvyn Bragg, Bill Bryson, Magnus Pyke, Harry Secombe and Alan Titchmarsh. Television crews have been there, including crews from France and America. Many charities have benefited from sponsored walks.

There are outstanding views on the walk from the Lune Valley round to Southern Lakeland. These and some spectacular skylscapes were well illustrated with slides.

**PROFESSOR DOREEN MARY ELIZABETH VERMEULEN-CRANCH,
CBE, MB, BCh, BSc, FRCA, DA**

Dr T B Boulton
Past President of the History of Anaesthesia Society

It is a great honour to be asked to present this citation on behalf of Professor Doreen Vermeulen-Cranch. Her career has been one of outstanding achievement in the field of European anaesthesia. She played an important part in the development of the modern specialty, first in the United Kingdom during the Second World War, and then uniquely, for a number of decades thereafter, in the Netherlands.¹ It is sad that several problems of a domestic and orthopaedic nature prevented her attending the meeting in person to receive this token of our gratitude and admiration by acclamation.²

Doreen Cranch, as she then was, was born in Monmouthshire. Her father, who was of independent means, had made a detailed study of photography and the development of early radiology and, as a result, he provided valuable technical expertise in radiology for the medical services both in the United Kingdom and in France during the First World War. Her mother was a teacher.

Doreen was educated at the Cardiff High School for Girls and, after training at the Welsh National School of Medicine at Cardiff, she received her medical degree in 1940 shortly after the outbreak of the Second World War. She then held appointments as a House Surgeon at the Royal Devon and Exeter Hospital, and as a House Physician at the Cardiff Royal Infirmary. She has stated that during her student years she found anaesthetics 'fascinating but rather frightening', but fortunately, after qualification, a visit to the Nuffield Department of Anaesthetics at Oxford, headed by Professor Robert Macintosh, sparked her enthusiasm and made her determined to become an anaesthetist.^{1,2} To this end she took Resident Anaesthetist posts, first at the Cardiff Royal Infirmary and then at the University College Hospital, London. Filled with unquenchable enthusiasm she took every opportunity to visit other hospitals in London, notably the Brompton Hospital for Diseases of the Chest. Her mentors included Geoffrey Organe, Massey Dawkins and, most importantly for her future career, the thoracic anaesthetists Ian Magill, Robert Machray, Michael Nosworthy and the intrepid Ruth Mansfield.^{1,2}



Figure 1.

**Professor Vermeulen-Cranch addressing the History of Anaesthesia Society
(from *Proceedings of The History of Anaesthesia Society* 1994: 16,7)**

Doreen obtained her Diploma in Anaesthetics, then, of course, the only anaesthesia qualification in the world, and in 1944 she was appointed as Chief Assistant Anaesthetist at University College Hospital. Hours of work were long and arduous in London, during the dark days of the War and the consequent aerial bombardment, far beyond the imagining of any grade of medical practitioner in the National Health Service today. In 1944 she was seconded to the South Coast where thousands of hospital beds had been cleared and improvised in anticipation of D-Day, and she subsequently played an exhausting part in treating allied and enemy casualties alike, as is the privilege of the medical profession.²

Doreen Cranch, with the encouragement of Massey Dawkins, published her first paper jointly with her colleague Edith Merry in the *British Journal of Anaesthesia* in 1946.³ This must have been one of the earliest papers on the use of epidural analgesia for caesarean section. Nineteen forty-six also proved to be a year of dramatic change in the personal and professional life of Doreen Cranch. First she married a Dutch Merchant Navy Officer, who had perforce been compelled to operate from the United Kingdom during the German occupation of the Netherlands. Thus she became the more familiar Doreen Vermeulen-Cranch that we recognise today. She was then introduced to Professor Noordenbos Snr, Chairman of Surgery at the Amsterdam University Hospital. He had visited the United Kingdom and realised the potential both of the new techniques of anaesthesia and of Doreen herself,^{1,2} and he invited her to attempt to improve the standard of anaesthesia at the University Hospital, albeit in a lowly academic position and at a very small salary.^{1,2}

Nowadays, when the standards of anaesthesia of Continental Europe are high, it is difficult to recall or realise the very marked contrast between anaesthesia in the United Kingdom and that which prevailed in mainland Europe in 1946.^{1,2,4-6} The United Kingdom has had the good fortune to have had the administration of anaesthesia solely in the hands of physicians since the earliest days, apart from use by dental surgeons in their own practices. In the major British hospitals before the Second World War and in the British Armed Forces during the War, the speciality of anaesthesia had developed a high degree of competence, and a status that was well recognised and, indeed, it was the envy of the world (even of the Americans). In Holland in June 1946 Doreen Vermeulen-Cranch found that, as in other continental countries, the responsibility for the anaesthetic, the choice of agents and the method of administration, was the prerogative of the surgeon, who was frequently domineering. The actual unfortunate administrator of the anaesthetic, who was frequently blamed for every shortcoming of the operative conditions, was usually the most junior member of the surgical staff or a nurse.^{1,2,4-6} Endotracheal anaesthesia was unknown. Local infiltration, regional and spinal anaesthesia, and open ether were the principal techniques employed.^{1,5,6} There were a few rudimentary nitrous oxide and oxygen anaesthetic machines around, most of which were badly designed and poorly maintained; consequently they were downright dangerous. Nitrous oxide was therefore little used.^{1,6,7}

There was generally much resistance amongst Dutch surgeons to any idea of having specialist physician anaesthetists. As Doreen said a few years later in her inaugural lecture as University Lecturer, '[anaesthesia was at best regarded in Holland in 1946] as an unimportant nuisance that made surgery possible'.⁸ She started to work at the Amsterdam University Hospital on 17 June 1946. She has described her task as 'exhilarating', a typical assertion that confirms her determined character. Considerable ingenuity and improvisation were required, but soon many departments in the Hospital were seeking her help. It must not be

thought that her task was easy, however. She met with both prejudice and antipathy, but her well known charm indisputable, but forceful, tact, undoubtedly stood her in good stead.^{1,2}

It was however the need for the development of thoracic, and later cardiac anaesthesia in the Netherlands before these surgical specialties could themselves progress, and it was the expertise in thoracic anaesthesia that Doreen had acquired in London that accelerated her personal recognition, and confirmed the value of modern anaesthesia amongst Dutch surgeons. This was especially true of her productive association with Professor Boerema, who succeeded Professor Noordenbos Snr in September 1946.^{1,2} It will be recalled that it was the seminal lecture by Gray and Halton at the Royal Society of Medicine in March 1946 that brought the then revolutionary Liverpool technique of light anaesthesia, paralysis with a muscular relaxant and controlled ventilation, to the attention of the specialty.⁹ Doreen Vermeulen-Cranch arrived in Holland in June 1946 with a sample in her suitcase of the first commercial batch of tubocurarine in solution, supplied by Burroughs Wellcome.^{1,2}

Nor, of course, did she keep her knowledge to herself. Doreen had a dedicated mission to promote modern anaesthesia in the Netherlands. As early as January 1947 she initiated a course for medical practitioners starting with two unpaid trainees. From this small beginning many physician anaesthetists were trained by her over the years. No fewer than thirteen of them have become Professors and Heads of Departments in major hospitals in Holland and elsewhere.^{1,2,6}

One could go on listing many firsts. Amongst them, the first recovery and intensive care unit in Holland in 1947, her appointment as the first University Lecturer in 1951, and triumphally, in May 1958, her election as the first Professor of Anaesthesiology in Continental Europe. This was arguably also the first ever chair in anaesthesiology in the world to be held by a woman.^{1,2} It goes without saying that she is an accomplished speaker and an author of many papers. Medico-politically she was involved in training and supporting the use of nitrous oxide by dental surgeons in Holland for analgesia and conscious sedation for anxious and handicapped patients.⁷

Since the beginning of her career in the Netherlands Doreen has worked successfully with fully qualified nurses officially attached to the physician anaesthetist. These nurses receive practical and theoretical teaching in all aspects of assisting the anaesthetist in the operating room. They also work in the recovery room on rotation. After the conclusion of their training and after successfully passing an examination, the nurse is awarded an in-house diploma. This diploma has been recognised as a model for a national diploma of training in other hospitals. However, Professor Vermeulen-Cranch has been active recently in cautioning the President of the Royal College of Anaesthetists against the delegation of responsibility for clinical care in the operating room to those who are not medically qualified, in an attempt to compensate for a shortage of physician anaesthetists or to shorten waiting lists.

Doreen Vermeulen-Cranch has been described by Professor Mauve, one of her first two trainees in 1947, as the 'mother of anaesthesia in the Netherlands'⁶ and it is undoubtedly impossible to dispute this claim. She has been appointed as a Commander of the Order of the British Empire by the Queen of the United Kingdom for services to medicine, as well as to an equivalent honour by the Queen of the Netherlands; she is an Honorary Member of the Association of Anaesthetists of Great Britain and Ireland,^{4,5} and she has been a frequent and

lively participant and speaker at the meetings of the History of Anaesthesia Society ever since its foundation in 1986.^{7,10,11} We sincerely hope that we shall have her cheerful and charming presence with us again before long when her present difficulties have been successfully mitigated.

References

1. Vermeulen-Cranch DME. Open ether to open hearts. In: Ruprecht J, van Lieburg MJ, Lee JA, Erdman W, eds. *Anaesthesia. Essays on its History*. Heidelberg: Springer-Verlag, 1985; 265-270.
 2. Vermeulen-Cranch DME. Personal communication, 2004.
 3. Cranch DME, Merry ESM. Epidural analgesia for caesarean section. *British Journal of Anaesthesia* 1946; **20**:24-33.
 4. Organe G. An account of the development of the World Federation of Societies of Anaesthesiologists. In: Ruprecht J, van Lieburg MJ, Lee JA, Erdman W, eds. *Anaesthesia: Essays on its History*. Heidelberg: Springer-Verlag, 1985; 311-313.
 5. Boulton TB. *The Association of Anaesthetists of Great Britain and Ireland 1932-1992 and the Development of the Speciality of Anaesthesia*. London: Association of Anaesthetists of Great Britain and Ireland, 1999; 149-151.
 6. Mauve M. Anaesthesia in the Netherlands from the thirties to 1948. In: Atkinson RS, Boulton TB eds. *The History of Anaesthesia. Royal Society of Medicine International Congress Series 134*. London: Royal Society of Medicine, 1989; 95-97.
- Vermeulen-Cranch DME. 'No' to nitrous oxide in the Netherlands. *Proceedings of the History of Anaesthesia Society* 1994; **16**:62-67.
- Vermeulen-Cranch DME. De ontwikkeling van de anaesthetica, tot heil van de patient. *Openbare les Amsterdam*, 1951.
9. Gray TC, Halton JA. A milestone in anaesthesia (d-tubocurarine chloride). *Proceedings of the Royal Society of Medicine* 1946; **39**:400-410.
 10. Vermeulen-Cranch DME. Theodor Picnot (1820-1910), an English dentist in the Netherlands. *Proceedings of the History of Anaesthesia Society* 1991; **9**:5-10.
 11. Vermeulen-Cranch DME. The John Tomes Dutch Dental Students' Society. *Proceedings of the History of Anaesthesia Society* 1994; **15**:43-45.

BOOK AND TV REVIEWS

For Fear of Pain - British Surgery 1790-1850. Peter Stanley, Amsterdam - New York, Rodolpi, (*Clio Medica* 70, Wellcome Series in the History of Medicine), 2003.

Scream - The History of Anaesthetics. Channel 4 Television Documentary, July 2004.

The Dressing Station - a Surgeon's Odyssey. Jonathan Kaplan, London, Picador, 2001.

Dr Stanley, not medically qualified, is the principal historian at the Australian National Military Museum. At the age of ten he read a description of the amputation of Nelson's right arm, and this operation without an anaesthetic evoked a mental picture that haunted him for years. Eventually, to exorcise the horror of this childhood memory, he began to study the practice of surgery during the half century before the introduction of inhalational (or as he calls it 'chemical') anaesthesia; the result is this book. Although parts of the story he tells are familiar, their sum is different from any book that has gone before.

He started by asking, and attempting to answer, how surgeons could bring themselves to operate on conscious patients, and how patients could bring themselves to submit to it; how medical students were trained to disregard the suffering they inflicted, and what qualities were possessed by those who were able to build up a successful surgical practice. Next he considered the scope of operative surgery, and under what conditions the operations were performed. As his studies progressed, Dr Stanley brought together information, some well known, some little known, and found himself, in his own words: 'writing a social history of the operating theatre'. But this book is also a study of the social, psychological, and economic features of pre-anaesthetic surgery and its practitioners.

He was especially concerned to investigate the truth of the received view of pre-anaesthetic surgery: 'crude, dirty, rapid, bloody ... an explosion of agony, gouts of blood, and rapid movement'. He found the true picture somewhat different. His first four chapters feature the leading surgeons of the period, their characters, their feuds, and the rivalry between the Londoners and the incoming Scots. Some of this is familiar, but entertaining nevertheless; major operations and the surgery of the Napoleonic Wars are described. Next come the medical students and their training, the relations between surgeons and patients, including a very moving chapter about children, and descriptions of the patients' experience of the operating theatre, and of its organization. Finally, the introduction and acceptance of anaesthesia, and the legacy of painful surgery as it persists in folk memory.

Dr Stanley deliberately confined his study to Britain, which is a pity, because he has excluded the evidence of surgeons such as Pirogoff, who wrote the most illuminating account we have of the effect of the introduction of general anaesthesia on both the surgeon and his practice, describing the (at first) unnatural and even repulsive experience of operating on an inert, unreacting body, and the speed with which he realised that the indications and scope of operations could be extended. However, this is an excellent book, well written, well referenced, well produced, and strongly recommended. If only it had been read by those responsible for the television documentary *Scream - The History of Anaesthetics*, not that it was likely to have made any difference, since their obvious purpose was to produce something sensational, regardless of the facts.

The presenter, Phil Hammond, a pleasant-enough general practitioner, and the programme makers received considerable help from the AAGBI, but refused the advisers a preview of the finished product, understandably, when one has seen it. Hence David Wilkinson, who recorded the brief historical comments that were slotted in at various points, not always with strict relevance to what preceded or followed, appears bemused rather than outraged, more 'I'm an anaesthetist, what am I doing here?' than 'Get me out!' For apart from his, and the intelligent contribution of Jean Horton on anaesthesia during the Crimean War, the amount of misinformation and distortion was staggering. As the programme went on, the screams of the patients were echoed by those of the reviewer.

We were told, for example, that surgeons, desperate to discover anaesthetics, poisoned themselves and their servants, blew up operating theatres, and lost their minds. What nonsense! Also that for the laity an evening in the operating theatre was a great night out; whereas, as Stanley reminds us, operations, which were few and far between, were done by daylight, the preferred time being early afternoon. Liston is pilloried as the exemplar of the blood-thirsty surgeon, '*the maverick Scot*', as we are reminded insistently after each commercial break. This is the Liston who, as quoted by Stanley, reminded his students that surgery was not the most important aspect of medical practice, though to think so was 'a very common belief, especially among the young and inexperienced'.

When the news of ether, the 'amazing new substance,' known since 1540, and an ingredient, for its stomachic properties, of a number of medicines, reached London: 'Liston was determined to be in charge of it ... determined to be the first in London ...' and so on. Next day the newspapers screamed: 'We have conquered pain ... Everything had changed, patients queued up for operations'. In fact, hardly anyone took the blindest bit of notice. The search for a better agent than ether brought - guess what? Nitrous oxide! Dr Snow, summoned to the Palace in 1853 to provide Queen Victoria with obstetric analgesia, 'put on his best hat and sword', in case an episiotomy were required, no doubt.

And so it went on. Demonstrating the armamentarium for endotracheal intubation, Dr Hammond described the problems he had had as a junior doctor, trying to intubate tiny screaming new-born babies. Well he would, wouldn't he, with a No 9 tube, especially if they were already screaming. So finally, via curare, ketamine, and the problem of awareness during caesarean section, we came to the present day anaesthetist, his expertise and his role in intensive care, about whom Dr Hammond had so many nice things to say, that it is impossible not to forgive him for all that had gone before.

As to Dr Stanley's question, how could surgeons bring themselves to operate on conscious patients, some of the experiences described by **Jonathan Kaplan** are sadly relevant. Qualifying in South Africa, he writes very vividly about his participation in the student anti-apartheid demonstrations, which saw his own first involvement in casualty surgery. In London for his surgical training, competing with local graduates for jobs, he is entertaining about the trainee jungle, and although he is circumspect about the hospitals he worked in, it is not difficult to identify the one where the main corridor is three-quarters of a mile; but who was the consultant surgeon with Tourette's syndrome?

Failing to secure funding for a research project, he was advised to further his experience in America. There, where laboratory investigations ruled, he found a quite different approach to clinical work, and after some frustrated developments in balloon angioplasty he returned

briefly to South Africa. Here he was told of an instance of torture by the military, strikingly similar to an incident described in a recently published novel, which resonates with the subject of Dr Stanley's book - how can people bring themselves to inflict pain deliberately. He then joined an international mobile surgical team working in Iraqi Kurdistan at the end of the first Gulf War. His descriptions of the situations he had to deal with, far worse than anything we read about in the newspapers, are horrifying. His accounts of man's inhumanity to man *en masse*, there and subsequently in Mozambique, Eritrea, Burma, and Brazil, make one wonder about the point of all the international refugee organisations, NGOs, charities, and aid teams. Frustrated by bureaucracy and the power of big business, and overwhelmed by numbers, they were, according to his account, perhaps able to help one in a thousand, if that.

As one reads, one sees that the answer to Dr Stanley's question, which he does not answer satisfactorily himself, lies in the balance between ends and means. Before anaesthesia Pirogoff would not perform palliative operations; he did not consider that the infliction of pain was justified by the result. For his contemporary, the French surgeon Roux, on the other hand, as described by the young Edward Warren, the operation was the end in itself, the survival of the patient being irrelevant. In Kaplan's words, 'medicine is not always benign or balanced, or even practised for the benefit of the suffering.' So the conclusion has to be that there is not one single answer. For some, surgery was the end in itself, for others, the pain, inseparable from the means, was justified by the hoped-for end.

David Zuck

oooOooo

World Federation of Societies of Anaesthesiologists – 50 years. Guito A, Ruprecht J (Eds.).

Milan: Springer, 2004. 49.95 euros. Copies of this book are available from:

Springer, Via Decembrio, 28 - 20137 Milano

Tel: 02 542597.30

Fax: 02 542597.05

Email: miraglia@springer.it

Toll free number: 0080 7774643

This multi-author book is an exhaustive history of the World Federation of Anaesthesiologists (WFSA) since its inception at the first World Congress in Scheveningen (the Netherlands) in 1955. A hard-cover copy was presented to all 10,685 who registered attendance at the 13th World Congress in Paris in April 2004, thanks to an educational grant from Organon. It is full of facts about the first beginnings of a body to represent anaesthetists up to the present day. To someone like the reviewer, who played a small part in the organisation, it is a very interesting account of the progress made over the years in the effort to encourage anaesthetists from all over the world to get together, and to raise the standards of anaesthesia by encouraging research and by making improvements in training and safety.

After forewords by the President of the recent (13th) World Congress in Paris, the President and Secretary of the WFSA and the Editors, the first contribution is by Maarten Mauve (the Netherlands). He mentions the first person to advocate international cooperation amongst anaesthetists, Francis Hoeffler McMechan (USA), who established the National Anesthesia Research Society, later the International Research Society. He gives details of the path taken

towards the foundation of the WFSA by such men as Harold Griffiths (Canada), Ritzema van Eck (the Netherlands), Geoffrey Organe and John Gillies (UK), Jacques Bourreau and Jean Delafresnaye (France), Torsten Gordh (Sweden) and Alexandre Goldblat (Belgium).

Douglas Bacon and the late Emmanuel Papper (USA) give a fascinating account of why the Americans showed an initial reluctance to join the WFSA. They go back to the early 18th century to show how this was born of the determination of the early founders to break free from the old world, and citing the fear of communism in the 20th century.

There follow contributions from three Presidents of the WFSA. Otto (Ted) Mayhofer (Austria) shows how the WFSA developed from the 1st World Congress in 1955 up to the 5th in Kyoto (Japan), and how it was decided to hold regional congresses in various countries in Europe and later in the Far East and Australasia, organised by the local anaesthetic societies. In three contributions John Zorab (UK) gives further brief accounts of World Congresses held up to the 12th in Montreal in 2000; he describes the inception of the Presidential Medallion handed on to successive Presidents since 1972 and redesigned in 1988, and then follows with a brief account of some of the work achieved in the setting up of the Regional Congresses, and of the lectures and newsletters produced by the WFSA.

Michael Vickers (UK) describes the changes that have occurred in the twenty years up to 2002 in the financial status of the Federation and the increasing work in education, publications, constitutional changes and administration.

Other authors, including three past Presidents, Michael Rosen (UK), Carlos Parsloe (Brazil) and TC Kester Brown (Australia) describe the various World Congresses since Scheveningen. Details are given of the formation of the various committees and subcommittees; the difficulties of financing the organisation and of communication between the various members; the relationships with the Regional Societies and with the World Health Organisation; the establishment of training centres in the less developed countries; the attempt to standardise equipment and to teach its maintenance and repair to anaesthetists with no access to expert help. Michael Dobson (UK) describes the relationship of the WFSA with the World Health Organisation.

David Wilkinson (UK) sets out the complicated relationship of the WFSA and Europe. Elena Damir (Russia) describes international anaesthesia relationships in her country. Information is given about the WFSA in Japan (Koki Shimoji), Africa (Martin Chobli, Benin), the Asian-Australasian Region (Cedric Hoskins, New Zealand) and the South African Society ((Nagin Parbhoo). Kester Brown and Anneke Meursing (the Netherlands) discuss the future of the WFSA and Kester Brown and Roger Eltringham list some of the achievements in the educational field.

Other important matters mentioned are the gathering of material for the archives of the Federation and its storage, and finally the almost impossible, though desirable, attainment of producing the highest standards of anaesthesia everywhere, in every country of the world. In the appendix, the statutes and bye-laws of the WFSA are listed, and a short curriculum vitae and a photograph of each of the contributors is given.

Inevitably there is some reduplication when many authors contribute to such a book, and several of the photographs are repeated in the text. It is hardly a publication to be read from

cover to cover in one sitting. To the historian of anaesthesia, however, it is obviously an important documentation of the origins, work, and aspirations of the WFSA, and of the efforts made by many throughout the world to bring modern, safe and good anaesthesia and analgesia to all including the poorest nations. The reviewer can recall some of the difficulties which occurred in trying to establish this in the poorer countries in Africa, and obviously great strides have been made in the last few decades.

I think there was an unjustifiable feeling amongst some who were not involved in early days that those concerned were a self-congratulating body. The reviewer recalls vividly how one very distinguished anaesthetist from another country said to him after he had played some part in the 4th World Congress in London 'Now you will become one of the back-scratching crowd!'. Wherever he went after that in any part of the world, if he felt someone scratching his back, he knew at once who it was.

I believe this book shows how unselfishly many have worked in the cause of world anaesthesia.

Douglas Howat