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THE HISTORY OF  
ANAESTHESIA SOCIETY  
PROCEEDINGS



Volume 30

Proceedings of the meeting in Norwich  
6th and 7th July 2002

## HISTORY OF ANAESTHESIA SOCIETY

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## HISTORY OF ANAESTHESIA SOCIETY

2002 Summer Scientific Meeting, Swallow Nelson Hotel, Norwich

### Organising Committee

Dr Christopher Woollam, Norwich

Dr Neil Adams, Bury St Edmunds

Dr Ian McLellan, Leicester

Ms Keeley Gripton, Norwich

The organisers wish to thank the following for their generous support for this Meeting:

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### Proceedings of the History of Anaesthesia Society

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The Society acknowledges with thanks the Meeting photographs from Dr Geoff Hall-Davies of Birmingham.

## Editorial

Norwich was a new venue for the summer meeting of the HAS in July 2002. Chris Woollam nobly stepped into the breach when the original organiser dropped out through illness, and our congratulations must go to him and his organising committee for an enjoyable and interesting meeting. It was recalled that on the foundation of the HAS somebody remarked that the Society would have a limited life because it would run out of material. Fifteen years later this meeting attracted 20 papers, including an encouraging input from a younger age group, and still there is new material emerging about Snow and Simpson.

There is always something of local interest at these meetings. Keith Sykes clearly enjoyed his six months as house surgeon at the Norfolk and Norwich Hospital (N and N) in 1950, and Chris Woollam surveyed the anaesthetic services at the hospital, beginning in 1847 and including a period from 1919-1946 when anaesthetic sisters played a significant role. Stephen Cherry from the University of East Anglia, the special guest lecturer, reviewed Surgery in Norwich in the 18th and 19th centuries, and Simon Crocker from the Department of Obstetrics at the N and N gave a very entertaining history of caesarean section.

Some members had not long returned from the Ralph Waters 75th anniversary meeting in Madison, and Tom Boulton reminded us of British Anaesthesia's debt to Waters. There was a strong team from the Mayo Clinic, led by Douglas Bacon. He also presented the paper by A J Wright (Birmingham, Alabama), which revealed the long time span between early concerns about the standard of anaesthesia in the US and the foundation of Waters' department.

In this wide-ranging meeting other topics covered included a pre-1846 practitioner (James Wardrop) who induced unconsciousness by exsanguination; the introduction of ether to Russia; portraits of two designers of chloroform inhalers, Junker and Vernon Harcourt; and an early example of CEPOD. Of recent interest were reminiscences of the Suez crisis in 1956, and the untidy state (hopefully to be remedied) of the archives at the Royal College of Anaesthetists.

There was an excellent dinner at Delia Smith's restaurant, with a wide-angled view of the vivid green sward of Norwich City's football pitch. There were 68 registrants for the meeting.

We have attempted an improved reproduction of the photograph of visitors to Simpson's grave from Volume 29. Members may find it easier to identify themselves.

Owing to pressure on space, the cumulative index due to appear in this volume will be held over until Volume 31, due to be published in 2003.

## PMED

## Meeting of the History of Anaesthesia Society in Norwich on 5-6 July 2002

### Participants

Dr C K Adam	Leven, Fife	Dr D P Martin	Mayo Clinic, US
Dr A Adams	Cambridge	Dr D McCallum	Edinburgh
Dr N Adams	Bury St Edmunds	Dr C A B McLaren	Wootton Bassett
Dr E N Armitage	West Sussex	Dr I McLellan	Leicester
Dr D Bacon	Mayo Clinic US	Dr P Morris	Leicester
Dr A M Barr	Reading	Dr C Mulnier	West Suffolk
Dr M Barton	London	Dr J T Mulvein	Bristol
Dr F E Bennetts	Wokingham	Dr A Newson	Auckland, New Zealand
Dr R C Birt	Rochford	Dr A Nicholls	Birmingham
Dr J W Blizzard	Chelmsford	Dr A Padfield	Sheffield
Prof R I Bodman	Cork	Prof J P Payne	London
Dr T B Boulton	Reading	Dr C Pegum	Dublin
Dr J A Chamberlain-Webber	Brighton	Dr Y Pole	Manchester
Dr H Connor	Hereford	Dr J Pring	Penzance
Prof A Dronsfield	Derby	Dr B Roberts	Cardiff
Dr P M E Drury	Liverpool	Dr A M Rollin	Epsom
Dr M Evans	Victoria, Australia	Dr N M Rose	Ledbury
Dr J G Fairer	Newton Abbott	Dr M Rucklidge	Lancaster
Dr A M Florence	Liverpool	Dr S Saville	London
Mrs S Garner	Leicester	Dr M Sidery	Papworth
Dr G Hall-Davies	Birmingham	Dr J C Sill	Mayo Clinic US
Dr G W Hamlin	Blackburn	Dr J Spears	Chelmsford
Dr H R Hannah	Chippenham	Prof Sir Keith Sykes	Oxford
Dr J M Horton	Cambridge	Dr A Trench	Dunblane
Dr I T Houghton	London	Dr W D Turner	Leicester
Dr D D C Howat	London	Dr D A Walmsley	Chelmsford
Dr M T Inman	Plymouth	Dr B M Q Weaver	Winscombe
Dr R Irvine	Sutton	Dr B R Whittard	Teignmouth
Dr A S Jackson	Cheltenham	Dr D C White	Beaconsfield
Dr R D Johnstone	Kidderminster	Mrs P Willis	London
Dr M Knowles	Basingstoke	Dr C Woollam	Norwich
Dr R MacKenzie	Mayo Clinic US	Dr S Yusuf	Birmingham
Dr K Mcleod	Huntingdon	Dr D Zuck	London

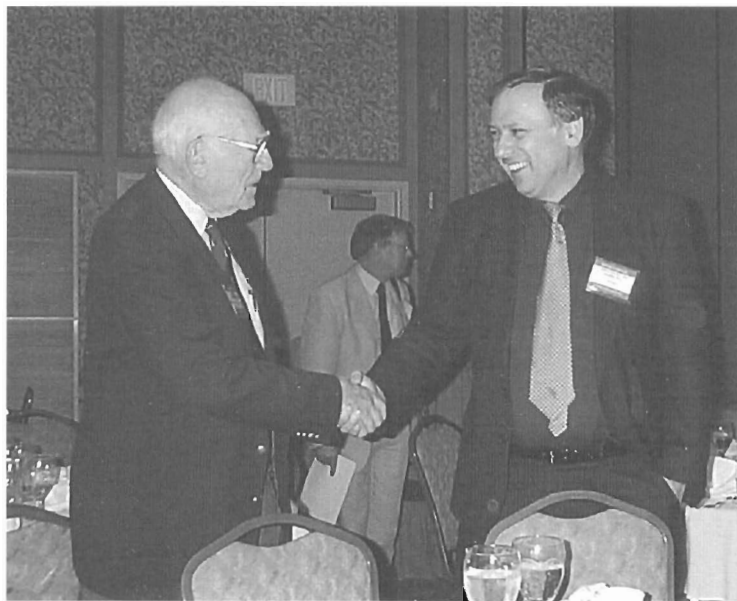
## **RALPH M WATERS MD AND PROFESSIONALISM IN ANESTHESIOLOGY**

**A celebration of 75 years - 6 – 8 June 2002, Madison, Wisconsin, USA**

The History of Anaesthesia Society (HAS) was invited by the Anesthesia History Association (AHA) to co-sponsor this meeting, together with the Department of Anesthesiology of the University of Wisconsin Medical School, the Wisconsin Society of Anesthesiologists, and the Wood Library-Museum of Anesthesiology. The conference was held in the Madison Hotel and attended by 160 delegates, including 13 UK members of the HAS and 16 of our overseas members.

The purpose of the conference was to celebrate the arrival of Ralph M Waters in Madison in 1927, when he founded the first academic department of Anesthesiology in the world, and to explore his legacy to anesthesia practice and professionalism. Between 1927 and 1949, Waters trained anaesthetists from all over the world, known as 'Waters' Babies' or 'Aqualumni'. Aqualumni who attended were Lucien Morris, who had conceived the idea for the meeting, and Merel Harmel, Carlos Parsloe and Darwin Waters (Waters' son). Torsten Gordh, Eric Nilsson and Lone Wu sent messages and videos.

The proceedings commenced on the Thursday evening with the opening ceremony held in the magnificent council chamber of the Wisconsin State Capitol. The Principal of the University of Wisconsin welcomed the delegates, and announced that the University had approved the endowment of the Ralph M Waters Distinguished Chair in Anesthesiology, and had



**Drs Lucien Morris and Neil Adams at the Conference Dinner**

appointed Dr Susan M Goelzer as the first professor. Then followed a thought-provoking lecture delivered by Professor Robert Joy on 'Teaching Medical History: Who cares and does it matter?'.

As is customary at meetings in the USA the academic programme commenced each day with a 7.30 am breakfast before the first plenary session. Ted Smith set the scene by describing Madison, Wisconsin, the University and world events in 1927. Douglas Bacon followed with the reasons for celebrating the work of Ralph Waters. At a seated lunch Alan Jay Schwarz spoke about the 'Definition of Professionalism', and in the afternoon John Steinhaus spoke about 'Ralph Waters as an innovator, investigator and instigator'. On Saturday morning Sir Keith Sykes spoke on 'How Dr Waters influenced the development of Anaesthesia in Europe and the British Commonwealth'.

Free papers had been invited on any aspect of Waters' career and legacy, and the three broad areas of professionalism to which he had contributed: education, research and the creation of specialty societies. Of the 41 free papers presented, 35 were given in three busy parallel sessions, which meant that it was impossible to hear all of these interesting papers.

The conference gala dinner was held on the Friday evening in the splendid surroundings of the Blackhawk Country Club. After dinner Lucien Morris, Darwin Waters, John Steinhaus and Carlos Parsloe reminisced about their time with Waters in Madison. There was an excursion to Frank Lloyd Wright's house and school, and also a tour of Madison City, both accompanied by very entertaining guides.

**Jean Horton**

## **FUTURE EVENTS AND MEETINGS**

### **2003 14-16 January**

Royal Society of Chemistry: 9<sup>th</sup> Priestley Conference, Royal College of Physicians, London

*Inspired Gases: Their Medical Uses*

Contact: Penelope Mohamed. Email: [conference@rsc.org](mailto:conference@rsc.org)

### **8 May**

The Pointer Lecture

Dr Tilli Tansey, Wellcome Library, 183 Euston Road, London NW1 2BE

### **13 – 14 June**

HAS Summer Meeting, Ludlow

Contact: Dr A Kuipers. Email: [A.J.K@btinternet.com](mailto:A.J.K@btinternet.com)

### **4 – 7 September**

British Society for the History of Medicine, 20th Congress University of Reading. Contact: Dermot O'Rourke. Email: [Dermot@ouvip.com](mailto:Dermot@ouvip.com)

### **November**

HAS Autumn Meeting, East Grinstead

Contact: Dr C Barham. Email: [chris\\_barham@compuserve.com](mailto:chris_barham@compuserve.com)

### **2004 2 – 3 July**

HAS Summer Meeting, Lancaster

Contact: Dr Miles Rucklidge. Email: [Miles@ohfl.freeserve.co.uk](mailto:Miles@ohfl.freeserve.co.uk)

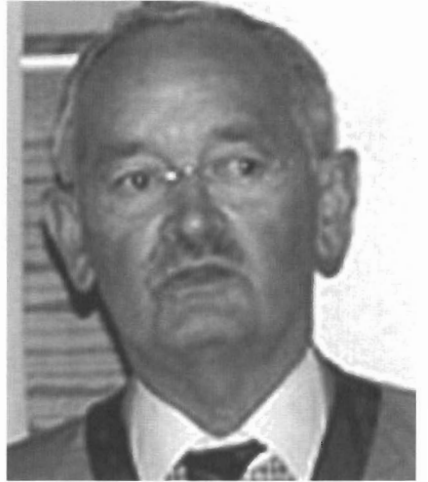


Members at Sir James Young Simpson's grave in Warriston Cemetery, Edinburgh, June 2001





**Dr Ian McLellan, retiring President**



**Dr Adrian Padfield, incoming President**

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**Speakers at the 2002 HAS Meeting at Norwich**



**Professor Sir Keith Sykes**



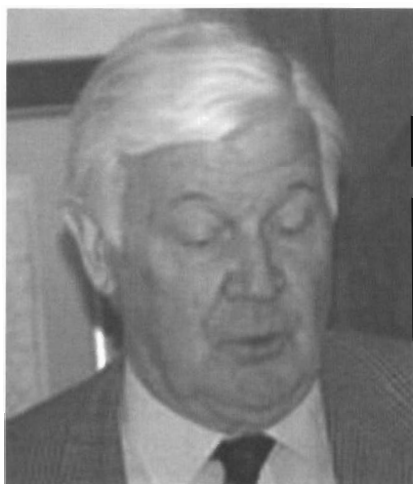
**Dr C H M Woollam**



**Dr D D C Howat**



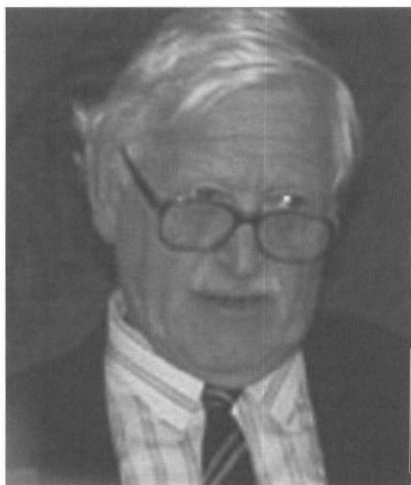
**Professor D R Bacon**



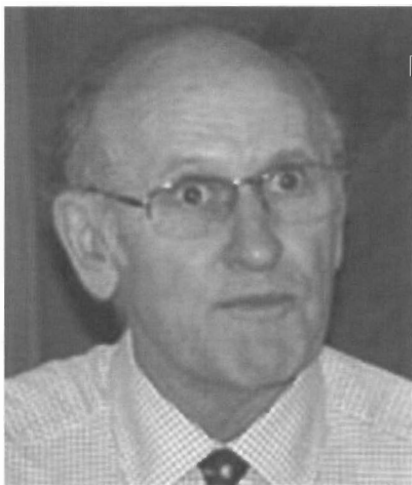
**Dr P M E Drury**



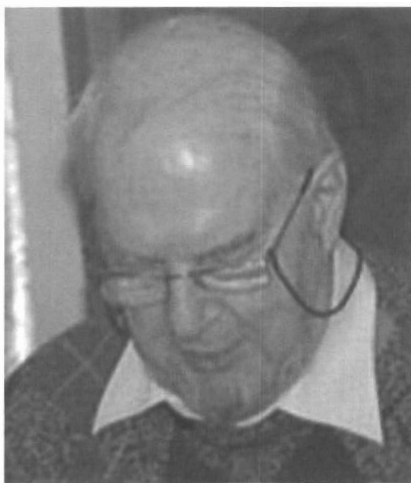
**Mr S G Crocker**



**Dr J G Fairer**



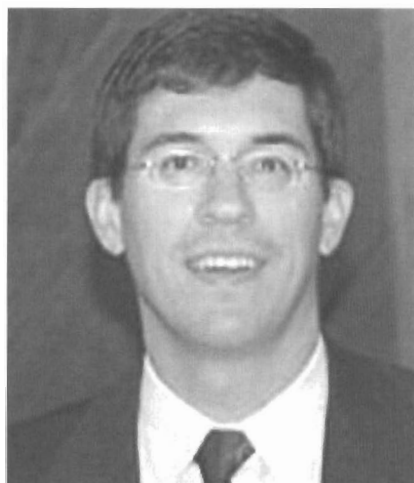
**Dr A M Barr**



**Professor R Bodman**



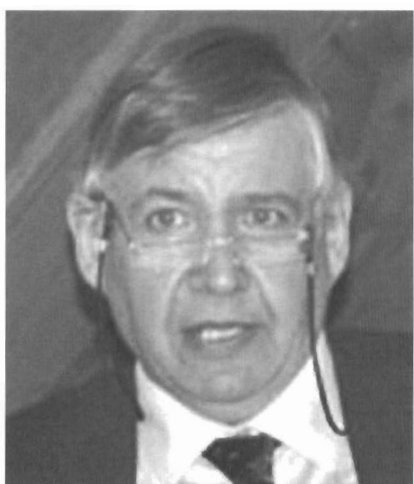
**Dr D Zuck**



**Dr D P Martin**



**Dr T B Boulton**



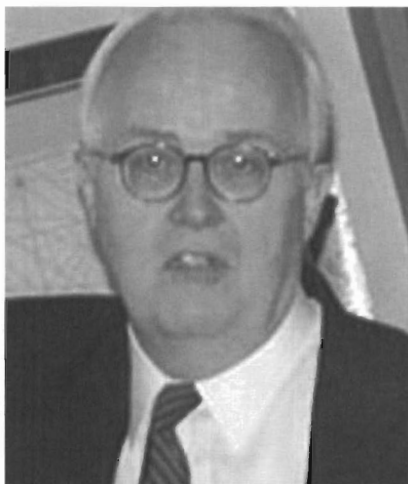
**Dr D J Wilkinson**



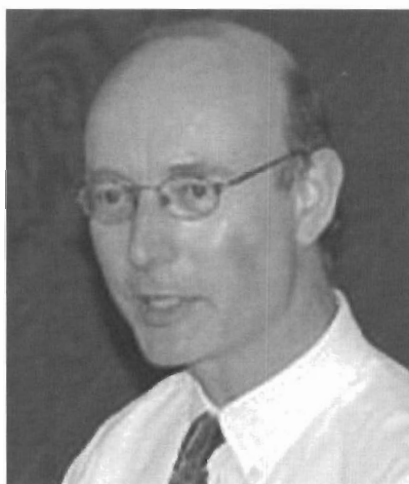
**Dr C Mulnier**



**Dr M Sidery**



**Dr R A Mackenzie**



**Dr J C Sill**



**Dr S Cherry**

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## HOUSE SURGEON AT THE NORFOLK AND NORWICH HOSPITAL, 1950

Sir Keith Sykes  
Emeritus Professor, University of Oxford

### Introduction

I qualified in June 1949 and became House Physician to Dr J C Hawksley at University College Hospital (UCH), London on 1 August 1949. Hawksley's prime interest was in the anaemias, but he also seemed to have inherited most of the peptic ulcer patients at UCH. The only drugs then available for the treatment of peptic ulcers were antacids and bismuth, so many of the patients spent 6 to 8 weeks in hospital on various gastric diets. There was a weekly gastroscopy session when Hawksley passed the Wolf-Schindler flexible-tipped (but otherwise extremely rigid) gastroscope under very ineffectual topical anaesthesia, in an attempt to visualise persistent ulcers, but apart from the odd emergency such as a coronary thrombosis, stroke, barbiturate poisoning, or diabetic crisis admitted from casualty there was little to disturb the peaceful routine. There was a very short waiting list and patients were kept in hospital far longer than was necessary in order to keep the beds full. Diagnostic tests were few, therapeutic agents even fewer, and if someone collapsed the only therapy was an intravenous injection of coramine. In short, there was a great deal of pompous debate, but little action.

### Appointment at the Norfolk and Norwich

It was during breakfast, in January 1950, that a colleague opened the *British Medical Journal* and drew my attention to an advertisement for a House Surgeon post at the Norfolk and Norwich Hospital (N and N). Although he knew that I had been promised a House Surgeon post at UCH, he was also aware that I was keen to move out of the rather traditional and gloomy environment there. He told me that the National Health Service now paid travelling expenses to interviews, so I could have a day away from my House Physician post and a chance to explore Norwich at no cost to myself. I applied for the job, and took the train to Norwich for the interview. There was no other candidate and I was offered the post. I confessed my predicament to the Chairman, who was most understanding. After some discussion, he suggested that I should lunch in the Residents' mess before making a decision. There was soup, a choice of roast lamb or roast beef, and a treacle pudding. The twelve or so house officers and registrars who were lunching were full of praise for the Hospital, the consultants and the lifestyle, and Freddy, the friendly House Governor, not only lunched with the doctors, but seemed to be on first name terms with everyone in the hospital. After lunch we retired to the lounge for coffee and I was introduced to some of the other junior staff; to John Simpson, the very affable Resident Medical Officer (Senior Registrar); to Michael Bostock, a most elegantly-dressed Medical Registrar, whose choice of Balkan Sobranie cigarettes created a lasting impression; to Raymond Ramsay, an equally elegantly dressed surgical registrar, who had been awarded the MBE for service with the Chindits during the war; and, finally, to Eric Hardy, the Resident Surgical Officer (Senior Surgical Registrar). The contrast with the dingy and dark residents' quarters, the subterranean passages connecting the various parts of the UCH complex, and the appalling food at UCH was too much, so I accepted the post and moved to Norwich on the 1 March 1950. When I left, 6 months later, my weight had increased by from nine stones ten pounds to nearly thirteen stones!



## The Hospital

In 1950 the hospital had 440 beds and there were two general surgical firms; the one run by Charles Noon and Norman Townsley, and that run by my chiefs J M Ridley Thomas and A B Birt. Ridley Thomas was a short, dapper, figure in his early fifties. He had a permanently tanned face and silver-grey hair. Birt was in his late thirties, tall, with a pale, aquiline face, short, darkish hair, and piercing eyes. Ridley Thomas was a canny diagnostician with a superb surgical technique. When he was operating his hands scarcely moved and he always seemed to be in the correct plane for dissection. He dealt speedily with an enormous load of urological cases. Birt, on the other hand, who had trained at St Thomas's, had a very academic approach to surgery, and was a general surgeon who thought nothing of splitting a mitral valve or performing an oesophagectomy. However, the latter procedure lasted 4-5 hours with an interval for tea and resuscitation of the patient!

The firm had about 80 beds and the 20-30 of these devoted to urological cases were clerked by the Registrar, Neville Connolly. The other 50 beds were my responsibility. Although I had twice as many patients to look after as at UCH, there was no problem in coping with the numbers; case records were short and to the point, and paperwork was kept to a minimum. The Ward Sisters were very experienced and took care of minor problems, and staffing levels throughout the hospital were low. There were no bleeps but communications were never a problem because the hospital was small, the telephonists knew our routine, and there was a telephone line to the local pub!

## The Theatre

We operated in a modern, prefabricated theatre suite that was well designed and equipped, but the theatres had no air conditioning and became extremely hot during the summer. On hot days the basic dress for men was shorts or bathing trunks, while a number of nurses wore a bikini under their sterile gown. It was usual to wash down the theatres with hoses after an infected case, so you can imagine that there was often a rather wet ending to our emergency lists! The two surgical firms alternated emergency duties, admitting on 4 days in one week and 3 days in the next. The emergency load was enormous, and I noted in one letter that we had admitted 31 emergencies in one 3-day period. Furthermore, since many patients were tough Norfolk farming types, who often lived some distance from the city they rarely presented for treatment until the disease was far advanced. As a result I saw an amazing range of pathology which I would never have seen in London.

Although the occasional emergency case could be operated upon between the routine lists, most of the emergency surgery was performed by the Senior Surgical Registrar or the Registrar in the evening. The list usually started after dinner and often went on until 2 or 3am, but the kitchens always delivered a hot meal for all the theatre staff at around midnight. Typically we would operate on one or two intestinal obstructions or perforated diverticuli, several perforated peptic ulcers or obstructed herniae, and three or four appendicects. Although a Casualty Officer was on duty during the day, the on-take registrar and house officer were responsible for all surgical casualties other than orthopaedic cases after 5 pm, so you can imagine that patients often had to wait a long time for treatment. As I became more experienced, I was frequently left to perform appendicectomies on my own and recorded 72 such cases plus a number of smaller operations, such as drainage of abscesses, during my stay. There was no recovery ward and intensive care units were unheard of, so patients

recovered in the open ward, the sickest patients being placed close to Sister's office at the entrance to the ward. On operating days the Ward Sister or Staff Nurse would often stay until midnight to help the inexperienced night staff cope with patients recovering after our daytime operating lists. I noticed that the anaesthetists always visited their cases before going home, and I was often grateful for their advice concerning post-operative care.

### **Nurse Anaesthetists**

Once a week Alan Birt or Eric Hardy would take the Registrar or myself to Attleborough Cottage Hospital to operate on herniae, varicose veins or other minor cases. These were selected and cared for by the local general practitioners who ran the hospital. One of the delights associated with this expedition was that the list was always interrupted at about 4pm so that Matron could entertain us to tea, sandwiches, and a large and delicious cake.

I was a little surprised to find that at Attleborough Hospital the anaesthetics were usually given by one of the two nurses who had been employed to give anaesthetics during the war. I later learnt that Addenbrookes Hospital in Cambridge had also employed nurses at the beginning of the war when all the other doctors capable of giving an anaesthetic had been called up for active service. The Norwich nurses officially worked under the surgeon and appeared to be very competent. Birt told me that he was somewhat surprised to find this situation when he came to Norwich but he had no complaints about the standard of anaesthesia.

### **Private Work**

Occasionally, one was asked to assist for a private case, and for this task Birt gave the houseman one or two guineas. The private nursing homes were prettily furnished but quite unsuitable for the care of patients. I recall one where there was an inscription over the door into the operating theatre which read 'In God we place our hope and trust' - not very complimentary to the surgeons. Inside, the hot water sterilisers were heated by open gas flames while the anaesthetist administered nitrous oxide-oxygen ether! At the end of the case a bell was rung and all the staff, from the kitchen maid to the surgeon, rallied round to carry the patient back to his or her room on a sort of canvas hammock. This was quite an undertaking because the corridors were narrow with many right-angled bends and stairs, and it was necessary to flex the patient's body to get it round the corners.

I found Alan Birt to be a most considerate boss. He taught well, and encouraged one to operate under his guidance. He was a rather slow operator, but indefatigable and given a break for tea, would happily soldier on into the late evening. During the weekend when the firm was not on call, he would often adjust the timing of his rounds so that I could pursue my chosen leisure activity, and at the termination of the appointment, he organised a dinner for all the firm at an upmarket restaurant. This was paid for by the firm's 'Burning fund' - the communal chest created by fees for signing cremation certificates!

### **Social Life**

The resident doctors had a good social life and were often invited to the homes of consultants or married junior staff. In return the Mess held a giant evening party for those who had

entertained them. Another excellent aspect of the N and N philosophy was that all the junior staff were encouraged to get out of the hospital when not on take.

The residents doctors had two main interests; sailing and cars. A number of the consultants were keen sailors and were glad to have an extra hand on board. I was fortunate to be invited to crew for the gynaecologist Tony Bentall, who had a large yacht on Wroxham Broad. I was also able to get to Lowestoft on a couple of occasions to crew in a Dragon class yacht for a GP friend who practised there. Our sailing stories finally stimulated Raymond Ramsay, the ex Chindit surgical registrar, to buy a sailing dinghy. Unfortunately, the boat turned out to be extremely slow, and Raymond, who had planned to take part in a local regatta on the following day, decided that if he could not sail there he would motor there. So, he fitted the outboard motor which, needless to say, would not start. So we brought it back to the mess, stripped it down, clamped it to the railing of the stairs, submerged the propeller in a tin bath full of water and celebrated with a beer or two when it roared into life. Unfortunately, we had forgotten that Matron's flat was nearby, but she lost no time in reminding us that running outboard motors in the mess at 2am was not her idea of reasonable behaviour!

### **Cars**

Other members of the mess were interested in cars, and my diary records, enviously, that 6 of the 11 residents possessed a motorised vehicle of some sort. In those days it was extremely difficult to buy a new car, though the waiting time of about four years could be reduced if you could get the BMA to certify that you needed a car for your practice. Raymond Ramsay managed to get such a letter and, after several months of anxious waiting, became the proud owner of a Hillman Minx coupé. I remember being highly impressed with the quietness and speed of this car when Raymond drove me to a meeting at the RSM one night, the journey time being three and a quarter hours from door to door since he was running in the engine at a steady 40 miles per hour!

Consultants cars were also a major source of interest. There was story about the two orthopaedic surgeons – H A Brittain and G K McKee - who both set off to drive to a meeting in London. They were known to drive fast and the engine of McKee's Riley blew up and left him contemplating the steaming bonnet by the roadside. Brittain drove by in his Rolls and said to his houseman as he swept past, "That will teach him to buy a cheap car!"

### **Retrospect**

I regard the period spent in the N and N as one of the happiest and most productive of my life. Cedric Prys-Roberts had a similar experience a year or so later. At UCH there were few emergency admissions and life was dominated by the supervision of students, incessant ward-rounds and the Consultant's pompous teaching rounds. At the N and N, there was usually a huge emergency load, but this was quite variable, and when the load was light and one could see the sunlight outside, it was more difficult to sustain one's interest in the patients. The NHS had just been inaugurated and everyone was full of enthusiasm. Strikes were unknown and, apart from Matron, the House Governor and an accountant, there were few administrative staff. Norwich boasted a large market, good shops, little traffic and such delightful places as the Castle Museum, the Maddermarket Theatre, the Cathedral and the proximity of the Norfolk Broads and Blakeney Point.

### **Role of the Anaesthetist**

But perhaps the most important thing I learnt at the N and N was that the anaesthetist could not only provide good operating conditions for the surgeon, but could also play a significant role in perioperative care. The anaesthetists that I met most often - Rice, Reynard and Roger Kirkpatrick, impressed me greatly so that when I was called up for army service that autumn I asked if I could train as an anaesthetist in an army hospital. Unfortunately, my service dress was lost in the transit to Germany so when I went for my posting interview with the ADMS I was wearing battle-dress with very large boots. When I saluted these came together with a surprisingly loud sound which made ADMS look up. The sight of a National Service conscript dressed like an ordinary soldier must have convinced the ADMS that I was destined for a career in the regular army, for he posted me as a General Duties Medical Officer to look after the 22nd Light Anti-aircraft Regiment in the Ruhr. The job involved looking after the 800 or so soldiers in the Regiment, the thirteen and a half couple of mangy hounds who were the basis of the Regimental hunt, together with responsibility for 2000 civilians, a prison, and two leave centres. It was another year before I was sent to Hamburg to train as an anaesthetist - but that is another story!

## **FROM CHLOROFORM TO REFORM**

### **History of the provision of anaesthesia at the Norfolk and Norwich Hospital from 1847 to the introduction of the National Health Service (Abstract)**

Dr C H M Woollam, Norwich

It took only a few weeks for the news of successful painless surgery to reach Norwich. The first demonstration was on 16 January 1847. John Greene Cross, Consultant Surgeon at the Norfolk and Norwich (N and N) Hospital gave a demonstration of etherisation by removing carious teeth from two of his assistants. Four days later a visiting surgeon from the Westminster Hospital, Charles Guthrie, carried out a lithotomy under ether anaesthesia at the Ophthalmic Hospital.

The first mention of chloroform anaesthesia at the N and N does not appear until November 1847, when the Honorary Consultant Surgical staff reported that they had tried chloroform and other allied preparations, and found them completely satisfactory. The duty of administering anaesthesia fell to the two house surgeons and was made a specific condition of employment for the first house physician post in 1895.

By 1910 the annual operation numbers had risen to 2,145. The house staff felt that this was too great a number to expect them to carry out and maintain their other duties. The Hospital Consultant Staff suggested to the Board of Management that two Honorary Hospital Anaesthetists be appointed. The Board agreed, and Dr H J Starling and Dr Henry Watson were appointed. The house staff still had to undertake a fair proportion of the anaesthetics required. The system worked well until the outbreak of the First World War when the call-up of both medical and nursing staff, and the additional war casualties (2,576 in 1915) received by the hospital caused a crisis. Various ploys were tried, attempts were made to recruit two Belgian anaesthetists, and local General Practitioners were offered a guinea a day to administer anaesthetics at the hospital. Finally the theatre nurses started to administer anaesthesia. At first this was on an informal basis, but by 1919 the first Sister Anaesthetist had been appointed; a second Sister and then a third soon joined her. This set the pattern for the next thirty years, with the majority of general anaesthetics at the N and N being administered by the Sister Anaesthetists.

In May 1923 the Board of Management, led by Sir Charles Tomes, tried to bring an end to this practice on safety grounds. The Honorary Medical Staff proved conclusively that much the safest person to have an anaesthetic from was one of the Sisters, their overall anaesthetic death rate being well below the national average.

The Sisters embraced the new techniques of endotracheal intubation, intravenous induction and use of suxamethonium. The surgical services at the N and N expanded rapidly after the introduction of the National Health Service. Along with this expansion came increasing numbers of anaesthetic trainees, and the need for the Sisters became less. The last two Sisters retired from anaesthetic practice in 1954.

*The section devoted to the Sister Anaesthetists of Norwich was the basis of a paper published in the October 2002 number of Anaesthesia. This abstract is published with the agreement of the Editor.*

## PIROGOV AND THE ARRIVAL OF ETHER ANAESTHESIA IN RUSSIA

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### Introduction

Nikolai Pirogov is perhaps best known to anaesthetists as the probable inventor of the use of rectal ether anaesthesia, although this is disputed. What is not so easy to discover is how ether anaesthesia was introduced into Russia. Fjodor Inozemtsev (Figure 1) gave the first ether anaesthetic at the surgical clinic of Moscow University on 7 February 1847 for the removal of a breast tumour in a 48-year old woman. On the following day he administered ether to two boys of 13 and 14 for removal of stones in the bladder. On 12 and 14 of the same month it was used by T C Vancetty in the State Hospital in Kharkov, and on 18 by W A Karaev in Kiev. It seems likely that the news reached Russia from the English and French reports in the press. After that it rapidly became popular in Russia.<sup>1,2</sup>



FJODOR INOZEMTSEV

Figure 1. Fjodor Inozemtsev



Nikolai Ivanovich Pirogov at the time of his graduation from Dorpat.

Figure 2. Nikolai Pirogov

### Early experiences with ether

At first Pirogov had considerable misgivings about the value of ether, in spite of the enthusiastic reports in the newspapers in London and Paris. He had seen patients with delirium tremens leap out of bed in hospital, and even one who had jumped out of the hospital window and suffered a severe compound fracture-dislocation of the foot (but who happily got up and walked). He feared that ether might have the same effect. He was aware

too that the inhalation of alcohol in old wine caverns could cause intoxication. At that time he also subscribed to the common view that pain was sometimes necessary and desirable.

Pirogov described his experiences in his book, published in French in St Petersburg in 1847, *Recherches Pratiques et Physiologiques sur l'Éthérisation*.<sup>3</sup> It had to be passed by the Imperial Censor before it could be published, which was in late May or early June 1847. Pirogov first overcame his doubts when considering the benefit that a palliative operation under ether might offer to someone suffering from a painful advanced cancer.

On 14 February 1847 Pirogov used it to anaesthetise a 35-year old woman with an advanced cancer of the breast, which he excised as a purely palliative measure. The woman was of nervous temperament and of feeble constitution. He gave her ether the day before the operation and discovered that she was easily rendered unconscious, although she woke up near to tears. She had dreamed that she had said goodbye to her parents and had left the hospital; at the same time Pirogov thought that there was probably an erotic element in her dream for she seized Pirogov's coat, covered her eyes, and said 'I'm ashamed'. The operation next day lasted only two minutes, and the patient recovered consciousness six minutes later and asked why the operation had not been done. She had a slight headache and sickness which lasted until the evening, but otherwise was well.

## Apparatus

The apparatus that Pirogov used was Charrières inhaler,<sup>5</sup> designed by a Parisian surgical instrument maker. He next used it to anaesthetise a girl who required frequent dressings of a very painful amputation stump. He induced anaesthesia in 40 healthy persons and went on to describe over 40 other cases.

He eventually had an apparatus of his own manufactured.<sup>6</sup> This consisted of a rubber mask with two straps to secure it on the head, and a steel spring to hold it against the root of the nose. Screwed into the funnel at the opening was a tube  $1\frac{3}{4}$  inches (4.5 cm) long with an expiratory valve attached to it. Into this fitted a T-piece with an inspiratory valve, and an opening to allow the entry of air when the tap inserted into it was turned to the open position. To the bottom of the T-piece was attached a flask of glass or tin containing ether, with a pipe for the entry of air and a funnel to fill the flask.

## Rectal administration

Pirogov then went on to perform 45 experiments on animals (dogs, cats and rabbits). He applied it directly to nerves, to the brain and spinal cord, into the blood stream via arteries and veins, into the stomach, into the trachea, and finally into the rectum. When he injected liquid ether into the blood stream the effects were usually disastrous, and when it was injected into the rectum it was quickly rejected. However, he was impressed with the smooth anaesthesia resulting from the injection of ether vapour into the rectum, and wondered why more surgeons had not attempted it. He stressed that it would succeed only when pure ether vapour, without any liquid, was injected into the rectum. He therefore devised an instrument to ensure this, which he called an enema pump with a hollow piston.<sup>7</sup> This consisted of a syringe containing ether fluid within a tin flask, which contained water at approximately 50-60°C. Inside the flask was a hollow piston in which the ether vapour was conducted to an elastic cannula, a screw cover for the syringe, and a catheter with a metal tip which was introduced into the rectum. The flask had a tap to allow the water to be drained out.

The rectum had to be washed out thoroughly before the catheter was introduced, and the metal tip had to be constantly sprayed with warm water, to avoid the ether vapour becoming liquid before being introduced. Pirigov found that 2 ounces (about 56 ml) of ether was normally sufficient to produce anaesthesia; occasionally more was needed in a large individual. Anaesthesia usually occurred in 2-3 minutes, provided the rectum was empty and no liquid entered it. He stated that induction was quiet, with less disturbance than during ether inhalation.

### Who was the first?

Stanley Sykes has pointed out that there is considerable doubt as to who was the first to administer ether by rectum to produce anaesthesia; Pirogov in St Petersburg, Marc-Dupuy in France or J T Johnstone in Madras, India.<sup>8</sup> Marc-Dupuy had his paper published in the *Comptes Rendus hebdomadaires de l'Académie des Sciences* on 5 April 1847.<sup>9</sup> Pirogov's article on the subject did not appear there until 5 May,<sup>10</sup> although he had first used rectal ether on 2 April. Johnstone appears to have used it in three dogs and on a patient for an operation for hydrocoele about the same time, but it caused such discomfort that the patient preferred to have the operation performed without anaesthesia.<sup>11</sup> Marc-Dupuy described its use only in animals; three dogs and one rabbit.<sup>10</sup> Although Marc-Dupuy published his experiments first, it appears that Pirogov was the first to use rectal anaesthesia in humans successfully.

### Biographical notes

Nikolai Ivanovich Pirogov was born in Moscow on 13 November 1810, the thirteenth child of his father, who is variously described by different authors as a quartermaster in charge of a military depot,<sup>12</sup> a treasurer,<sup>13</sup> and as running a drug store!<sup>4</sup> In 1812, at the time of Napoleon's invasion, the family had to leave Moscow and their house was destroyed by fire. In spite of the fact that his father died a few years later and his mother was left with little money, he was educated at a private school, for the family doctor recognised that Nikolai was very talented and was keen to learn. Deciding to study medicine, he went to medical college in Moscow at the unusually early age of 14, qualifying in 1827 at the age of 16. The teaching was didactic, with no opportunity to perform dissections or post-mortems.

He continued his studies at the University of Dorpat (now Tartu in Estonia). Dorpat was in Russia, although it had been previously under German and Swedish rule. The teachers were German and the standard of medical education was higher, aiming at producing professors. In 1833 he was sent to Germany, travelling via Copenhagen, Hamburg and Gottingen, where he studied anatomy under Langenbeck, and finally Berlin. He returned to Dorpat in 1835, and although he failed to get the chair of surgery in Moscow, it was only a year before he became professor of surgery in Dorpat itself at the age of 26. Shortly afterwards, at the age of 30, he obtained the chair at St Petersburg, where he did his work on ether. He married in 1842 and had two sons. Shortly after the birth of the second child his wife died of meningitis.

Pirogov did much to raise the standard of medical education in Russia,<sup>4</sup> but his advanced views ensured that he was constantly in trouble with the authorities, and he had to resign his chair in 1861. He was the first in Russia to use chloroform, on 30 November 1847, only a few weeks after its introduction by James Young Simpson. In 1848 he began to use an ether-chloroform mixture.



## War experiences

In 1847 he was sent to the Caucasus,<sup>15</sup> where war was being waged against the tribes there. This was a running sore for the Russians, comparable with the difficulties the Indian Army had on the North West Frontier. At the siege of Salty, an enemy stronghold, Pirogov used ether to anaesthetise the wounded soldiers, perhaps the first time anaesthesia was employed on the battlefield. He used ether and chloroform by inhalation and ether per rectum, and he seems to have employed rectal chloroform on a few occasions, although his lists of anaesthetics used concern all those given in Russia up to that date. He attempted to unravel the cause of deaths which occurred and was incidentally aware of the case of Hannah Greener.<sup>14</sup>

During the Crimean War in 1853-1856 Pirogov was sent to Sebastopol. There he administered chloroform to all the wounded who required surgery, even for those who needed only painful examinations. With the help of the Grand Duchess Elena Pavlova, who was a friend of his wife and was related to the Tsar, he organised a system of educated women nurses to treat the patients. He did his best to improve the transport and treatment of the wounded, although hampered by the bureaucracy that stifled much enterprise in Russia, and again earning the displeasure of the authorities. He recognised the good work which Florence Nightingale did in Scutari. He believed that women, properly educated and brought up, were as good as men, and due to his influence women were admitted into medical schools many years earlier than in the rest of Europe.

In 1864 he published a major work 'Principles of War Surgery', and these principles were still followed at the outbreak of World War II. He appears to have played some part during the Franco-Prussian War of 1870-1871, and in the Russia-Turkey War of 1877-1878.<sup>1</sup>

## Conclusion

Pirogov (Figure 2) died on 21 November 1881 at the age of 71. He was the most outstanding doctor in Russia and was eventually recognised and honoured by the Tsarist authorities. In spite of his eminence he appears to have been considered a 'non-person' in the USSR. The prestigious Pirogov Society, which had been formed after his death, was closed by the communists after World War I. Later they recognised his worth and he was rehabilitated after 1945.

## Acknowledgements

I am indebted to Dr Inger Findley, Consultant Anaesthetist, St George's Hospital, London, for her translation of Secher's epilogue in Pirogov's *Recherches Pratiques et Physiologiques sur l'éthérisation*, a limited number of which were reprinted by Janssenpharma A/S of Copenhagen in 1984.

My thanks are due to Dr Elena Damir, Professor of Anaesthesia in Moscow, and to Dr Antony Zilber, Professor of Anaesthesia in Petrozavodsk, who is a specialist in the history of our specialty, for information about the early days of anaesthesia in Russia. Thanks are also due to Dr Zilber for the portrait of Inozemtsev (Figure 1).

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## A RIDDLE WRAPPED IN A MYSTERY INSIDE AN ENIGMA - BERKELEY SHERWOOD-DUNN AND *REGIONAL ANESTHESIA*

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Winston Churchill said 'I cannot forecast to you the action in Russia. It is a riddle wrapped in a mystery inside an enigma'. The more I have found out about *Regional Anesthesia* the more it has become a riddle wrapped in a mystery inside an enigma. The riddle is 'Who was Berkeley Sherwood-Dunn?' The mystery is why did he feel that Pauchet's work was so new, so interesting, so challenging that it should be brought into the English language from the French? The enigma is that the book was published by an American firm but copyrighted only in Great Britain.

### The Riddle

Who was Berkeley Sherwood-Dunn? There is no extant biography on him nor is there an obituary. *Index Medicus* lists his publications between 1914 and 1950. In 1916, he published an article on operations of the stomach in the *American Journal of Surgery* and in 1917 on fractures of the thigh, both of which point in the direction that he may have been involved in the conflict going on in France as an American volunteer. After World War I, Sherwood-Dunn published about 16 other papers dealing almost exclusively with non-surgical topics. The subjects of the papers are on treating syphilis, how to avoid old age, and basal metabolism. There are only two papers that are surgical in nature. One is entitled 'Tunneling of the prostate' and the other is 'Forge of prostate versus proctectomy'. All of these papers are published in American medical journals.

This information does not lend itself to a conclusion as to whether Berkeley Sherwood-Dunn is American, British, or French. I suspect he is an American, although the hyphenated last name was fairly uncommon at this time in America. He also published one gynecologic paper that has been soundly criticized as being anti-woman and anti-everything else.

The frontispiece of his book lists Sherwood-Dunn as *Officier D'Academie; Surgeon (Colonel) Service De Sante Militaire De Paris; Physician to the Cochin Hospital* within the French military. Presumably, this is where Sherwood-Dunn learned of or saw Pauchet's regional anesthetic techniques. Yet this information sheds no additional information on his nationality.

### The Mystery

Sherwood-Dunn's book is entitled *Regional Anesthesia (Victor Pauchet's Technique)*, with 224 figures in the text published by the F A Davis Company in 1921. Sherwood-Dunn apparently had had enough experience with surgery to realize that there were some problems with general anesthesia at the time. One of the biggest ones was closing the abdomen, which was incredibly difficult in the pre-muscle relaxant era. The problem was very deep ether which led to several nasty pulmonary complications, and a high incidence of postoperative pneumonia, vomiting, and other unpleasant side effects. Sherwood-Dunn observes that what Pauchet is doing is very different from the infiltration techniques that had been done by Professor Reclus. In contrast, Pauchet was trying to anesthetize the nerve trunks. What is

interesting is that Pauchet's work is almost a continuation of William Halstead's work, where the nerves were dissected and cocaine placed directly on them. The difference is that Pauchet was doing transcutaneous needle placement near the nerve trunk and injecting local anesthetic. Another difference between Halstead and Pauchet was, of course, that the latter, working in the early part of the 20th century, used procaine, which was superior to cocaine as a local anesthetic.

The book was copyrighted in 1920 by the F A Davis Company. The copyright is 'Great Britain All Rights Reserved'. This is curious because the F A Davis Company is based in Philadelphia, and at the time the United States had not signed the international copyright agreements. If this was pitched for an American or English speaking audience, F A Davis should have copyrighted it both in America and Great Britain, but they did not. The book was only copyrighted in Great Britain, and therefore this copyright was not binding for Americans who might want to borrow parts of the book; whereas Gaston Labat's *Regional Anesthesia* (published by Saunders) basically took Pauchet's illustrations, re-drew them using Mayo Clinic illustrators, and translated the text from French for the first half of his book. There was no legal issue with Labat doing that because the United States did not participate in the Berne Convention. It would not be until the mid-1950s that the United States agreed to international copyright. If it was the intention of the publisher to bring Pauchet's work to an English-speaking audience it is a mystery as to why it was copyrighted only in Great Britain.

The book itself is curious because the text is a faithful translation. While no translation of the second edition of Pauchet exists, one of our Mayo residents translated the entire third edition of Pauchet. As far as can be determined, Sherwood-Dunn's book is an accurate translation of Pauchet's work; it reads almost identically to what Pauchet has written in the third edition. What is also interesting is that Sherwood-Dunn was very careful to say: 'This is Pauchet's work'. Sixty nine percent of the illustrations are directly from Pauchet. The other ones are essentially by European anatomy authors from which the illustrations have been borrowed with acknowledgment, including Professor Reclus, Hirschfeld, Braun, Laboure, and Kulenkampff.

### **The Enigma**

Did Berkeley Sherwood-Dunn know what Gaston Labat was doing, producing a book bringing Pauchet's work to the American audience? Berkeley Sherwood-Dunn used the second edition of Pauchet, and Labat is the third author on the third edition of Pauchet. Were they in competition? Were they both training or working with Pauchet? Did they know each other? They probably had contact because Labat had been Pauchet's surgical assistant during the war. It is also interesting that this book came out in 1921, the same time that Pauchet's third edition came out, yet Sherwood-Dunn only translated the second edition. Why didn't he wait for the new edition and use the more advanced, more descriptive edition? Finally, did he know that Labat was translating the third edition and did he try to scoop Labat by rushing into print with this book?

### **Conclusions**

Why did this book come about? Sherwood-Dunn was a surgeon who appreciated that blocking the nerve trunks, in doing any abdominal operations, provided superior anesthesia. He believed (like Pauchet) that surgical technique was important. Blunt dissection did not

work. The tissues had to be handled gently, and he further commented upon the importance of Crile's anoci-association technique; keeping the room quiet, keeping the patient quiet, using earplugs and cotton over the eyes. All of this was important to the success of regional anesthesia.

Sherwood-Dunn faithfully translated Victor Pauchet's work, and yet it cannot be demonstrated that this was pitched to an American audience. There is no American copyright. Why was an American publishing in Great Britain for a British audience? And then why did Sherwood-Dunn abandon surgery? Unlike Gaston Labat who published without acknowledgment of Pauchet's pioneering work, Sherwood-Dunn gave adequate credit to Victor Pauchet for his ideas and illustrations.

## VERNON HARCOURT AND HIS INHALER

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### Introduction: the Special Chloroform Committee

In July 1901 a Special Chloroform Committee was constituted by the British Medical Association to study methods of measuring the concentration of chloroform in body fluids, and to establish a safe dose. The moving spirit was the physiologist A D Waller, who was convinced that the majority of deaths associated with chloroform were due to overdose, though he appreciated that quantitative evidence was lacking. It was not of course the first committee of its kind, but previous efforts had been full of uncertainties and differences of opinion. The committee was a prestigious one, and included the neurosurgeon Victor Horsley, the physiologist Charles Sherrington, as well as the anaesthetists Dudley Buxton and W J McCardie.

The committee published its final report (after a number of intermediate reports) in the *British Medical Journal* in 1910.<sup>1</sup> It is hard not to be impressed by the painstaking experimental detail which sought accuracy in the measurement of chloroform, and by the work on the isolated perfused heart (using mostly dogs, sometimes cats, and on one occasion a chimpanzee).



Figure 1. A G Vernon Harcourt

The committee had power to co-opt two members, and one of them was Augustus George Vernon Harcourt, (Figure1), Reader in Chemistry at Christ Church, Oxford. He had previously described a method of measuring chloroform in air, but he was, in any case, a distinguished scientist. He had been elected to the Royal Society in 1863 and had served on the Council from 1878 to 1880. He also held office for 14 years in the Chemical Society of the British Association with (it was said) conspicuous tact.

### The Inhaler

As well as working on methods of measuring chloroform concentration, Vernon Harcourt designed an inhaler, intended to give concentrations of 0.5-2%, which the committee accepted in 1904. There seemed to be general agreement that 2% was a safe upper limit. The inhaler was of the drawover variety. Two glass beads of appropriate density gave some indication of the temperature of the chloroform; below 16°C both beads would float, and above 18°C both would sink. The temperature could be kept between the two by occasionally holding the flask in the warm hand. A pointer and dial controlled the amount of air/chloroform mixture admitted to the breathing tube. There was an expiratory valve on the facemask, and non-return valves to prevent the re-entry of expired air, which clicked audibly. Harcourt was aware of the increase in concentration caused by shaking, and advised mounting the inhaler on a firm stand. It was McCardie who suggested that it could be carried with a band slung round the neck (Figure 2). At least two members of the committee breathed through the inhaler, as apparently did visitors to the Harcourt home in Oxford.



Figure 2. The Vernon-Harcourt Inhaler

### Waller's intervention

The committee considered 14 methods of inhaling chloroform before accepting the Harcourt model; its portability was a point in its favour. Then Waller broke ranks rather by publishing

an article in the *Lancet* of 9 July 1904,<sup>2</sup> in which he admitted that his view was at variance with that of the committee. He stated that some of his work was presented to the committee but not included in its interim report, and he felt that it should not remain unpublished. He did not favour the drawover principle and felt that this, as well as inevitable shaking of the flask, increased the risk of overdose.

Further discussion took place in the same month at the Annual Meeting of the British Medical Association, in the Section of Physiology, during a discussion on chloroform anaesthesia. Waller said that he agreed with the special committee up to a point (with reference to 2% being a safe maximum concentration), but he repeated his criticisms and implied that Buxton, in his enthusiastic report, made no mention of cases where the apparatus had to be set aside, or of fatal accidents (this was later denied by Buxton).

Waller had some support from A G Levy, later a resident anaesthetist at Guy's Hospital, who did not accept Harcourt's view that the concentration of chloroform remained constant during wide variations of respiration. He was critical of the inhaler in his monograph *Chloroform Anaesthesia*,<sup>3</sup> which was published after the final report of the special committee, and which identified ventricular fibrillation as a cause of death. There was evidently no requirement in those days to declare an interest, and it should be noted that both Levy and Waller had designed chloroform vaporisers. In retrospect it was a pity that Waller had lost his early interest in electrocardiography; tracings would have enhanced the special committee's report.

### Further differences

The July discussion was published in the *British Medical Journal* in September 1904,<sup>4</sup> and more comments by both Harcourt and Waller appeared as addenda. Harcourt concluded with a dismissive sentence: 'What can be thought of experimental work which is undertaken with the object of examining a non-existent cause and which shows it to produce an immense effect?' Waller replied in a letter to the *British Medical Journal* of 1 October: 'Mr Harcourt has painted a fancy picture, has published it as my picture, and has easily shown that the picture is grotesque'. He also wrote that the suppression of his report indicated a very defective procedure on the part of a scientific committee of the Council of the British Medical Association. (This little spat was referred to in David Zuck's paper on Waller in Liverpool in 1997).<sup>6</sup> It was interesting that the letter immediately following Waller's was from Edward Lawrie of the Hyderabad Commission, claiming that the Symes principles of administration (summed up by plenty of chloroform and plenty of air) were alone compatible with uniform safety, and more so than the Harcourt inhaler.

### Use of the inhaler

The inhaler was further discussed at the Society of Anaesthetists meeting on 2 December 1904. Neither Harcourt nor Waller were present at this meeting (or if they were they did not speak). Blumfield and Silk did speak, and neither were particularly enthusiastic. Silk had not used the inhaler, but made the reasonable point that with a mortality of 1/3000 for chloroform anaesthesia, it might be premature to make claims based on a hundred cases only.

Although the Harcourt inhaler was used at University College Hospital for about nine years the Junkers inhaler was probably used more widely. Bryn Thomas<sup>7</sup> thought that it did not last much beyond World War I, partly due to its delicacy, and partly due to a decline in popularity



of chloroform. It is curious to see it mentioned in Langton Hewer's *Recent Advances* until the 7th edition of 1953 as being 'now little used'. The reference disappeared in the 1957 edition when J Alfred Lee became joint editor. In *Textbook of Anaesthetics* by Minnitt and Gillies (1943), the inhaler is described as one of the best known but now almost obsolete.

In the invaluable *Short History of Anaesthesia* by Atkinson et al, it is recorded that the inhaler was used in Barthelemy's first demonstration of insufflation anaesthesia in Nancy in 1907.<sup>8</sup>

### Biographical Notes

Vernon Harcourt was a member of a distinguished family; he was the son of an admiral and a grandson of the Archbishop of York. His cousin, Sir William Vernon Harcourt, held office as Home Secretary and Chancellor of the Exchequer under Gladstone. Vernon Harcourt went up to Balliol College, Oxford in 1854 to read Classics, but he soon changed to Chemistry, in which subject he obtained a first-class degree. He wrote later<sup>9</sup> that the Sciences occupied a subordinate position at Oxford at the time, and that the study of two dead languages was regarded as of higher educational value than the structure and changes of our own bodies and of the world we live in. His change of subject may have been influenced by his clergyman Uncle William, a keen amateur scientist who was one of the founders of the British Council for the Advancement of Science, and whose letters reveal that he corresponded with people of the calibre of Davy, Faraday and Herschel, among others.

Vernon Harcourt was appointed Reader in Chemistry at Christ Church in 1858. He is regarded as a pioneer in the new discipline of Physical Chemistry, being more interested in the rate of change in a chemical reaction than in the product. He published the first detailed studies of kinetics, regarded in subsequent textbooks as 'classic' and models of their kind. However, he seemed curiously uninterested or unaware of other work in the field, with the result that his formula for the rate constant  $k$  was overtaken by others (eg Arrhenius). He did justify a cautious approach, saying that 'the evil of being anticipated by an industrious German is much less than that making statements which you or others afterwards discover to be inexact'.<sup>10</sup>

### The White Knight

It has been suggested<sup>11</sup> that he was a model for the White Knight in *Alice Through the Looking-Glass*, which was published in 1871. He was a friend and contemporary of Charles Dodgson (better known as Lewis Carroll), who was a teacher of mathematics at Christ Church. It is not altogether a flattering portrait, describing an eccentric inventor who, when Alice first met him, was carrying a wet-weather sandwich and clothes box, held upside down to keep the contents dry. Unfortunately the lid fell off and all the contents fell out. The White Knight may have been a composite portrait which included Lewis Carroll himself, since he too was a bit of an inventor (eg a portable chess set).

### Pupils

One of Vernon Harcourt's earliest pupils was Edward, Prince of Wales, who spent four terms at Christ Church in 1859. He wrote: 'How far I succeeded in interesting him in the great science of chemistry I cannot tell. I remember only that he was the most amiable pupil'.<sup>12</sup> He tried to further the advancement of women, being the first to lecture to a mixed audience at

Oxford. He wanted to open the Fellowship of the Chemical Society to women, but this was not achieved until 1920, a year after his death.

His obituary in the *Proceedings of the Royal Society*<sup>13</sup> was written by H B Dixon, then Professor of Chemistry at Manchester and a former pupil, who felt that not the least of his influences on British Chemistry was sending brilliant pupils into the world.

## Conclusion

There are a number of men, distinguished in other fields, who have made a contribution to the history of anaesthesia, and among these was Vernon Harcourt. The fact that the special committee of which he was a member was no more successful than its predecessors was hardly his fault. His family mottoes were: 'Le bon temps viendra' (the good times will come) and 'Gesta verbis praevenient' (loosely, actions speak louder than words).

## Acknowledgements

Lord Vernon, Vernon Harcourt's great great-nephew provided me with a family tree. Dr N Laurie Smith, formerly Consultant Anaesthetist in Edinburgh, sent me a photocopy of a booklet produced by John J Griffin of Kemble Street, London, makers of the Vernon Harcourt Inhaler, from which Figure 2 is taken. Judith Curthoys, archivist at Christ Church, Oxford, drew my attention to the booklet *Some Scientists in the life of Christ Church, Oxford* by P W Kent, which contains invaluable references.

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## A SHORT HISTORY OF CAESAREAN SECTION

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### Introduction

The history of the Caesarean Section is a tale of women and their families in despair and brave physicians who struggled against criticism and authority, and is shrouded in mythology and the history of the ancient world.

The term 'Caesarean' was first used by Rousset, physician to the Duke of Savoy, in his book published in 1591. Therein he advocated the operation on living women. The term 'Section' was used by Jacques Guillemeau in his book of midwifery in 1598 but the two terms only came together in the 20<sup>th</sup> century.

### The ancient world

Certainly the operation was known to the ancient Hindus and Egyptians and there are multiple references to the operation in mythology. Indeed, the world is doubly indebted to it; firstly for the God of Physic, Aesculapius, who was born by the operation according to Ovid, and his surgeon was Apollo, and secondly for the God of Wine, Bacchus, who was similarly delivered, his mother, Semele, having been 'consumed by the embrace of Jupiter'.

The operation was known to the ancient Hebrews, for in the oldest book of that faith, The Mischnagoth (c140 BC), it is noted that: 'in the case of twins, neither the first child which shall be brought into the world by a cut in the abdomen, nor the second, can receive the rights of primogeniture'. In the Nidda, an appendix to the Talmud, the second oldest book of that faith, we read that: 'it is not necessary for the woman who has been delivered by this method to observe the days of purification'. So the operation is very old, but well documented reports are relatively modern.

### Julius Caesar

What, then, of the place of Julius Caesar in this legend? The name Caesar was taken by the Julia family; at that time the high born families had their own tokens or money, but it was against the law to put an effigy of oneself on the coins. The Julia family got round this law by taking the name Caesar which, in the Punic, or Carthaginian tongue means elephant, and the early coins have an elephant on them. But I digress. Was Julius Caesar born by this operation? Clearly, and sadly, not! At that time women dying in late pregnancy, or labour would be delivered post-mortem of their child so that the two could have separate lives in the after-world. However, we know that when Caesar invaded Britain in 55 and again in 54 BC his mother, Aurelia, was still alive, so that he could not have been so delivered. There are two main contenders for the origin of the term. We know that Lex Regis - The Law of the King - contained the general laws of Rome. It appears that in about 715 BC the King of Rome, Numa Pompilius, formally added to Lex Regis the law concerning the necessity for the post-mortem operation, and it seems likely that when the Caesars came to power Lex Regis was changed to Lex Caesareae. However, the Latin verb 'To cut or to fell' is Caedo, declined

caedo, caedere, cecidi, caesum, and those that are cut out are the caesones. So the term may just be a derivation of the Latin.

### 16th to 18th centuries

There were sporadic, undocumented reports until the case of Jacob Nufer's wife. Jacob was a pig herdsman, and in 1500 his wife was taken in labour which went on for many days. Thirteen midwives tried to deliver the baby; the lithotomists were called and were equally unsuccessful. Jacob asked the mayor's permission to operate and was refused, but later the mayor relented and Jacob, having called on divine aid, operated with a razor. Both mother and child survived and the child died at the age of 77. The problem is that this case was unreported for 80 years, and the fact that the two survived lead us to believe that this was not a Caesarean but the delivery of a baby from the peritoneal cavity – an abdominal pregnancy. This would explain the mother's relatively good condition and the inability of the professionals to reach the baby via the normal route.

By 1582 Rousset had described the Nufer case and seven others with no successes. The lack of cases and progress with the operation must be viewed in the light of the problems. The women tended to die after the operation and so most of the senior obstetricians of the day were vehemently against it. Ambroise Paré in his book on surgery (1579) strongly criticised it and there followed variable reports. In 1590 Rousset recounted five cases in his book *Caesarei Partus Assertio Histeriolog*, the fifth with the operator, John Lucas, anything but sober! Rousset however was constructive, saying: 'and if the operation succeeds with him drunk what may not he expect who performs it when sober and according to the finest rules of his art?'

The first well-documented case of the operation on a living woman was carried out on 21 April 1610 by Trautmann of Wittenberg. Obstructed labour had been caused by the gravid uterus occupying a huge ventral hernia. Trautmann asked for 'the gracious help of God' and opened the abdomen and uterus longitudinally. The baby was apparently alive and the mother died suddenly on the twenty-first day. This may not be surprising as Trautmann, having delivered the child, did not know what to do with the uterus, so he closed the abdomen leaving the uterus outside, where it suppurated.

### Controversy

The war of words continued, and Mauriceau in his excellent book *The Diseases of Women with Child and in Child Bed* (1668) wrote that the operation is: 'inhuman, cruel and barbarous' and: 'I do not know that there is any law, Christian or civil, which doth ordain the martyring and killing the mother to save the child'. In 1683 Percival Willoughby, a foremost obstetrician of the day, wrote in his *Observations In Midwifery* the statement which casts any consideration of the operation aside: 'I therefore pass it (the operation) over with silence, being unwilling ... to embolden any in the works of cruelty'. Dionis in his *General Treatise of Midwifery* (1718) said that: 'the operation is by no means to be performed until the woman is dead. ... Those that venture to do so when the woman is alive deserve to be severely punished'. It is not surprising, then, that progress was slow.

In 1704 de la Motte, a leading French obstetrician, described a woman with a very long labour who had a transverse lie. The baby had died and the midwives had made their

attempts, even pulling off an arm. A local surgeon was called and carried out the operation through a crescentic incision. The mother survived. She initially had a faecal fistula which healed spontaneously and thereafter she menstruated abdominally, as the unrepaired uterus had adhered to the abdominal wall - but she was alive.

## Success

The first 'successful' operation in Britain was carried out by Mr Smith of Edinburgh. On 29 June 1737 he was summoned to see a woman who had laboured for six days with a large, and now dead, child and a grossly deformed pelvis. He gave overnight sedation, but in the morning there was no progress and he conferred with two colleagues before operating. The very large child was stillborn and the mother was alive, but died 18 hours later - the first British success! The real success came in January 1738 and was carried out by a midwife. I can do no better than quote from William Smellie's *A Collection of Preternatural Cases and Observations in Midwifery* (1766), not only because of its historical value but in appreciation of the fine and colourful language employed in those times:

'Alice O'Neal, aged about thirty-three years, wife to a poor farmer near Charlemont [Ireland], and mother to several children, in January 1738-9 [sic] was taken in labour, but could not be delivered of her child by several women that attempted it. She remained in this condition twelve days; the child was thought to be dead after the third day. Mary Donally, an illiterate woman, but eminent among the common people for extracting dead births, being then called, tried also to deliver her in the common way: and her attempts not succeeding, performed the Caesarean operation, by cutting with a razor first the containing parts of the abdomen and then the uterus. ... She held the lips of the wound together with her hand till one went a mile, and returned with silk, and the common needles which tailors use. With these she joined the lips in the manner of the stitch employed ordinarily for the harelip; and dressed the wound with whites of eggs.'

Alice O'Neal survived and was soon back to her duties though with a large ventral hernia. Sadly the battle raged. Burton of Colchester, an antiquary and man-midwife, said the operation was indicated for 'gross distortion of the pelvis or where coalition, callosity or schirrous of the mouth of the womb or vagina is so large as to render birth that (*the normal*) way impractical'. He went further, saying: 'To neglect to save a person when it is in your power to do so is accessory to death - to decline the operation in this case is to be accessory to the death of two persons'. So these enthusiasts were ready to help but their seniors still prevailed. Smellie said: 'If she is weak and exhausted delay until the woman expires and then immediately proceed with a view to saving the child'.

The problem was the condition of the mothers - virtually moribund by virtue of dehydration, sepsis and haemorrhage compounded by the absence of anaesthesia. So what were the alternatives - for the child craniotomy, decapitation or embryotomy - and these operations were not always carried out on a dead child. The mother might also receive a surgical assault and given the main indication for the operation - disproportion to a small or deformed pelvis - symphysiotomy and pubiotomy were tried. Sigault developed the former, having experimented on animals and condemned criminals, and carried out his first successful operation in 1777. The mother and baby survived though the mother's bladder was damaged. Sigault and his assistant were presented with medals and the chief was presented to the

monarch Louis XIV, who gave a pension to the patient. Aitken of Edinburgh first suggested pubiotomy, and Ippolyto carried out a bilateral procedure in Italy in 1832; the mother was 22 years old and had gross rickets. She had had the membranes ruptured for three days when the operation was performed. It was followed by 20 hours of ergot administration resulting in a stillbirth and maternal death after five days. *The British Medical Journal* described the operation as 'murderous'.

The cause of Caesarean in the hands of the adventurous was assisted by that great obstetrician, Sir James Young Simpson, who, in 1855, denounced craniotomy on the living child noting that it was not credible that a child had less feeling an hour before birth than an hour after birth.

### Porro

The problem was the mortality rate associated with the operation, and various series to 1800 reported rates of 70 - 100%; and then came Porro.

In 1768 Dr Joseph Cavallini, a name to remember, wrote of an operation he had performed on animals, especially dogs (or rather bitches). He delivered the pups and then removed the uterus. The mothers recovered. Just over 100 years later Professor Porro of Pavia, believing that the cause of the maternal deaths was a leakage of secretions into the abdomen from the uterus, proposed his operation. He opened the abdomen longitudinally and similarly the uterus, and delivered the child. Then he slipped over the uterus and down below the tubes and ovaries a silver wire noose – Cintrat's constrictor. (Figure 1) Tightening the noose just above the bladder peritoneal reflection he occluded the uterine and ovarian vessels, and he then removed the tissues above the constrictor; subtotal hysterectomy and bilateral salpingo-oophorectomy. The cervical stump was sewn into the lower end of the wound and the constrictor sloughed off after a week. Mutilating, brilliant, and life saving!

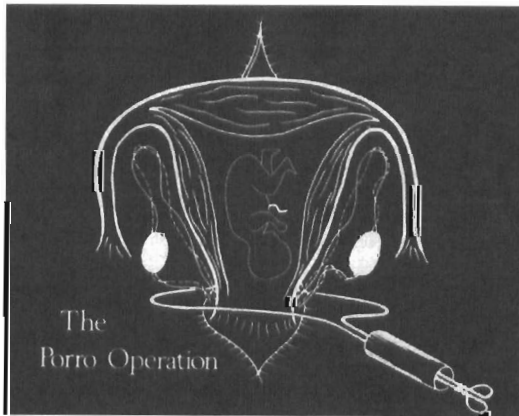


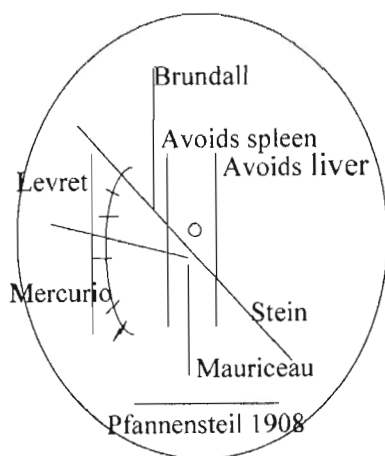
Figure 1

Porro's first patient was, by coincidence, a Senora Cavallini, who in 1876 was successfully delivered. Sadly, the next 3 patients died but one had been in labour for five days and was moribund, another was in status eclampticus and the third was dying of osteosarcoma. However, Porro had removed sepsis and haemorrhage from his patients and the maternal mortality rate was halved. The corner had been turned, women could survive, and as this was recognised the operations were done earlier on fitter women. So the mortality fell further and as it did the operation became conservative and the uterus was retained. Porro must be one of the heroes of the story.

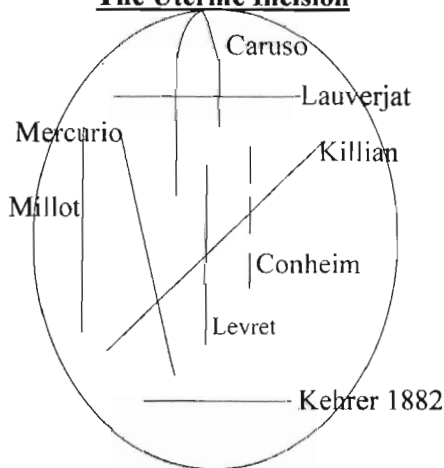
### **Incision and suturing**

The abdominal and uterine incisions used over the years demonstrate the inventiveness of surgeons, and range from the classic via the astonishing to the modern. It can be seen that the lower segment operation was suggested by Kehrer in 1882 and influenced by Pfannensteil in 1908. (Figures 2 and 3)

### **The Abdominal Incisions**



### **The Uterine Incision**



**Figures 2 and 3**

Suturing of the uterine wound was only becoming acceptable in the 1870s when silver wire was used. It had been encouraged by the very honest presentation of Spencer Wells to a learned society in 1865. He had operated on a young woman with an ovarian cyst but found a second cyst. The latter he drained with a trochar only to obtain a large amount of blood. On opening the aperture further out came a baby's leg followed by the whole baby, the placenta and more blood. The woman was saved by silk sutures which approximated the uterine edges and stopped the flow. However, controversy continued as demonstrated by the Rodenstein case. On New Year's Day 1871 Rodenstein assisted his chief with a Caesarean and was left to close the abdomen. Rodenstein put three silk stitches into the uterine wound, but when the chief saw the patient 24 hours later he was so furious at this foreign material left in the patient that he took her back to theatre and removed the silk!

There are even cases of self Caesarean Section – in the USA a woman having delivered her first twin on her own in her cottage in the woods, then could not deliver the second – presumably a transverse lie. She took a kitchen knife and delivered the (dead) twin abdominally. A neighbour found her some hours later, lying on the floor. The intestines were returned to the abdomen, which was bound up and the poor soul recovered. Finally there have been two cases of accidental Caesarean. A well documented case is of a woman in late pregnancy who was filling a bowl with water from a stream when she was bisected by a cannonball. A passing soldier found her; she died, the baby survived 24 hours and the soldier fainted. The other case was of a woman, also in late pregnancy, who was gored by a bull which opened her uterus. The mother and baby died but the bull survived to father many healthy children.

## Conclusion

So, when we look at the ease of Caesarean Section today, often carried at maternal request, we would do well to remember the horrors that women endured, and the brave physicians who pushed forward the development of the operation to save lives, and restore women to health.



## **HISTORY HAS JUST BEGUN**

### **An account of the Records and Archive of the Royal College of Anaesthetists**

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#### **Introduction**

The aim of this communication is to bring to the notice of the members of the Society the records of historical interest held in the archive of the Royal College of Anaesthetists, since their existence would not appear to be widely known, and also to ask for some help.

As history is the written word of what has 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. It behoves us therefore to record events at the time of their occurrence, and also to make a clear distinction between primary and secondary sources; so that if in the future some historian should want information on which to base a history of the College, it will be obvious what can be relied on as fact, and what is merely opinion.

#### **Archive of the Faculty**

The story of how the archive came into being and how it developed is itself interesting. It contains elements of tragedy and comedy, of wisdom and stupidity, of erudition and ignorance, of enthusiasm and apathy, and finally of hope followed by despair.

The official part of the archive dates from the founding of the Faculty of Anaesthetists as a part of the Royal College of Surgeons of England on 11 March 1948, when the first Board of the Faculty was formed. Sadly, of the 21 original members only one (Professor Cecil Gray) is still alive. On 8 July 1948, 81 anaesthetists were elected to the Fellowship, and on 14 October a further 16. Thirteen were elected in 1949, 21 in 1950, two in 1951 and eight in 1952.

There was then a big expansion. Three hundred and fourteen new Fellows were elected in 1953 and a further 572 in the following year, so that by the end of 1954 a total of 1,056 Fellowships had been awarded. At this stage it was recorded in the minutes of the Council of the College of Surgeons that one of the Vice-Presidents thought that far too many Fellowships were being handed out. Thereafter the rate of increase declined and by 1 October 1989, the last year in which a list of Fellows of the Faculty was published in the Register of the College of Surgeons, there were 6,010 Fellows recorded as being alive.

#### **Faculty records**

In the early days of the Faculty there was some confusion as to who was and who was not a Fellow. Some anaesthetists were offered the Fellowship and declined it, possibly on grounds of cost; others accepted and later resigned, whilst still others received two offers. It must be remembered that as long as the Faculty was a part of the College of Surgeons the Board was subservient to the Council of the College, and the Board minutes had to be submitted to the Council for approval before they became operative, though this was usually a formality. The Faculty records were therefore kept by the records department of the College, and the method employed was a very simple one. As soon as the Council had accepted the Board's recommendation the name of the new Fellow was written on a small filing card, together with

the address and the date of the award. This card was kept in a filing drawer until the Fellow died or resigned. The date of the event and the source of information about it were entered on the card, which was then transferred to a second drawer; all the cards were retained.

When the College of Anaesthetists moved to Russell Square these cards disappeared. Whether they were accidentally lost in the move or were deliberately destroyed no one seems to know, but they no longer exist. A number of other records did not survive the move, but what did survive has been sorted out by Dr Jean Lumley (the present Honorary Archivist to the College). They consist of minutes of the Board meetings, the signature book of Board members (which is incomplete), records of financial transactions, lists of those who attended some of the Annual Dinners, the minutes of some sub-committees of the Board, and some other miscellaneous items. Not all this material has been catalogued.

In the early nineteen-nineties a questionnaire, which had been designed by Dr Tom Boulton, was sent to all the Fellows asking them to fill in their biographical details. Unsurprisingly, not everyone responded but by 17 June 1996, 909 had been returned; these are now kept in a separate filing cabinet in alphabetical order. They have been catalogued, but they have never been analysed. Since at least 80 of the Fellows who took the trouble to return their questionnaires are now dead, the whole exercise would seem to have been a waste of time and money, unless some use is made of the information gathered. There was also some talk of sending out further questionnaires at regular intervals in order to update the information contained in the original ones, but this was never carried out. And there the matter rests.

### **Biographical data**

The other section of the archive contains biographical data which have been collected from a variety of sources. At present this contains obituary notices taken from the national press, death certificates, obituaries from newspapers and medical journals, wills, probate listings, and a number of letters from Fellows, some of which are hand-written. If Thomas Carlyle is to be believed when he wrote in his essay *On History*: 'History is the essence of innumerable biographies', then this portion of the archive should be of great value to historians.

The idea of collecting data about the lives and deaths of Fellows of the Faculty arose following the sudden death of an anaesthetist who was a friend of my father, and who died of a heart attack while playing golf on 7 September 1958 when he was only 61. At that time my father was 75, and considered 61 to be rather too young an age at which to die. Having considered the matter he asked me whether or not I thought that being an anaesthetist was a dangerous occupation. As one of my chiefs had died a few years earlier aged 48 it seemed a distinct possibility, and something worth investigating. A trawl through the obituaries in the *British Medical Journal* revealed that of the 22 Fellows who had died in the ten years since the founding of the Faculty, half had not reached retiring age. Five had died in their 50s, two in their 40s, and four in their 30s, the youngest of them being only 33. Now, over 40 years later, there are 872 death certificates of deceased Fellows held in the archive, as well as a few others who were not Fellows. The certificates have been acquired from the Registries for England and Wales, Scotland, Northern Ireland, the Irish Republic and a number of states in America. Many of these would not be in the archive if it had not been for various friends in the different countries who have helped with the research, and to whom I am most grateful.

## Obituary notices and wills

The collection of obituary notices, most of which are from the *Daily Telegraph*, is far from complete, but they often give information about family relationships and are, of course, primary evidence of the date of death. They also sometimes give the date of birth, and other interesting facts about the life of the deceased.

The collection of wills is far from complete, but it does contain a number of interesting ones. A will is the last chance that the testator has of taking a swipe at his nearest and dearest without risking any comeback, and a few anaesthetists have taken advantage of the fact. One, who wrote his will a short while before committing suicide, left a bequest of his medical books to a colleague, and stated that on no account was any religious service to be held over his body after his death. The will of Eric Emery gives instructions to set up the Emery Bequest of his collection of modern art, which has recently been exhibited at the Courtauld Institute.

The index of wills at the Probate Office gives the date of death of the deceased, the place of death (if different from the usual place of residence), and the value of the deceased's estate. Most but not all of this material is listed in the archive, and it is interesting to note that while some anaesthetists died millionaires others left only a few thousand pounds, and a small number died intestate.

An almost complete list of the obituaries of Fellows that have appeared in the *British Medical Journal* and other journals is included in the archive, and in many cases a photostat copy of the obituary is filed with the death certificate. These items are, of course, only secondary evidence.

In 1999 a Fellow working in Australia, who has developed a special interest in the high number of suicides amongst anaesthetists, sent me a list of deceased anaesthetists who had been connected with the Australian and New Zealand College. Out of a total of 209 deaths, 22 were classified as definite suicides with three more as possibles. Of these 22 eight were trainees. It was therefore decided that in future the death of anyone registered at the College, in whatever category, should be included in the archive. This has required a search back through the records to find out how many members or trainees have died, and in what circumstances. This investigation is still proceeding.

## Before the founding of the Faculty

As part of an investigation into the socio-economic implications of a life spent in the practice of anaesthesia, a separate collection of data about anaesthetists who worked and (in most cases) died before the founding of the Faculty has been started. These pioneers of the specialty are mainly known through their contributions to the literature of the subject in this country, and for this reason only English anaesthetists are included at present. Here, the obituaries contained in Plarr's *Lives of the Fellows of the Royal College of Surgeons* are very revealing. It is surprising how many of the early anaesthetists in England were Fellows of the College of Surgeons who, for one reason or another abandoned surgery for anaesthesia. In at least one case this was due to failing eyesight. Plarr was the librarian at the College of Surgeons and knew many of the people of whom he wrote. In his day the College was much smaller than it is now, and consequently it was easier for him to write from first-hand

knowledge. Today his work is carried on by one of the librarians, with the assistance of a number of retired surgeons who also write from personal knowledge.

A similar arrangement is observed by the Royal College of Physicians where Munk's *Roll of Fellows*, which starts in 1518, is regularly updated by contributions from colleagues of the deceased. Munk's *Roll* is also illustrated with photographs of the subjects, which Plarr's *Lives* is not. The Royal College of Anaesthetists does not have a library and therefore does not require a librarian, so any attempt to collect material for a publication comparable to that of either Plarr or Munk must rely on some volunteer taking on the work. If anyone would like a new all-absorbing, time-consuming hobby, he can be provided with a starter pack of a dozen or so A4 files containing about 900 death certificates.

## **Conclusion**

I am glad to have the opportunity to give a public airing to a subject which is only loosely connected with the history of anaesthesia, and I sincerely hope that it will be many years before any entry is made in the archive on your behalves. I also hope that by the time of my own demise to be registered, there will be someone continuing to keep a record of the lives of anaesthetists; otherwise all the effort that has been made by past Honorary Archivists and many others will have been wasted.

## A WAY OF 'PERFORMING OPERATIONS ON IRRITABLE PATIENTS' Dr Wardrop's 1818 Contribution

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### Introduction

At the Royal Berkshire Hospital, the Reading Pathological Society Library has a splendid historical collection of texts and journals. In Volume 10 of the *Transactions of the Medical and Chirurgical Society of London*, I found an interesting conjunction of papers. In December 1818, Dr James Blundell described his first use in a human of blood transfusion via a syringe, which he had previously reported in animals. Five months later, James Wardrop presented to the Society a mode of performing operations on irritable patients. His method was to produce unconsciousness by exsanguination.

### James Wardrop

Wardrop was born in 1782. He was apprenticed to his surgeon uncle and at the age of 19 became House Surgeon at the Royal Infirmary, Edinburgh. He then began travelling to further his education. He was successively in London, Paris, Germany and Vienna and then returned to Scotland where his specimens laid the foundations of the Museum of the Royal College of Surgeons of Edinburgh. At 27 he went south again, and became one of the many Scottish doctors who migrated permanently to London. He obtained the MRCS without examination (his published works being deemed sufficient). He founded the charitable West London Hospital of Surgery and in 1818 was appointed Surgeon-Extraordinary to the Prince Regent. Ten years later he was made Surgeon to the King. He wrote several well-regarded texts, three of which we have in the Reading Pathological Society Library: *On Aneurism, and its Cure by a New Operation*, 1828; *The Morbid Anatomy of the Human Eye* (we have the 2nd edition of 1834); and of most interest for this discussion, *On Bloodletting*, 1835.

### The Problem

Wardrop begins his 1819 talk by setting out the problem. 'It is not uncommon', he says, 'to meet with persons who have diseases which can only be relieved by an operation, but whose minds are so irritable, that although convinced of the propriety of such a measure, yet when about to submit to it, their courage fails, and they wrest themselves from the hands of the surgeon and his assistants by a convulsive effort.' 'In infants and children', he notes, 'where any particular mechanical neatness or dexterity is necessary, the difficulty can generally be overcome by inclosing all the body, excepting the part to be operated on, either in a bag or a wooden box.'

Among adults he recalls the case of an officer with a tumour of the lower jaw, whose courage kept failing at the last moment. Eventually he allowed himself to be tied hand and foot. He then became tranquil and the operation was easily finished. But Wardrop has heard some patients, who had been thus operated on for the stone, declare that the binding of the limbs was by far the most distressing part of the operation.

## **The patient**

The subject of his presentation was a young woman of a robust form who had a tumour adherent to the orbital plate of the left frontal bone. Some months previously a tumour had been extirpated from this site; the portion adhering to the bone had been left behind, giving origin to the new growth. This was firmly attached to the skin and a small sinus led to the interior. The diseased mass was no bigger than an almond, but it was attended with great pain. Even cautiously touching the orifice of the sinus with a probe excited violent irritation.

She had come from a distance, determined to get the disease removed, yet when the scalpel touched the skin she made violent resistance. A second attempt was made, having secured her on a table with numerous assistants, but such was the force and exertion she made to extricate herself whenever the operation was about to be begun, that every hope of success was abandoned.

## **The solution**

‘It then occurred to me’, says Dr Wardrop, ‘that if she would allow herself to be bled to a state of deliquium, the tumor might be extirpated while she remained insensible’. [Deliquium was a word new to me; the Oxford Dictionary defines it as ‘failure of the vital powers, a swoon’] After a few days, the young lady agreed. A large vein was freely opened while she sat in the erect posture in a very warm room, in which there were seven people, with the doors and windows kept shut to hasten her fainting. No less than fifty ounces [ie one litre] of blood were drawn before she fainted, and then a complete state of syncope came on, which lasted a sufficient time to allow the tumor to be removed. With the assistance of Mr Young, the operation was accomplished with great facility. When the fainting went off, she would not believe the operation had been performed till she examined her face in a glass. She suffered little from the effects of the operation, though she remained pale and feeble for a few days from the profuse bleeding. After a week, she was better than most patients who have undergone so severe an operation, and she rapidly recovered her usual strength without in any way appearing to have suffered from the loss of blood.

## **The caution**

After this one very successful episode, Wardrop is surprisingly cautious. His discussion starts in bullish enough fashion: ‘The quantity of blood drawn’, he observes, ‘may to some appear enormous’; but he was emboldened from having almost universally observed that those patients recovered from operations best who lost the greatest quantity of blood. He refers to the Battle of Waterloo (June 1815) when, he says, ‘it was found that the wounded who were left in the field and not taken to hospital till the fourth and fifth day, recovered much sooner than those who were immediately attended to’. This difference, he believed, could only be accounted for, by the bleeding being so extensive as to produce syncope, thus preventing inflammation and fever. Nevertheless, he does not recommend the exsanguination technique for general adoption. However ‘in circumstances equally urgent to suggest its employment’, it may be ventured on fearlessly.

## **Wardrop and bloodletting**

Wardrop knew about bloodletting. His small textbook on the subject was written sixteen

years later, and it was very well received. It begins: 'The abstraction of blood from the human body is one of the most powerful of our therapeutic means'. He likes blood loss. Page 44 notes: 'the good effects of the loss of even very considerable quantities of blood during operations, in preventing subsequent febrile symptoms and local inflammations'. On page 77, remarking on alarming haemorrhage during or after operations, he observes, 'those patients recover most speedily and have much less fever in whom a large quantity of blood has been lost'. On page 136 his enthusiasm carries him further: 'blood should be abstracted before and after most surgical operations. In plethoric subjects where little blood loss is expected, such as operation for cataract, it is very judicious to bleed the patient on the morning of operation'. Let no one say Dr Wardrop was blindly fanatical. He concedes (p52) that in those severely wounded or on whom an operation has been performed, the action of the heart and arteries, which is at first diminished by the general shock to the system, should be allowed to recover before resorting to blood letting. Nor does he believe in false economy. Rather than leeches or cuppings for repetitive local bleeding in treatment of an illness, he suggests copious venesection is better (p47). And for those who need venesection, he emphasises the importance of an adequate first bleeding. Rather than three successive bleedings in 36 hours of 20 ounces each, an infinitely greater degree of relief will be derived from taking 40 ounces in one bleeding (p60). This gives a satisfactory sudden change on the action of the heart and the arteries. The main indication that enough has been taken is the loss of incompressibility of the pulse. But his test is by one finger tip only, so compressibility usually does not occur until syncope supervenes. After the fainting goes off, if the incompressibility returns, more blood should immediately be drawn until the incompressibility is subdued. These are Wardrop's key messages, but most of the book is in flowery language without any precision. His 1819 case presentation was similarly vague. How many days after his first attempt at operation did the successful experiment take place? We would like to know whether his patient showed a fear of the lancet, the exact quantity of blood removed and during what length of time. Was she supported erect during the operation? How long did it last? What was her pulse rate throughout? How long was she unconscious?

Wardrop's book does make clear that he knew a lot about fainting. In surgery, he notes the usefulness of syncope in helping to stop bleeding, and the need to wait for the syncope to go off, then to check on the vessels before closing the wound (p10). For the treatment of inflammatory disease, the common rule was that the patient be bled to syncope (p63). In no case of syncope produced by venesection has he ever witnessed any subsequent pernicious effects (p73). He hastens to point out that it is the removal of an adequate quantity of blood that is important, not the fainting. Elsewhere, however, and almost in passing, he returns to his idea of 1819: 'When it is desirable to make a person faint with the loss of as little blood as possible, as, for instance, for facilitating the reduction of a strangulated hernia, or dislocated bone .... then venesection ought to be performed in the erect posture (p64). He notes that 'premature' syncope (p65) is sometimes the effect of a moral influence. Presumably he means a psychological or emotional faint. The conditions he contrived of warmth, humidity and raised atmospheric carbon dioxide would speed the blood loss. Add the 'moral' effect of many onlookers, and especially the erect posture, then doubtless the onset of fainting is hastened. Without these factors it is likely that much more than fifty ounces would need to be removed from a single vein to provide unconsciousness.

## Practical Observations

His practical observations are commendable, but his thinking is decidedly confused. His main indication for blood letting is the relief of inflammatory symptoms, whatever they are. He admits (p67) that syncope after just a small blood loss can be effective, yet seven pages later he says that the longer the syncope, the more completely the inflammatory action is subdued. It is 'diminution of the heart's action' he is seeking to achieve. He gives no authority for his extraordinary comment about Waterloo, and was probably repeating some popular story to justify his bold experiment. The surgeons on both sides at Waterloo, notably Larrey and Guthrie, preferred immediate amputation. If there were better results from the wounded left in the field it would not have been due to blood loss but to the fact that the worst cases died and only the fittest actually came to surgery.

Had Wardrop really believed massive acute blood loss was so good, why did he finish his triumphant presentation on such a cautious note, and why no mention of the case in his later textbook? It is a curious paradox. Between those two publications he describes the case again in his *Lectures on Surgery*, published by Wakley's *Lancet* in 1833 and gives a bit more detail: 'The quantity of blood removed was 54 ounces. After the tumour was excised and the diseased bone cauterised, she was carried to bed, where she soon recovered from the syncope'. He also gives a rationale for the technique: 'In the majority of the more severe operations, patients are seldom removed to their beds without being brought, from the quantity of blood removed and the mental agitation, to a state approaching to syncope, and if this state does not militate against recovery .... might it not be a rational practice to produce this state previous to the operation and thus save the pain of it?'. Although he seems so satisfied, it is now 15 years since the young lady's operation and he does not appear to have followed it up. 'Future experience', he says, 'can alone point out the circumstances under which such a measure can with safety and with propriety be adopted.' Two years later his book has only the passing reference to reducing dislocations and herniae. Thomas Pettigrew, in Volume II of his *Biographical Memoirs of the most celebrated Physicians, Surgeons etc, etc.* written about 1838, is laudatory of Wardrop, but offers this warning comment on his 1819 experiment: It is 'A practice, perhaps in a few cases admissable, but in the majority of instances likely to prove prejudicial to recovery'.

## A Place in History?

Does Wardrop deserve a place in the history of anaesthesia? He did have the concept of inducing a reversible unconsciousness, although like many of his colleagues his concern seems more for the comfort of the surgeon than the patient. I could find no evidence that he used the technique again for surgery. If he or anyone else did, it was certainly not widely reported at the time, nor picked up by historians of anaesthesia. In *The Evolution of Anaesthesia*, Armstrong-Davidson notes the original experiment, giving the wrong date of 1832. Norman Bergman, (so sadly missed by our Society), included in his award-winning work *The Genesis of Surgical Anaesthesia* a section on exsanguination. He quotes Wardrop in some detail and finds references to suggest that bloodletting was quite commonly used to assist in reducing dislocations, but the aim was to induce muscular weakness rather than unconsciousness. Most other medical histories ignore Wardrop's contribution to pre-anaesthesia and I think they are right. In modern parlance, the 1819 episode was a lucky one-off. Wardrop may on reflection have realised his young patient had been fortunate. Why did he not consider alcohol or opium? He certainly used opiates later. His *Lancet* lectures of 1833



mention large doses of opium half an hour before operation and afterwards. Wardrop had a brief glimpse of the blessing of truly painless surgery, but only by finding another indication for his obsessional, illogical therapy. His obituaries in the 1869 volumes of the *British Medical Journal* and the *Lancet* enthuse over his contributions to operative surgery and to ophthalmology, but make no mention at all of his blood letting. Exsanguination anaesthesia is only one level above the apocryphal tales of concussion and carotid compression. In all probability they were never used. The technique of James Wardrop should not have been.

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## **THE SUEZ CRISIS – 1956**

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### **Introduction**

In 1956 Britain and France sent a Combined Operations Force to capture Port Said and re-occupy the Suez Canal. This misconceived operation resulted from a dangerous state of confusion in world affairs. The brief respite following the end of the Second World War in 1945 saw the USA twice as rich as before the war and the British and other European nations virtually bankrupt. Both were equally dependent on Middle East oil and the Suez Canal.

Germany was formally divided in four sections, between the USA, the British, the French and the Russians. In effect, it was divided into Eastern and Western blocks. Berlin, the capital, was in the Eastern block but administered by the four powers. In 1948 the Russians blockaded the city in an attempt to get the allies out. This was defeated by a massive airlift to supply the city. The Cold War had begun. The North Atlantic Treaty Organisation (NATO) was formed in 1949 to protect Europe against Russia. Soon, Britain was fighting in Korea, Malaya, Egypt, Kenya and later Cyprus and Aden. The French were fighting in Algeria and Indo-China.

The Americans had occupied Japan, and were fighting Chinese and Russian troops in the Far East and threatening to use the atom bomb on North Korea. The Russians constructed the Warsaw Pact in 1955 as a counter to NATO. After Stalin died in 1953 there were revolutions in Czechoslovakia, Poland and Hungary. The Americans, Russians, French and British were experimenting with and detonating megaton bombs in the air. The Americans detonated an H-bomb over Bikini Atol that killed a number of Japanese fishermen 70 miles away. It was not surprising that the possibility of a Third World War was on everyone's mind. I moved my family to a village in Buckinghamshire.

### **Egypt**

In 1956 Colonel Nasser had displaced King Farouk. He decided to build a hydroelectric dam on the Nile, at Aswan; an ambitious plan to supply power to lower Egypt. He applied for a foreign loan but this was denied by the USA and Britain (19-20 July). Nasser promptly nationalised the Suez Canal (26 July), with a view to using the income from the Canal to finance the dam building. As if this was not sufficiently provocative he applied to the Russians to build the dam. The British and French, the principal users of the Canal were highly incensed and proposed to form a Canal Users Association with the Egyptians. When Nasser turned this down, they decided to re-occupy the Canal by force. While this dispute was going on the Israelis took the opportunity to attack the Egyptians. They mobilised on 25 October and commenced the occupation of Gaza and the Sinai Peninsula on 29 October.

### **Conscription and the AER**

In Britain conscription continued after the war, until 1960. Conscripts, after completing two years training were required to attend two weeks camp, and the Army Emergency Reserve (AER) was formed to accommodate them. I joined the AER in 1953 and was posted, as Specialist Anaesthetist, to the St Bartholomew's Hospital Field Ambulance commanded by

Colonel Hankey, Consultant Oral Surgeon at Bart's. This unit foregathered for two weeks each summer and attended lectures on atomic and biological warfare. When the Egyptian crisis broke I was re-called in August 1956, to form a Field Surgical Team - No 3 FST. We assembled at Epping and the first piece of equipment to arrive was a packing case four foot square, which turned out to be a Gestetner copier machine. Army stores had mistaken us for a Field Security Team. The unit consisted of myself, a surgeon, R G (Randy) Beard from Guy's Hospital, Sergeant Martin, OTT II, five operating room technicians and a driver. We were moved to Salisbury Plain, where we spent some weeks under canvas.

Our equipment arrived loaded onto a three-ton truck and a jeep. This was taken from us before we had an opportunity to examine it carefully, so we only had a brief look at it. We were told that we had all the equipment necessary to set up an operating room as soon as we arrived. Where on earth that was to be was not revealed, but we were told that the sterilising drums and autoclave would not arrive until the 'second wave'. Clearly we would not be able to operate before we had sterile equipment. In consultation with the Director of Medical Services (DMS) General Drummond, who visited us, it was arranged to have sterile packs, prepared in advance at the Cambridge Hospital in Aldershot. Drapes, gowns, gloves and dressings were packed in three layers of waterproof brown paper and sterilised; these were known as 'Cambridge Packs'. This was, of course, before the advent of plastic sheeting. It was regarded as an innovation for the army at the time. It would be interesting to speculate whether this was the first use of pre-packed sterile equipment, now universally used.

### **Move to Port Said**

The rest of August and September was spent picking mushrooms and wondering where we were going. When the weather deteriorated the unit was transferred to the Royal Herbert Military Hospital at Woolwich. Finally, on 29 October, we were ordered to report to the Ministry of Defence in Whitehall. By this time the other ranks were issued with rifles and the officers with revolvers. Although the Geneva Convention had been modified to allow RAMC personnel to carry arms, the Commanding Officer of the hospital could not allow us to travel in ambulances, as this was contrary to the Convention. The unit, in greatcoats, back packs and fully armed with rifles and hand guns set off for war on the Underground. From Whitehall we were transported to Lyneham. Overnight we flew to Malta, where we saw a most impressive array of RAF aircraft as we circled the airfield. We were allowed to open our secret orders, revealing that we were to make a combined operations attack on Port Said.

We boarded a Tank Landing Ship (LST) where we found our equipment already on board. We left Malta at 0600 hours on 30 October. We travelled at a sedate seven knots on a calm sea for the next seven days in radio silence; monitored, we suspected, by US submarines. Some excitement occurred when a Naval Officer was brought aboard suffering with acute appendicitis. The wardroom table was prepared and we had great difficulty getting equipment from the truck, which was tightly stored below decks. We were grateful for the sterile packs, but there was no question of getting to the anaesthetic equipment. All I could retrieve was two cans of Squibb's ether, which looked like World War One vintage. This I administered without a Schimmelbusch mask or Gamgee; that was without doubt the worst anaesthetic I have ever given. A gangrenous appendix was removed by Randy Beard. The patient, whose official title was 'The Beach Master' made a good recovery (apart from a very red eye), and was able to marshal the landing of the convoy from a chair on the bridge of our ship. The

navy personnel were toggled out in fireproof gear with masks and fireproof gloves. We went ashore in the same uniforms we were wearing on Salisbury Plain.

### **Field Surgical Team**

At first light on 6 November 1956 (0500 hrs) the convoy was standing off Port Said in company with three warships of the British Navy. There was a spectacular display as the town was bombarded. Clouds of black smoke from oil storage tanks on fire, formed a backdrop over the land. The sunrise revealed the beach and harbour where we were to land. The Marines in landing craft despatched from the warships were the first to land on the beaches, and our Tank Landing Ship followed to land in the fishing harbour by 0830 hrs. We made for the nearest building which was the Casino Palace Hotel. We unloaded our three-ton truck, set up an operating room in the bar and were ready to operate by midday.

There was a great deal of noise and some confusion. Casualties from the Marines, who were fighting in the streets around us, were brought in. Helicopters from the warships soon appeared and carried the wounded back to the ships, where they were looked after by surgeons in the sick bays.<sup>1</sup> It soon became evident that our Field Surgical Team would act more efficiently as a triage and casualty-clearing unit, to determine the priority for the wounded to be carried on the helicopters. In the event the town was subdued in a matter of hours, but snipers continued to make the streets dangerous and some were actually firing into the hotel. Helicopters had previously been used to transport casualties in Korea and in Malaysia on an ad hoc basis. On this occasion the Joint Experimental Helicopter Unit with the Royal Navy mounted a regular shuttle service for evacuating wounded from the front line. This was said to be the first time casualties were conveyed by helicopter directly from shore to ship.

### **Casualties**

As the fighting settled down Egyptian casualties appeared and soon filled the lower floor of the hotel. We proceeded to deal with them. Altogether 46 wounded were operated on during the next three days with the assistance of personnel from No 15 Field Ambulance. The pre-sterilised packs were invaluable and kept the unit going for two days until the autoclave arrived. All cases were given anti-tetanus serum, anti-gas gangrene serum and penicillin.

On 7 November things had quietened down in the town, apart from occasional sniper fire in the streets behind the hotel. Chaperoned by a tank, RAMC personnel visited the local government hospitals and supplied them with dressings and drugs, including anti-gas gangrene serum and anti-tetanus serum, penicillin, sulphonamides, etc.

As to the Egyptian casualties, it says a lot for the respect in which the locals held the British troops that they were quite prepared to come to us for treatment, in spite of the fact that we had attacked them. However, although most of them were dressed in civilian clothes, many had ammunition on their person when they came to the operating room and we were told that they had arms taken from them before being admitted. This was a source of contention in the press afterwards, when questions were asked about the numbers of civilian casualties. There were no women among the casualties nor were any seen in the Port Said hospitals.

On 8 and 9 November, we continued operating, nursing patients on stretchers on the floor. It was at this point that the Deputy Director of Medical Services, Brigadier Willy Officer, made the pertinent remark in typical army jargon: 'What we need is nurses, here, physically on the ground'. We were able to pay a visit to the Lady Strangford British Hospital, which had been our original objective. However, it was partially destroyed and had been the site of heavy fighting. There was no equipment remaining, but the floor was littered with discarded army boots. We continued looking after our Egyptian patients until 17 November, when those who had not been transferred back to the Egyptian hospital were handed over to the Casualty Clearing Station (CCS) established by Major Cowan, RAMC.

### **Cease-fire**

A cease-fire had been declared and the United Nations sent in troops to monitor our evacuation. On 5 December, we were transported to Famagusta, in Cyprus, by Tank Landing Ship, where we were relieved of our transport and equipment. The Suez expedition had not been popular with the army personnel in Cyprus, where they were fighting a war with the Greek guerrillas (EOKA), and there was a high state of tension in Nicosia at the army base hospital. The feeling was that ours was an unnecessary diversion, taking valuable personnel and supplies from the important business of destroying the guerrillas in Cyprus. They were probably right.

From the time we left Malta on 30 October, we had been virtually cut off from world news. We did not know that the Israelis had already captured the whole of the Sinai Peninsula down as far as Sharm al Sheikh in the south, by the time we arrived in Port Said on 6 November.<sup>2</sup> They had destroyed the Egyptian army in Gaza, but they had been stopped from capturing the Canal itself, by an ultimatum from the British and French governments. Meanwhile, a revolution in Hungary caused one hundred and fifty thousand people to flee to the West. Under cover of the British and French activities at Port Said, the uprising was brutally put down by Russian tanks, which occupied Budapest (2-3 Nov), with the loss of many lives.

We found that our 'surprise' attack on Port Said had had world coverage. There had been vocal anti-government demonstrations in Trafalgar Square. President Eisenhower had withdrawn his support for the venture and chosen to ignore Israel's activities. With the supply of vital oil cut off from the Gulf and the Americans threatening to withdraw financial support, the operation had to be terminated. The crisis resulted in the resignation of the Prime Minister, Sir Anthony Eden, and reflected general discredit on the British and French governments.

### **Politics and the Press**

The press and politicians took sides. There was confusion between the criticism of the political decision to invade Egypt and the actual carrying out of the plan, so far as it went. There was no question that what was called 'gun boat diplomacy', the solving of territorial disputes by force of arms, could no longer be justified by a British government. However, criticism of the part played by troops on the ground, especially the RAMC, was disputed. This found me confronted by the radical Labour Member of Parliament, Edith Summerskill, in a BBC *Panorama* programme in January. She had toured Port Said after we had left, and reported on the damage done in Port Said and statements from Egyptian medical staff, but

had not interviewed our own troops. Her criticism was hotly denied by reporters such as Donald Edgar of the *Express* who had come with us to Port Said.<sup>3</sup>

### Conclusion

We arrived home to find we had taken part in a fiasco. However, we were not ashamed of the part we had played in the exercise. But it was not a hero's welcome.

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## JOHN SNOW AND PARACENTESIS OF THE THORAX

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### Early paper by John Snow

Probably there are not many among us today who appreciate that pleural effusion, or hydrothorax, unilateral or bilateral, was quite a common condition even fifty years ago, and much commoner still in John Snow's time. It was the subject of one of his early communications. On Saturday 7 December 1839, when he had been qualified and in general practice in Soho for only one year, he read a paper at a meeting of the Westminster Medical Society. The title was '*The Anasarca which follows Scarlatina.*'<sup>1</sup> Anasarca (from Greek, ana=up or through, sarx, sarcos=flesh), or dropsy, was the old name for oedema, and in the extreme form it extended from the feet upwards through the abdomen and thorax to the face and eyelids. Patients who died were found to have pleural and pericardial effusions, and ascites. Treatment in Snow's time was both local, by puncturing the skin to allow fluid to drain out, and more elegantly, later, by the insertion of Southey's tubes; and systemic, by emetics, purgatives and diuretics. None of the medicaments was pleasant. Purgatives included jalap and calomel, and among the diuretics were juniper, horseradish, mustard, and oil of turpentine. Digitalis is often mentioned as being a powerful remedy, especially where the pulse is feeble or intermittent.<sup>2</sup>

In his talk, Snow reported on a recent epidemic of scarlet fever in the metropolis, where the subsequent anasarca, associated with kidney disease, had been unusually frequent and in some cases fatal. He mentioned that the attribution of oedema to renal disease, and the first demonstration of albumen in the urine of dropsical patients, had been fairly recent. Dr Bright had discovered its relationship with certain diseases of the kidney, and had found also that this condition of the glomeruli might be occasioned by scarlet fever.<sup>3</sup>

### Post-Scarlatina Dropsy

Snow went on to describe twelve cases of post-scarlatinal dropsy, five of which had been fatal. The first was a girl of twelve, who died suddenly after severe scarlet fever. Post mortem there was generalised oedema, together with ascites, and extensive pleural and pericardial effusions. Snow demonstrated this child's much enlarged kidneys at the meeting, and also showed the much enlarged and disorganised Malpighian bodies under the microscope. Her brother, aged nine, also had severe oedema and ascites, but recovered after a regime of purgation and venesection, though with obviously severely damaged kidneys. Post mortems were done on two of the other four fatal cases, and pericardial effusions were found in both. In one of those who recovered, Snow described extensive dullness to percussion in the cardiac area, and in the other great difficulty in breathing. In this last one, he said that 'the increased action of the heart continued, and a loud bellows-sound became established with the first sound'. At the time of the meeting the child was still under treatment, but his future was obviously dim.

The remainder of Snow's paper is devoted to a discussion of the reason for the association in some cases of scarlatina but not others, of kidney disease and severe anasarca. We need to remember that this was before Pasteur, when scarlet fever was still a mystery illness. During

the subsequent discussion, a Dr Addison said rather cattily that he thought that Bright was wrong to make the sweeping assumption that the disease of the kidneys was the *fons et origo* of the dropsy. (It seems almost certain that this was William Addison FRS of Wimpole Street, not Thomas, the Guy's physician who described the eponymous disease of the suprarenal capsules some years later; there were only two Addisons listed in the Medical Directory of this period). He was sure that with further experience it would be found that Bright was confusing an effect with a cause. Another speaker described a child of four who had died of anasarca and pericarditis after scarlatina.

### **Seriousness of Scarlet Fever**

Again, only the oldest of us will remember how common, and how dreaded, scarlet fever used to be. Before the era of sulphonamides and antibiotics it was a killer, both in the acute phase and as a result of the sequelae of rheumatic heart disease and glomerulonephritis. The epidemic that Snow reported, with the deaths of children, obviously remained in his mind, because two years later, on Saturday 18 December 1841, (incorrectly dated 19 in the *Lancet*), he read a paper at the Westminster Medical Society on Paracentesis of the Thorax.<sup>4</sup> An account of this talk was published in both the *Lancet* and the *London Medical Gazette*. The versions differ in some details. The one in the *Lancet* was taken down at the meeting by its reporter, and missed several significant points, but it had the important feature that it also reported the ensuing discussion. The paper in the *Gazette* was prepared and submitted by Snow himself, as was his custom. An editorial footnote to one of his earlier communications to the *Lancet* had indicated that they were not welcome, whereas he was obviously on good terms with the editor of the *Gazette*.

### **Snow as teacher**

We are accustomed to regarding John Snow as a great teacher of the art of anaesthetics; but it is noteworthy that even in his early years he was a teacher. His papers generally began with an exposition of the basic science involved. In one case this was physics, but usually (as here) it was physiology, and he obviously thought this necessary because of the great disparity between the beliefs of the senior practitioners and all the recent advances that were being taught in the medical schools. The need for this scientific introduction is seen clearly in some of the contributions to the discussion that followed the main speaker.

Snow began by explaining that: 'In the normal condition there is no vacant space in the thorax'. The pleural cavities are empty, the pulmonary and costal surfaces 'glide gently over each other during respiration. Whenever any fluid, whether a liquid or a gas, accumulates within the pleura, it is desirable that we should get rid of it'. He continued that tapping the thorax was, however, in practice restricted to cases where the liquid was known or presumed to be pus, or where the volume of liquid or air in the pleural sac was so great that not only was the affected lung useless, but the mediastinum was pushed across to such an extent that the function of the other lung was so impaired as to endanger life.

### **Dangers of paracentesis**

But what Snow called the ordinary methods of performing paracentesis of the chest, whether by trocar or bistoury, carried their own evils. The lungs would only follow the movements of the chest as long as the atmospheric pressure inside them, and on the chest wall, was equal.



No sooner was an artificial opening made into the pleura, than the atmospheric pressure became equal on the inner and outer surfaces of the lung on that side, and it would collapse in accordance with its own elasticity and remain unaffected by the movements of the ribs and the diaphragm. Thus it followed that at the conclusion of paracentesis performed in the ordinary way, the lung would remain collapsed if the space previously occupied by liquid was left full of air.<sup>5</sup> In fact, with the stethoscope applied to the chest, air could be heard bubbling in as the liquid was removed. The great evil that arose from the admission of air was its mechanical resistance to the expansion of the lung. The lung on that side could only expand in proportion to the absorption of the air, and this took a number of days, during which the patient suffered from limited respiration, and ran the risk that the lung might be bound down by the consolidation of coagulable effusion, and never expand again.

### **Leave the pleura empty**

So it would be a great advantage to leave the pleura empty, with the lung expanding and filling the chest, and even more so when both cavities were affected. In such cases, to make an opening into each pleura and allow both lungs to collapse, would be to cause instant death by asphyxia. In fact, when dyspnoea was caused by liquid in both pleurae, the patient could not dispense with one of his embarrassed lungs and attempt to live on the functioning part of the remaining one. Accordingly, paracentesis was not performed on such patients, although fluid which occupied both sides of the chest would soon prove fatal if not relieved. Such a condition, arising from disease of the heart or the kidneys, was a frequent occurrence, and although sometimes a symptom of approaching dissolution, at others it cut the patient off much sooner than the original affection would have done. For example, the dropsy arising from granular degeneration of the kidneys could occur at any stage of the disease, and in the form of bilateral hydrothorax could be fatal if not removed, even when the disease of the kidneys was at an early stage. In the case of renal dropsy following scarlet fever that he reported two years previously, a child was cut off by hydrothorax, though it was not worse in other respects than some who recovered.

Snow could not see why tapping might not be performed in these cases of bilateral effusion, where it might be life-saving, as long as the method did not allow communication between the pleural cavity and the outside air. A method had been proposed recently by Dr Davidson of Glasgow, which was to place a cupping glass over the cannula to prevent air from entering. But air had rushed in when the cupping glass was removed, and the splashing of fluid could be heard in the chest, a positive Hippocratic sign, three days after the operation.

### **Snow's Trochar and Cannula**

So the chief object of his paper was to bring before the Society an instrument by which fluid could be withdrawn from the chest without making any direct communication between that cavity and the outside air. It consisted of a trochar, and a cannula with a stopcock. The trochar passed through the stopcock in the open position, and made an accurate fit along the whole length of the cannula. When the trochar was withdrawn, it would still make an airtight fit when it was clear of the stopcock, allowing it to be closed before the trochar was completely removed, so that no communication with the atmosphere could take place. A mark on the trochar showed when it was clear of the stopcock, which could then be closed before the trochar was completely withdrawn. Unfortunately, although an illustration of the apparatus was shown at the meeting, it was not reproduced in the journals. In a footnote, the

editor of the *London Medical Gazette* wrote that although a drawing had been supplied, the description had been so distinct that it had not been thought necessary to have an engraving made. However it is likely that in its essentials the instrument resembled the following illustration.



**Figure 1. Snow's cannula reconstructed**

The other part of the instrument was a double-action syringe with two valves, similar to a stomach pump. This must have been a version of the Read pump, which was also the basis of Snow's neonatal resuscitator, described by him two months earlier. In a footnote to his paper in the *Gazette*, Snow said that since the meeting the trochar and cannula had, in fact, been made for him by Mr Read of Regent (now Oxford) Circus.<sup>6,7</sup>

Snow suggested that before introducing the instrument the skin should be drawn across, so that when the cannula was removed the skin would slide back and block any direct communication between the deeper wound and the outside. If this was an original suggestion it is a worthy example of Snow's ingenuity, and it has, of course, remained standard practice.

### **Ensuing discussion**

Why Snow thought it necessary to introduce his talk with an account of the mechanics of respiration is made evident by the ensuing discussion: 'Dr. Addison asked what objection there was to the introduction of air into the pleura? He admitted that the instrument was a very ingenious invention to prevent that occurrence, but he had never seen any evil result from it'. The pump would not expand a lung bound down by organised lymph, and a lung not bound down would expand and contract with the motion of the chest although air was contained in the pleura. 'He saw no objection to the entrance of air, for the hydrothorax did not cause inconvenience by preventing the expansion of the lungs, but by pressing on the mediastinum, and thus interfering with the circulation of the blood, for they knew that respiration might be greatly limited, and that one lung might be altogether dispensed with without inconvenience.'

Dr Frederick Bird said that the entrance of air into the pleura during paracentesis did no harm, and he mentioned two or three cases in which there was pneumothorax immediately after the operation, but the air was absorbed after a few hours. He did not consider the instrument to be an original invention. It appeared to be a modification of a recent German idea, where an empty bag was drawn over the trochar and cannula, and fastened to the chest by adhesive plaster. The trochar, when withdrawn, was allowed to fall into the bag, into which the liquid also flowed.

The President, Dr Golding Bird, said that air admitted during paracentesis was a highly elastic and compressible fluid, and would not offer as much resistance to the expansion of the lung as the fluid that was being removed. Golding Bird was assistant physician to Guy's Hospital, and Professor of *Materia Medica*. He lived for some years at 48 Russell Square, now the home of the Royal College of Anaesthetists, and died at the age of 41, from

rheumatic heart disease. He and Snow appear to have collaborated on one or two research projects in their earlier years, and in his *Case Books* Snow records two occasions when Bird was present during operations for which he (Snow) anaesthetised.

Replying to the discussion, Snow said that the greatest objection he had to the admission of air was the mechanical resistance it would afford to the expansion of the lung. When left to itself, the natural elasticity of the lung would leave a considerable space between itself and the ribs, to be occupied by air. He was still of the opinion that when dyspnoea was great from effusions pretty equal on both sides, the patient could not spare the use of one lung for a moment to allow of tapping in the ordinary way, without a risk of losing his life. When hydrothorax caused difficulty of breathing, it could only be by preventing the expansion of the lungs; it could never interfere with the circulation in any other way. The pressure on the large vessels would always be the same as in health, however large the effusion.

He was pleased to hear of the German invention, because it showed that others objected to the admission of air; but although it excluded air, it would be impossible to extract all the liquid, especially in empyema.

In conclusion, Dr Addison remarked that although he had an invention of his own to prevent the admission of air, he would be happy to try Mr Snow's instrument when he had a case requiring the operation.

So here we see John Snow describing a completely new instrument, based on a sound understanding of the physiology involved, designed to allow a hitherto impossible life-saving procedure, the drainage of bilateral pleural effusions, to be performed safely. It is not easy to find examples where advances in physiology influenced treatment during this period, and previous writers about Snow do not appear to have appreciated the innovatory nature both of this apparatus and of the thought behind it. It was the precursor of all trochars and cannulas and all exploring and spinal needles fitted with a stopcock. There are many to be found in instrument makers' catalogues, and if there were any justice, all should have been called modifications of Snow's cannula. How far he was ahead of his times in this, as in so much else, can be seen from the following.

### **Treatment of empyema**

Until 1920 the routine treatment for empyema was still rib resection and open drainage, and many died as a result. Matters came to a head during the 1918-1919 influenza epidemic, during which a large number suffered from the complication of streptococcal empyema. The death rate among American servicemen as a result of open drainage was so appalling, (70% in some centres) that an Empyema Commission was set up to find the cause. Its report pointed out the fatal error of the neglect of the physiology of the open chest wound.<sup>8</sup> As a result, closed drainage, either intermittent or with the water seal that we are familiar with, became standard. So here, as in other things, Snow had been many decades ahead of his time.

### **Conclusion**

What will appear strange to us today is that it seems to have been perfectly acceptable to his contemporaries that he should give a talk, and provoke a discussion, about an instrument that had not yet even been made, let alone used.

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## WAS MARIO DOGLIOTTI'S INTEREST IN REGIONAL ANESTHESIA SPARKED BY JOHN LUNDY?

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### Introduction

Mario Dogliotti opened the door to practical epidural anesthesia among many contributions to regional anesthesia and pain medicine. During his early career he visited the Mayo Clinic where he observed a very active practice of regional anesthesia directed by John Lundy. The present research explores this early meeting between Dogliotti and Lundy to see what influence it may have had in Dogliotti's subsequent contributions to regional anesthesia.

### Three characters

There are three main characters involved in this story. The *first* is Achille Mario Dogliotti, an Italian physician in anesthesia, born in 1897. He received his MD in 1920 and then was appointed as a clinical professor in 1926. His place in the history of anesthesia was secured by popularising the hanging drop technique for identifying the epidural space, a method originally described by Gutierrez.<sup>1</sup> It was Dogliotti who promoted the technique both procedurally and its application to pain relief and surgery.

Dogliotti was very interested in pain management. He was one of the first to describe trigeminal alcohol neurolysis for tic douloureux, and wrote the first Italian textbook of anesthesia. He was also interested in the ethical foundations of the treatment of pain, and in fact lobbied the Vatican and the Pope to come up with guidelines that allowed physicians to intervene in the management of pain in palliative care.

The *second gentleman* is John Silas Lundy. He was born in 1894, and received his MD in the same year as Dogliotti (1920). In 1925 he was appointed Chair of the Section of Regional Anesthesia at Mayo Clinic. At the time it probably had the world's largest practice of surgery and regional anesthesia.

The *final person* is Frank Pugliese. He was a fellow in the Section of Regional Anesthesia at Mayo for three months in 1928, and knew both Dogliotti and Lundy. Pugliese arranged for Dogliotti to visit Mayo Clinic for two months in 1929. In a hand-written note to John Lundy dated 3 April 1929, Pugliese described Dogliotti as: 'The man about whom I wrote you before. He is probably in Rochester now with the hope that he can pick up a good bit of information on anesthesia. I am again asking you to do all you can for him while he is there, and I am sure that some day you will be repaid for your kindness to him'.<sup>2</sup>

### Dogliotti's visit to Mayo Clinic

When Dogliotti visited Mayo Clinic in April and May 1929 he would have seen a variety of regional techniques, including spinal, sacral and field blocks. These regional techniques were used to augment anesthesia for abdominal and thoracic surgery, because muscle relaxants were not available at the time. In 1929 over 1000 sacral and field blocks were done. Specifically these blocks were being replaced by spinal anesthesia which was really taking

off at that time. By the early 1930s, spinals accounted for about 60% of all regional cases. Approximately 20-30% of all anesthetics at that time were regional.<sup>3</sup>

After meeting Dogliotti, Lundy wrote back to Pugliese his initial impression: 'I met the Italian doctor the other day but haven't the faintest idea what his name is, although Dr Hersh pronounced it perfectly. I presume that he is the man who is going round with me. I, of course, am unable to speak Italian and he speaks only a little English, so I talk with my hands almost as fluently as any Frenchman now. I am glad to do what I can for him, but I obviously am handicapped in explaining the details of the various procedures; however he will be here a month or so, and possibly by that time I will have found some way of making him understand me.'<sup>4</sup>

Having seen a wide variety of regional anesthetics during his two-month visit Dogliotti would have been exposed to the thinking at the time, that these techniques offered advantages in surgery. On 22 June 1929, before he left the United States, Dogliotti wrote to Lundy from Boston, saying: 'I wish to say goodbye and thank you warmly for your courtesy and kindness. I would to you remember to send me your latest paper about the postoperative lung complications'.<sup>5</sup> At the very end of the letter he remarked: 'I beg your pardon for my bad English. I hope to improve in the future.' The fact that he is handwriting in English means that he probably absorbed a lot more than Lundy appreciated.

### **Lundy's visit to Europe**

Lundy replied promptly on 24 June, saying: 'Thank you for your letter of June 22. I am glad you enjoyed your trip and visit here. I am looking forward to seeing you some day in Europe'.<sup>6</sup> A correspondence subsequently ensued between Dogliotti and Lundy. During this time their experiences in regional anesthesia were going on in parallel.

The trip that Lundy mentioned came to pass in 1938. Lundy wrote to Dogliotti on 28 December 1937, stating: 'I am planning a trip to Europe in April, and I should like very much to see you and I am wondering if you could meet me in Milan'.<sup>7</sup> Dogliotti handwrote a long reply dated 4 February 1938, suggesting that Lundy stay a while longer and make a presentation at the local society, and seemed very interested in having him interact some more during his trip. Lundy had to decline because of scheduling constraints, but he said: 'I will be looking forward to seeing you',<sup>8</sup> and arranged a meeting.

Lundy recorded his meeting with Dogliotti in his personal journal on 14 April 1938. He wrote: 'We had lunch at the Granoli's Café, it was very funny food in a well-known place. We had a long walk and then met Dr Dogliotti, who had come all the way from Sicily to do a therapeutic alcohol injection for a lady in Milan who suffered from sciatica. He informed me that a young man from Italy will attend the meeting of the anesthetists in New York in October, and some other details of his discussion'.<sup>9</sup> It was likely out of politeness that Dogliotti came up with the excuse to travel all the way to meet Lundy. At this stage of his career, Dogliotti would not be expected to travel some thousand miles from his practice to do a sciatic nerve injection. Rather, it speaks to the point that the two had remained close through the years.

## Further contact

Dogliotti had written his textbook in 1935,<sup>10</sup> and the first English translation was in 1939.<sup>11</sup> We can imagine at this meeting in Italy that they talked about the book and the forthcoming translation into English. Dogliotti maintained his contact with American anesthesiologists; in fact, in 1953 he presented two refresher courses at the American Society of Anesthesiologists Annual Meeting. They were both on regional anesthesia, the first being 'The segmental peridural analgesia in abdominal and thoracic surgery', and the second 'Our method for the differential block in pain relief'. He maintained his interest in regional anesthesia throughout his career.

## Conclusion

Dogliotti practised in an era when anesthesia was part of surgery training. This was at a time when continental Europe lagged behind the United States in anesthesia as a specialty, so he had to look elsewhere for his early training in anesthesia. Dogliotti met Lundy at an early point in both their careers. During this exposure to regional anesthesia he saw a high volume of cases at the Mayo Clinic in Rochester. He was one of the few physicians able to do both anesthesia and surgery at a high level. Dogliotti and Lundy maintained a correspondence and friendship throughout their careers. Finally, in answer to the question 'Was Mario Dogliotti's interest in regional anesthesia sparked by John Lundy?', I think we can make a good case that the answer is 'Yes'.

## Acknowledgements

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## THE RELATIONSHIP OF RALPH M WATERS, MD, FFARCS (hon) TO BRITISH ANAESTHESIA

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The seventy-fifth anniversary of the appointment of Ralph Milton Waters MD (1883-1979) to take charge of the administration of anaesthetics at the hospitals of the University of Wisconsin Medical School in Madison<sup>1</sup> has recently been celebrated. Waters became the first full-time salaried Professor of Anesthesia in the world at the University of Wisconsin in 1933.<sup>2</sup> This paper is intended to explore his relationship with British anaesthesia and the influence that he had upon its development.

### **Waters, Macintosh and John Snow**

Sir Robert Macintosh (1897-1989), then Emeritus Nuffield Professor of Anaesthetics of the University of Oxford,<sup>3</sup> paid tribute to Waters in a lecture to the Midwest Anesthesia Conference in Chicago in 1969. Macintosh referred to Waters as 'the outstanding personality in our specialty over the last hundred years'.<sup>4</sup> As Macintosh pointed out, one hundred years takes us back almost to the death in 1858 of John Snow MD, the pioneer British anaesthetist. This is significant. Waters was inspired throughout his career by the example of Snow.<sup>5</sup> This was not just because Snow was a skilful clinician and an outstanding research worker,<sup>6</sup> but also (very importantly) because by his example and insistence, Snow ensured that the administration of anaesthesia in the United Kingdom was placed exclusively in the hands of medical practitioners and of dental surgeons in their own practices.<sup>6,7</sup>

Waters frequently referred to John Snow in his scientific papers.<sup>7</sup> He wrote a competent biographical article on John Snow in 1936. He also stated on other occasions that 'The greatest anaesthetist was an Englishman, John Snow', as well as referring to him as 'My idol, the more I try to do various things, the more respect I have for Snow, my friend, what a man he was'.<sup>4</sup>

### **Waters career as a private practitioner in Sioux City and Kansas City 1913-1927**

Ralph Milton Waters was descended from English and Scottish pioneer farming stock. He was born in North Bloomfield, Ohio in 1883. He received his MD degree from Western Reserve University, Cleveland, Ohio and then migrated west to take over a general practice in Sioux City, Idaho, which, at that time was a town with a population of 65,000 persons with about a hundred physicians.<sup>1,7,8</sup> He moved to Kansas City, Missouri in 1924, still in private practice, where he stayed until 1927 when he started on the second phase of his career as anaesthetist to the hospitals.<sup>1,6,7</sup>

Waters progressed while he was at Sioux City from being a general practitioner with an interest in anaesthesia, (self-taught), to earning a reasonable living from 1916 onwards as a physician who limited his practice to anaesthesia, and continued as such in his three years in Kansas City.<sup>9</sup> This was an almost unheard of status in provincial medicine in the USA at that time; anaesthesia was administered by locally trained nurses, or by office or other non-medical personnel.<sup>1,7,8</sup> Waters analysed the reasons for this state of affairs.<sup>9</sup> He realised that the main factor was probably the 'lack of proficient anesthetists amongst the physicians



available'. This in turn was due to the almost complete absence of training in anaesthesia in the medical schools in the USA at that time.<sup>9</sup> Waters established the value of physician anaesthesia within his own environment and it became his life-long mission to try to remedy the position generally. Waters promoted this concept in his first paper published in 1919.<sup>9</sup>

His own professional development towards becoming a modestly successful physician anaesthetist was aided by the contacts that he made with the very few specialist anaesthetists practising independently in the midwestern states of the USA.<sup>1</sup> Notable among them were McKesson of Toledo and Lundy of the Mayo Clinic, with both of whom he spent time. Waters also formed a lifelong friendship with Guedel, then in Indiana, and made the acquaintance of McMechan, who was the leading medico-political figure in the nascent specialty of anaesthesia in the United States.<sup>1,7,8</sup> He also published papers on his vision for the development of the specialty.<sup>1,9</sup>

Clinically, Waters established 'down-town anaesthesia clinics', to which surgeons could bring their cases for anaesthesia and surgery, both at Sioux City and Kansas City.<sup>1,10</sup> This was surely one of the earliest examples of an organised ambulatory anaesthesia facility. He also developed his eponymous carbon dioxide absorption technique while practising in Sioux City, which he used from 1921 onwards.<sup>1,11</sup>

### **Waters' 'to and fro' carbon dioxide absorption apparatus**

The development by Waters from 1921 onwards of his 'to and fro' absorption apparatus with its soda lime canister was revolutionary.<sup>11,12</sup> Partial rebreathing, and even total rebreathing, with both nitrous oxide and ethylene was practised by many anaesthetists well into the nineteen thirties.<sup>13</sup> This was partly an economy measure, but the higher carbon dioxide levels undoubtedly stimulated respiration and enhanced anaesthesia as Leake and Waters demonstrated.<sup>14</sup> However, any attempt to reduce carbon dioxide tensions ran contrary to the widely accepted theory about surgical shock promoted by the prominent physiologist Yandell Henderson of Yale University.<sup>15</sup> Henderson believed that surgical shock was due to hyperpnea and consequent lowered carbon dioxide tension.<sup>15,16</sup> Waters, however, quotes in his 1924 paper the animal work of the Brazilian Ozorio de Almeida brothers,<sup>16,17</sup> and of Denis Jackson, the medical pharmacologist, then at St Louis,<sup>16,18</sup> which disproved this theory.

Waters lists the advantages of the 'to and fro' absorption technique as, firstly economy and portability, both important considerations in the private practice in which he was then engaged, and secondly of being of benefit to the patient by preserving heat and moisture.<sup>11,12</sup> He mentions in addition that unpleasant odours from ethylene, and from ether and ethyl chloride dropped through a hole in the canister were reduced, and that the apparatus is easily sterilised.<sup>11</sup> The one limitation that he mentions is that the apparatus could not be used to full advantage in 'nose and mouth work' because of the need for a close fit of the anaesthetic mask to the face.<sup>11</sup>

This problem was, of course, solved almost contemporaneously by the development of wide-bore endotracheal intubation by Rowbotham and Magill in England.<sup>19</sup> Guedel and Waters later further improved the situation by describing the cuffed endotracheal tube in 1928.<sup>20</sup> The scene was then set for the further development of thoracic anaesthesia.

### **The appointment of Waters to the University of Wisconsin in 1927**

In 1927 the reputation of Waters was such that he was invited to take up the salaried appointment of whole time Assistant Professor of Surgery in charge of anaesthesia at the hospitals of the new and innovative Medical School of the University of Wisconsin at Madison.<sup>1,7,8</sup> He undoubtedly saw the offer of this appointment as an opportunity to realise his vision for the future of anaesthesia in the United States.<sup>1,8,21</sup> He was encouraged by the enlightened surgeon Erwin Schmidt and by the basic scientists including Chauncey Leake. Consequently, at some potential personal financial sacrifice, Waters accepted the appointment.<sup>1,8,21</sup>

### **The world-wide status of the personnel who administered anaesthesia in 1927**

It is pertinent to consider the professional status of the personnel who administered anaesthesia worldwide in 1927 at the time when Waters arrived in Madison. There had been little change in the United States since Waters started to practice in Sioux City in 1913.<sup>1,7-9</sup> There were a handful of medically qualified specialist anaesthetists working independently in major cities or in isolated circumstances. Lundy had been appointed as instructor in anaesthesia at the Mayo Graduate School in 1923, but he did not head an academic department as such, and his contribution to research was clinical and personal.<sup>22</sup> The majority of anaesthetics throughout the United States were still administered by locally trained nurses and other personnel.<sup>1,7-9</sup> Only in the United Kingdom and the major British Dominions (specifically Canada, Australia, and New Zealand) was anaesthesia deemed to be the responsibility of qualified medical practitioners, and some apprenticeship training was given to medical students.<sup>23,24</sup> In the United Kingdom there were about one hundred specialist physician anaesthetists attached to the hospitals of medical schools, but they worked as independent practitioners. The majority of anaesthetics in the United Kingdom countrywide were administered by general practitioners as a sideline. Work done for poorer public patients in university hospitals, or by all specialists or general practitioners in the widespread system of voluntary hospitals, was purely honorary. Specialist and general practitioner anaesthetists were dependent for an income on patients operated upon in private hospitals or in the patient's own home.<sup>24</sup> In Europe and elsewhere a great deal of surgery was undertaken under spinal or local anaesthetics given by the surgeons themselves. General anaesthesia, when considered to be necessary, was administered by junior medical staff, nurses or other personnel.<sup>23</sup>

### **The development by Waters of the anesthesia center at Wisconsin 1927-1949**

Waters, during his twenty-two years at the University of Wisconsin, created a department, albeit nominally within the Department of Surgery, which was unique in the USA until the mid nineteen thirties, and almost unique in the world until after the end of the Second World War in 1945.<sup>24</sup> He provided a first class clinical service, he set up educational facilities that are now regarded as essential for any academic department, and he conducted clinical research and research with basic science departments.<sup>7,8</sup> Most important of all he taught medical students, so that they could provide safe anaesthesia in the widely dispersed smaller towns in the United States, and taught residents and fellows destined to create academic centers all over the USA, as well as in foreign countries.<sup>21,25,26</sup> The latter included departments founded by Gordh in Sweden<sup>27</sup> and by Parsloe<sup>28</sup> in Brazil. Waters also played a

leading part in establishing anaesthesia nationally as an accepted specialist medical discipline.<sup>29,30</sup>

The reputation of the academic center at the University of Wisconsin grew steadily. Waters received many visits by established senior physician anaesthetists from the British sphere of influence with kindness and hospitality. They, for the most part, could only look on with envy.<sup>1,3,4,26</sup> Significantly the visitors included Robert Macintosh<sup>3,4</sup> and Michael Nosworthy,<sup>31,32</sup> who were both destined to play an important part in the academic and clinical development of anaesthesia in Great Britain.

### **The clinical contribution of Waters and his colleagues at Wisconsin 1927-1949**

Sir Geoffrey Organe, MD (1909-1989) was the first Secretary General and later the third President of the World Federation of Societies of Anaesthesiologists.<sup>24</sup> Speaking in 1982, he listed a number of major clinical developments that had taken place during the fifteen years immediately preceding the celebration in 1946 of the centenary of Morton's seminal demonstration of ether anaesthesia at the Massachusetts General Hospital in 1846.<sup>23</sup> This period of fifteen years roughly coincides with the most productive years in the nineteen thirties and forties of the tenure of office of Waters at the University of Wisconsin. Organe's list includes 'Pentothal, cyclopropane in closed breathing systems which allowed artificial ventilation of the lung, and curare'.<sup>23</sup> Waters was intimately concerned with introducing or promoting all these developments.<sup>1</sup> He was, for example, the first to administer both cyclopropane<sup>1,33,34</sup> and thiopentone<sup>35,36</sup> clinically.<sup>1</sup>

These developments led, in the decade immediately following the retirement of Waters in 1949, to the establishment of the modern techniques for anaesthesia for major surgery, as we know them today.<sup>37</sup> It is true that Waters had a conservative attitude to the value of curare. He regarded it as a useful supplementary muscle-relaxing agent which could be used while the patient breathed spontaneously.<sup>38</sup> This view was shared by most of his contemporaries in both the United States and the United Kingdom in the nineteen forties and early fifties, including Harold Griffith of Montreal who had introduced the drug to anaesthesia in 1942.<sup>39</sup>

### **The visit of Ralph M Waters to the United Kingdom in 1936**

Ralph Waters paid a visit to the United Kingdom in 1936.<sup>1,40</sup> His British colleagues were captivated by his charming manner and received him with adulation. This was not only because the academic department that he had established was still unique and the envy of all anaesthetists, but also because he brought with him experience of three clinical concepts which were not generally familiar to anaesthetists in the United Kingdom at that time. These were the use of cyclopropane, the value of carbon dioxide absorption and the employment of controlled ventilation in the apneic patient.<sup>42,43</sup> He lectured at the British Medical Association meeting at Oxford, where he also gave a memorable demonstration of cyclopropane, and also at the Royal Society of Medicine.<sup>1,40</sup>

### **The influence of Waters on anaesthesia in the United Kingdom 1936-1949**

Robert Macintosh had visited Waters in the early thirties, and went again when he was rather unexpectedly elected to the newly endowed Nuffield Chair of Anaesthetics in the University of Oxford in 1937. He went on to visit Rovenstein, an early trainee of Waters who had

established an academic center in New York on the Wisconsin pattern. Macintosh subsequently incorporated many of the ideas conceived by Waters in the organisation of the new department in Oxford.<sup>3</sup>

Michael Nosworthy of St Thomas' and The Brompton Hospital visited Waters in 1938.<sup>26,31,32</sup> He became convinced of the value of controlled ventilation with cyclopropane for thoracic anaesthesia.<sup>31,32,41-43</sup> He had ample opportunity to use the technique in 1940 on air raid casualties and wounded soldiers evacuated from Dunkirk, and in 1941 he delivered his classic paper on 'anaesthesia in chest surgery with special reference to controlled respiration with cyclopropane' at the Royal Society of Medicine.<sup>31,32</sup>

There was considerable and powerful resistance on both sides of the Atlantic to the use of such a revolutionary technique as elective controlled respiration with cyclopropane.<sup>44,45</sup> However, the technique paved the way for the introduction and ultimate general acceptance of the modern triad of controlled ventilation with nitrous oxide and oxygen, with respiratory muscles paralysed by neuromuscular blocking agents, as promulgated by Cecil Gray of Liverpool, England in the decade following the retirement of Waters in 1949.<sup>37,43</sup>

### **Anaesthesia in the USA and UK at the time of the retirement of Waters in 1949**

At the time of the retirement of Waters his work promoting the establishment of training and academic anaesthesia in the leading university medical schools of the United States was beginning to bear fruit, as his trainees went forth from Wisconsin to found new academic centers.<sup>1,29,30</sup> However, there was a long way to go before physician anaesthesia, or even physician-controlled anaesthesia, became fully established in the USA. In 1948, shortly before his retirement, Waters wrote a paper for the benefit of the 'occasional anesthetist'.<sup>46</sup> The general medical practitioner in small towns in provincial USA was obviously still of considerable concern to him.

In the United Kingdom in 1948 with the introduction of the National Health Service (NHS) the specialty was about to enter the era of complete physician anaesthesia with consultants in the NHS enjoying full parity with those of other disciplines. It is nonetheless a sobering thought that in 1948 there was only one professorial department in the United Kingdom.<sup>24</sup>

### **Conclusion**

The modern academic anaesthesia center that Ralph Milton Waters MD FFARCS(hon) had the vision to found and develop at the University of Wisconsin between 1927 and 1949 was the first in the world. It remained unique in the United States until the middle of the nineteen thirties. A number of those whom he trained thereafter founded departments based on the Wisconsin pattern both within and outside the United States.

The detailed organisation of the first academic professorial department to be founded outside the United States, the Nuffield Professorial Department of Anaesthetics at the University of Oxford, England, owed much to visits paid to Wisconsin by its first Professor Robert Macintosh, and his friendship with Waters.

Teaching, careful basic and clinical research, record keeping, and the clinical application of new techniques were features of the anaesthesia center at the University of Wisconsin headed

by Waters in the nineteen thirties and forties. These contributed very significantly to the basis on which the revolutionary techniques of modern anaesthesia were developed in the United States, the United Kingdom and elsewhere in the world, in the decades following his retirement in 1949.

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In the late nineteenth-century, American anaesthesia practice began a slow and difficult transition from its status as a stepchild of surgery to an independent medical specialty. The early decades of this change paralleled the growing professionalism of clinical medicine and medical education in the United States after the Civil War. In 1869, the first academically affiliated hospital opened at the University of Michigan. During the 1870s, Harvard University President Charles Eliot brought reforms to the medical school there. Johns Hopkins opened its medical school in 1893 with its model of serious basic science instruction and extensive clinical experience. The American Medical Association set up a Council on Medical Education in 1904. Yet these and other positive developments could not prevent Abraham Flexner's devastating 1910 report on the generally sorry state of American medical education.<sup>1</sup>

The Flexner report's effects on American medical education were profound. In 1910 some 148 medical schools operated in the United States; by 1919 that number had fallen to 85. Many of the marginal proprietary schools that Flexner criticised so harshly did not survive his report. A similar reduction in medical students also took place - from 21,526 in 1910 to 12,930 in 1919. Greene has argued that medical education standards that were developed after Flexner's report did not allow easy access by new disciplines such as anaesthesia. Since physician anaesthesia in America was so rare in 1910, decades would pass before the specialty could establish itself.<sup>1</sup>

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Early in the twentieth century a profession of anaesthesiology did begin to slowly emerge in the United States. In 1905 G A F Erdmann and three other physicians founded the first anaesthesia organization, the Long Island Society of Anesthetists. Six years later, the Society combined with a group from Manhattan to form the New York Society of Anesthetists. An anaesthesia supplement to the *American Journal of Surgery* began publication in 1914 and continued until 1926. Edited by F H McMechan, this supplement was the first regularly published item devoted to the specialty. McMechan and J T Gwathmey founded the American Association of Anesthetists in 1919. McMechan also began the world's first anaesthesia journal, *Current Researches in Anesthesia and Analgesia*, in August 1922. These and other developments served as prelude to the arrival of Ralph Waters in Madison, Wisconsin, in 1927, and the creation of the first academic department of anesthesiology in the United States.

The poor quality of much anaesthesia administration had been noticed before the American Civil War, and less than two decades after Morton's public demonstration in Boston. In 1859, one physician noted: 'In some cases Dr M had seen chloroform administered by young gentlemen, rather in a careless manner .... In fact, he believed that most of the fatal cases can



be traced to a careless administration of the remedy'.<sup>2</sup> Many anecdotes can be found in the medical literature that illustrate the stepchild nature of anaesthesia administration in the US after the Civil War. In April 1875, Dr W A Bradfield of East Pascagoula, Mississippi, was attending a pregnant patient: 'Every thing seemed to be perfectly natural, and nothing wanting but a few good pains. I had scarcely finished my examination when she was seized with another violent convulsion, which seemed to cause every muscle in her body to become perfectly rigid. I then chloroformed her, and instructed the midwife how to keep her in that condition until I could go to my office and get my instruments and more chloroform'.<sup>3</sup> This kind of on-the-spot training of any person available seems to have been the norm in both hospital and home settings in the second half of the nineteenth century. Midwives, first-year medical students, husbands, chauffeurs, and inexperienced general practitioners were all pressed into service to administer anaesthesia.

### Concern about anaesthesia practice

However, by the early 1880s some physicians were committing to print their concerns about anaesthesia practice. These observations generally fall into three broad areas:

1. anaesthesia is complex, often risky to the patient, and poorly administered;
2. trained specialists should administer anaesthesia;
3. anaesthesia training should be part of the medical school curricula.

One of the earliest physicians to make the case against the anaesthesia status quo was New Yorker F D Weisse: 'Had I the power to make and enforce law, I would make a law forbidding the administration of any anaesthetic, except by or in the presence of a regular graduated doctor of medicine or dental surgeon. The majority of those who are today giving nitrous oxide are mere amateurs .... who understand but little of the practice and less of the theory of anaesthesia'.<sup>4</sup>

By the early 1890s concerns about anaesthesia appeared regularly in the medical literature. 'There is a decided tendency among the older members of the profession', W L Coplin observed in 1892, 'to have a medical student administer the anaesthetic. .... For my own part, were I to undergo an operation of any gravity ... I should prefer that the student do the operation and that the surgeon administer the anaesthetic'.<sup>5</sup> Coplin, a surgeon by training, spoke from experience; he had spent more than five years administering anaesthesia at the Jefferson Medical College Hospital in Philadelphia and to the private patients of various surgeons and gynaecologists in that city.<sup>5</sup> In 1898 the *Journal of the American Medical Association* editorialised about the 'indifferent' anaesthetist:

'When the patient is under, the anesthetist, who has given ether two or three times, wishes to demonstrate to the assembled students and spectators his entire familiarity with etherization by indifferently gazing around the room or at the field of operation, or he exchanges jokes with a bystander. This is essentially wrong and it is a wrong to be corrected by the operator himself. No operator should permit any man to administer his anesthetics unless he is competent to do so and willing to direct his undivided attention to the patient.'<sup>6</sup>

Poor payment for anaesthesia services concerned some commentators: 'For the operator to charge \$100 or \$200 for performing a simple uncomplicated operation and give the anesthetizer \$5 for conducting a difficult and complicated anesthesia ... is an injustice which is not calculated to increase the number or efficiency of anesthetizers', complained Galloway of Chicago in 1899. Yet poor pay was not the only problem; contempt by some surgeons for anaesthesia administration seems to have also been common. 'A patient', wrote Galloway, 'requested that the most experienced anesthetizer available be obtained. The surgeon informed the patient that that would cost \$25 additional, and the patient said he would gladly pay it. The surgeon employed a student to give the anesthetic, collected \$225, gave the student \$5'.<sup>7</sup>

### Further criticism

After 1900, criticism of the quality of American anaesthesia practice intensified. Heinick warned in 1901: 'Never should the surgeon administer chloroform or ether, and operate at the same time. It is false economy. There is no scarcity of physicians. It is unsafe. Deaths have been caused by this practice.'<sup>8</sup> Apparently that practice was still common enough in 1901 to provoke comment. Seven years later Roberts published an article with the alarming title *The Anesthesia Peril in American Hospitals*.<sup>9</sup> In that article he noted:

'During a recent visit in a metropolitan medical centre I was shocked at the reckless manner in which general anesthetics were given. Observations during my surgical life in some ten or more hospitals .... has convinced me that a protest against the methods ... is urgently needed'.

In the same year Baldy stated flatly:

'The general administration of anesthetics as performed today is the shame of modern surgery, is a disgrace to a learned profession, and if the full, unvarnished truth concerning it were known to the laity at large it would be but a short while before it were interfered with by legislative means'.<sup>10</sup>

In 1910 two other critics continued these themes. 'Yet the majority of doctors treat anaesthetics lightly', wrote Porter, 'and some delegate the giving of chloroform in obstetrics to the husband or the nurse while they use forceps in the delivery. Is there anything in the practice of medicine where we are as careless as in this one of anesthesia?'.<sup>11</sup> In that same year, Barnesby published a book with the alarming title *Medical Chaos and Crime*, which contained such chapters as 'The surgical novice' and 'The amateur anaesthetist'. In that latter chapter, he wrote: '... and though [America is] the birthplace of modern anesthesia, the discovery of which has brought relief to countless thousands, we permit the administration of anesthetics by any Tom, Dick or Harry who can be pressed into service'. Barnesby further noted: 'Were a public investigation called for at the present time, the employment of trained anesthetists, or the adoption of adequate measures for the safety of the patient, would be found to be the exception rather than the rule'.<sup>12</sup> Despite the passage of almost three decades, the situation was little improved from Weisse's conclusions in 1882.

## Specialist Anaesthetists

By 1900, numerous nurse anesthetists worked in the United States; many of them were nuns in Catholic hospitals. Also by that date a few physicians were making anaesthesia a significant if not complete part of their practices. Thomas D Buchanan<sup>13</sup> and Thomas L Bennett began practice in New York City in 1899; S Ormand Goldan began practice in that city the following year.<sup>14</sup> Just three years earlier the *Medical Record* of that city had declared: 'So far as we are informed in the matter, there exists in this great city no physician who makes a specialty of administering anesthetics. There would seem, however, to exist a demand in that direction'.<sup>15</sup>

## Role of American Medical Association

As early as 1891 the *Journal of the American Medical Association* had editorialised about physicians and anaesthesia administration: 'That the administration of an anesthetic by a physician for any purpose whatever, except in obstetrics and cases of emergency, without the presence of another physician, when such can be procured, is to be condemned', the editorial stated: 'In a large city like Indianapolis, where the services of an expert in anaesthesia can always be procured, the physician who does not avail himself of such services should be held to a strict accountability for any disastrous results that may occur'.<sup>16</sup>

Some physicians expressed the need for professional anaesthesia services and noted the drawbacks at the same time. 'An excellent solution of the problem, and what ought to be the desideratum of every surgeon, would be the professional anesthetist', wrote Simon in 1898, 'It is doubtful, however, whether one taking the work up as a specialty could make a living at it alone; and especially is this true in the smaller cities'.<sup>17</sup> J Montgomery Baldy of Philadelphia echoed this argument eleven years later. He argued that physician anaesthetists were 'a perfect solution', but went on to note the lack of such medical men due to 'the disadvantages of the scientific narrowness and lack of opportunity for distinction and income to hold a sufficient number of men of this type'.<sup>18</sup> Baldy used this conclusion to argue for nurse anaesthetists as the best practical solution to the need for specialty anaesthesia training.

Critics of anaesthesia practice at this time noted the complexity of anaesthesia and the importance to the anaesthetist of the condition of the patient: 'The position of the anaesthetist is not an easy one. Upon him depends not so much the success of the operation (for every operation is successful and beautiful even though the patient die), but the recovery of the patient', Simon noted.<sup>17</sup> More than twenty years later the great surgeon Frank Lahey made the same argument for professional anaesthetists.

'In our opinion, there exists no more forceful argument in favor of the regular employment of a trained anesthetist than the fact that once the operation is under way, the responsibility as to whether the patient is going to be able to endure the complete procedure is almost entirely in the hands of the anesthetist'.<sup>19</sup>

Lahey supported physician anaesthesia and over the years hired Drs Lincoln Sise and Philip D Woodbridge to administer anaesthesia for his clinic.

In 1912 a Committee on Anesthesia made its report to the American Medical Association's House of Delegates. Chaired by Dr Yandell Henderson of Connecticut, the five member

committee stated forcefully: 'Anesthesia should cease to be regarded as merely an adjunct of surgery .... It should be in charge of those whose principal aim is, not to see as much of the operation as possible, but to administer anesthesia in such a manner as to bring the patient through with the least possible loss of vitality'.<sup>20</sup> Coming just two years after Flexner, this report had little effect on anaesthesia practice but did put the AMA on record as supporting its improvement.

## Education

Some early writers declared the need for better education in anaesthesia. 'As the success and progress of surgery depend in a large measure upon the safety of anesthesia, it is evident that too much study can not be given to this subject', Heinick wrote in the 1901 edition of his textbook. 'An operation may be practically devoid of danger, while an anesthetic is never administered without imperiling the life of the patient'.<sup>21</sup> Eight years later, Peterson was even more explicit:

'For some years past I have felt that we were not doing our duty toward the undergraduate in sending him forth upon his life's work with little or no experience in the practical administration of anesthetics', he wrote, 'it is only by such a systematic course of instruction in the theory and practice of administering anesthetics that we can ever hope to deal with the problem we have under consideration. The faculty of the department of medicine and surgery of the University of Michigan have only this spring placed themselves on record in favor of such a course ...'.<sup>22</sup>

As we have noted, a number of physicians lodged serious complaints about the quality of anaesthesia administration in the United States in the forty years between about 1880 and 1920. These physician-authors also declared the need for specialists trained in anaesthesia - especially physician anaesthetists. By 1920 little had changed, the same complaints echoed across the decades. Some physician anaesthetists were practising, and societies and journals were beginning to meet and publish. Even at this early date observers of the situation had a positive vision of things to come:

'A word as to the future of anesthetization; instead of the haphazard methods of administering anesthetics they will be properly taught by those competent to teach ...'.

wrote Goldan, the New York City physician anaesthetist, in 1901:

'The anesthetist will not be considered a mere satellite of the surgeon, but recognized as one of a distinct class. There will be an incentive to men to give their best energies to the perfection of anesthesia'.<sup>14</sup>

## R M Waters

In 1919, early in his career, Ralph Waters published an article which expressed his similar positive vision for the future of anaesthesia:

'No more is the occasional necessity for a layman or a nurse to administer an anesthetic an argument that we physicians should not fit ourselves to do the best work that can be done in that line and help to develop the science, to make it better',

he wrote,

'I wish especially to appeal to the physicians...in every town who occasionally give anesthetics, to wake up, get busy, and make anesthesia a part or all of your business. Do it the best you know how every time you officiate at the head of the table. Learn all there is to find out about it, and help the rest of us to do it better by adding to the developments already made.'<sup>23</sup>

Eight years later Waters was invited to Madison, Wisconsin, by Chief of Surgery Erwin Schmidt to establish an academic anaesthesia programme at the medical school. The programme he started, and the programmes started by many of his trainees, finally provided a mechanism to address some of the problems with anaesthesia practice so many physicians had noted for so long.

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## A STRANGE LITTLE BOOK (ABSTRACT)

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The details of James Young Simpson's 'Chloroform Dinner Party' on 4 November 1847 are well known. The later life and contributions of one of those first anaesthetised on that day, James Mathews Duncan, deserve more notice. He is well known to our obstetric colleagues as he was appointed Physician for Diseases of Women at the Royal Infirmary in Edinburgh at this time. He here developed an extensive practice both public and private, became a renowned teacher and helped to found the Royal Hospital for Sick Children. On the death of Simpson in 1870, he was expected to succeed to the Chair, but he was not selected, and some 7 years later accepted the position of Lecturer on Midwifery and Diseases of Women at St Bartholomew's Hospital in London.

He continued to prosper and to make a name for himself as a great teacher and lecturer at Barts. In 1881 he became President of the Obstetrical Society and two years later was elected a Fellow of the Royal Society. On his death in 1890 even Queen Victoria wrote to his widow with her personal condolences.

St Bartholomew's has many items of memorabilia relating to his time there, but a recent discovery of a little book in the basement storeroom of the Medical Library is perhaps of interest to anaesthetists. The volume is entitled *Mathews Duncan - J Y Simpson*. Inside is a set of papers relating to these two men. These include 'Notes on the inhalation of sulphuric ether by Simpson', 'Newspaper account of the Simpson Centenary *Daily Telegraph* 7 June 1911', 'An account of the election of the Professor of Midwifery in Edinburgh in 1840', and of particular interest, a letter to Duncan in Paris dated 28 February 1847 extolling the use of ether in midwifery written by Simpson. This letter is unknown to date to my knowledge, and the origin of this little privately bound book is probably part of the papers donated by the family to St Bartholomew's some time before 1950.

The Bart's archive also contains a folder containing a 135 page typescript written by James' eldest sister, Isabella. In this paper, written for his family after James' death, she suggests that James was the first to try the effects of inhaling chloroform whilst he was working as an assistant to Simpson. He realised its anaesthetic properties and brought these to the attention of Simpson, who then rediscovered them at the famous dinner party. Isabella suggests that James Mathews Duncan was disappointed that Simpson took all the credit for the discovery. This story is supported in part by a letter, also in this collection, from Duncan to Sir Robert Christison that recounts his personal recollections of the events surrounding the discovery. It is likely that James Mathews Duncan is the true discoverer of the anaesthetic properties of chloroform.

***The article relating to this abstract has been accepted for publication in Anaesthesia. This abstract is published with the agreement of the Editor.***

## JUNKER

Dr C Mulnier, Suffolk and Dr D Zuck, Past President, HAS

### Early years

Ferdinand Ethelbert Junker von Langgeg was born in Vienna on 7th July 1828. He was the son of a distinguished Austrian District Administrator, who was awarded the Austrian honorific in 1862 for services to the country. There is some confusion regarding the spelling of the 'von Lauggeg' that this award added to the family surname. There are several small places in Austria called Langgeg, and the honorific would have added a place name to the existing surname, but there is no place called Lauggeg in Austria.

For the purposes of this account the spelling that Junker himself used will be employed.

Junker studied medicine at the University of Vienna from where he graduated MD in 1854. He obtained additional post-graduate qualifications in the following year in obstetrics (MA), surgery (DocChir) and ophthalmology (MA). His initial practice was as assistant surgeon with the 1st Light Dragoons in Austria. He then moved to London towards the end of the 1850s.

He obtained the MRCS England in 1860 and set up in practice at 56, Gower Street near the homes of Boott and Robinson. He made his first entry in the *Medical Directory* for 1862. By 1865 he was a member of the Obstetrical Society of London. He moved to 40 Woburn Place in 1865, 36 Mount Street in 1867 and 31 Somerset Street in 1869. Back home in Austria the Seven Weeks War of 1866 resulted in victory of Prussia over Austria. Meanwhile Junker had been appointed physician to outpatients at the Samaritan Free Hospital for Women and Children at 18 Edwards Street, Portman Square. This was a busy outpatient department for the 20-bedded hospital where Sir Thomas Spencer Wells and Sir William Fergusson also worked. Junker remained on the staff list at this hospital until 1871.

### The Junker Inhaler

Junker devised a chloroform inhaler that was the first to employ the blow-over principle. He described his apparatus in the *Medical Times and Gazette* in November 1867.<sup>1</sup> It was designed for the administration of chloroform, chloromethyl or a mixture of the two. It consisted of hand bellows connected via flexible tubing to the lowest part of an airtight, graduated glass cylinder containing the anaesthetic liquid. Gentle pressure on the hand bellows drove air through the volatile anaesthetic. Air containing anaesthetic vapour then travelled via further flexible tubing from the top of the glass cylinder to the mask and thus to the patient. The glass cylinder sat in a non-conducting stand lined with velvet to prevent the chloromethyl from boiling when used in a hot room. A chamber at the apex of the mask, at the entry point of the connecting tubing, was designed to prevent freezing of the tubing when in use. This chamber also had an adjustable side opening to admit additional airflow when chloroform was used. The mask was fitted with an expiratory device to allow discharge of expired gases. The amount of anaesthetic administered could be regulated by altering the pressure applied to the air bellows. The device was manufactured by Krohne and Sesemann and was easily portable. It was known as the Junker.



The Junker enjoyed many years of vogue. Indeed, it was the preferred device of Sir Thomas Spencer Wells for administering an anaesthetic. There was a risk of wrongly assembling the Junker which allowed delivery of liquid anaesthetic directly to the patient with fatal consequences. Various modifications were made to it over the years by, amongst others, Frederick Hewitt, Dudley Buxton and Carter Braine. It was used in improved form until at least 1927. Unfortunately, in that year it was associated with the death of a patient through misconnection of the device and it fell out of use after that.

## Travels

Junker moved to Germany in 1870. The Franco-Prussian War took place in 1870-1871, and during that time he was chief physician and director of the English Hospital at Saarbrücken. In 1871 he visited von Langenbeck's department, and witnessed the use of the Trendelenburg tube or tracheal tampon to isolate the airway via a tracheostomy, and avoid tracheal soiling during laryngeal and maxillo-facial surgery. He described his observations in the *Medical Times and Gazette* in 1872.<sup>2</sup>

In the autumn of 1872 Junker moved to Japan. Japan had undergone a radical transformation with the Meiji Restoration of 1868.<sup>3</sup> Restoration leaders aimed to modernise Japanese society, and instituted an economic and social revolution that was to overthrow centuries of rule by the warrior class in favour of direct imperial rule. A universal education system was established. The Japanese government looked to Germany for medical knowledge, since German medical practice was widely regarded as the most advanced of the time. There was a shift from Oriental to Western medicine, and in order to promote its efforts at reform the Japanese government hired German doctors to teach at the newly created medical schools. Thus Western medicine was taught to Japanese students for the first time in a systematic and detailed fashion.

Junker became director of the new medical school at Kyoto<sup>4</sup> and took up his post in September 1872. He lectured in anatomy, obstetrics and pathology, later taking on medicine, therapeutics and basic sciences. He became interested in Japanese culture<sup>5</sup> whilst in Kyoto and wrote a Japanese anthology entitled *The Healing Grain of Rice*, a collection of stories, fables and legends called *Japanese Teatime Stories* and several essays on Japanese theatre and painting. Unfortunately, although his contract had been renewed until 1878, Junker was dismissed from his post in Kyoto as a result of difficulties he had with his colleagues, students and the town council. He left in 1876.

## Later life

Very little is known about Junker's life after this, but it is known that he was living in Leipzig in 1880 and was back in London by 1882. He changed his address in London on many occasions between 1882 and 1900. During the 1880s he translated various works by the Austrian surgeon Theodor Billroth from German into English, and a book by Sir Thomas Spencer Wells called *The Modern Chirurgery of the Lower Body* from English into German. It is thought that Junker died between 1900 and 1902 because his name no longer appeared in the *London Medical Directory* after 1901, but there was no obituary for him and no will was realised. It is strange that such a distinguished member of the medical profession should apparently disappear without trace. Various ideas have been proffered concerning his last years. The most entertaining of these, which is purely speculative and is intended to amuse,

not offend, considers the man that police in London were hunting from 1888. They sought a military man with knowledge of anatomy. A man able to silence his female victims and remove their internal organs with surgical precision. Of course the only evidence that Junker was actually Jack was that he lived in London at the time!

Whatever became of him, Junker was a talented and innovative man and his invention made him one of the forefathers of anaesthesia.

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## KROHNE AND SESEMANN: AN EARLY CEPOD

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### Introduction

In 2001 a handwritten tome and several advertisement leaflets for anaesthetic equipment dating from 1903/4 were donated to the Association of Anaesthetists of Great Britain and Ireland (AAGBI). The depositor's great-grandfather, Henry Frederick Sesemann and his half brother, Charles William Krohne, had, one hundred years ago, been in business together, manufacturing and selling medical equipment. The hand written artefact was the work of Charles Krohne, and represents what appears to be an attempt to record the details of all deaths associated with anaesthesia throughout the UK between the years 1903-1904. The enormity of the task, and the attention to detail of the work represents a unique resource, and is the subject of this paper.

### The document

The document is handwritten, with an unusual page layout. The left-hand side contains transcribed passages from anaesthetic texts published around the turn of the 20th century. The pages quote verbatim selected sections from the texts *Anaesthetics and their Administration* by F W Hewitt and also *The Anaesthetist's Pocket Companion* by Robert Marston (1899). These were clearly of interest to the author but the reason for the time consuming transcription is not clear in the document itself. Several pages between the quoted texts contain details of publications in the *Lancet* around the year 1873, centred mainly around deaths under anaesthesia.

The right hand pages of the opened document contain collected details of anaesthetic related deaths in the United Kingdom between the years 1903 and 1904. The surgical procedure, anaesthetic technique, events leading up to and occurring at the time of death of the patient are recorded, along with comments from the coroner involved in the inquest. Forty-eight deaths under chloroform anaesthesia are reported, five under ether, three under chloroform/ether, two under Somnoform, one under ACE and three with no agent mentioned. The high proportion of the total represented by chloroform deaths is of particular note as the document just precedes the chloroform investigations of the early twentieth century. The total number of operations and procedures facilitated by anaesthesia over this period is unknown and indeed, the denominator remains a critical point in mortality reports up to the present day.

Interspersed between the text quotations on the left-hand pages are sets of figures relating to specific anaesthetics administered by named practitioners, with flow rates, quantities used and duration of procedure. The detail is such that the same anaesthetic could be administered today. There are also transcripts of letters received by the author from individuals using the equipment manufactured by the company, mostly complimentary in nature. The content of the quoted texts on the left-hand bears no relation to the documented deaths on the right-hand pages. Listed in chronological order, the incidents and the coroners' reports are strikingly relevant to the practice of anaesthesia today.

## William Krohne

William Krohne not only produced equipment used for the administration of anaesthetics, but there is anecdotal evidence that he administered anaesthetics himself. Certainly the changes made to the anaesthetic equipment manufactured by the company reflect a high degree of insight into the art. Krohne and Sesemann were responsible for some of the early refinements of Junker's inhaler, including the feather indicator. From this vantage point, it is probable that Krohne recognised the reports as a source of extremely valuable information well before deaths under anaesthesia were formally recorded. Krohne's plans for the collection are unknown for he died in 1904 and the document contains no hint of his intentions.

This paper will put the document into its historical context and detail some of the unfortunate cases recorded in the diary. In doing so, it is hoped that some light will be shed on William Krohne, a man whose interest in anaesthesia led him to compile a comprehensive list of anaesthetic-related deaths for purposes which unfortunately will never be known. The paper will also highlight the short distance we have travelled over the last one hundred years, and confirm the importance of what is too easily regarded as a bygone era.

## Safety and early anaesthesia

Attention was correctly drawn to these early anaesthetic deaths as a result of public and media interest. The nature of anaesthesia for elective surgery is such that when serious complications arise, the focus is on the anaesthetic. After all, the anaesthetic was administered to an individual whose life was often not threatened by the surgical problem. During these pioneering years the knowledge of the pharmacological attributes of anaesthetic agents was slow to accumulate, and the physiological effects of the agents in man were not easy to interpret. The deaths tended to be unheralded and unexpected.

During the establishment of anaesthesia as a method of facilitating surgery, an agent was required which had an acceptable risk/benefit ratio. Chloroform was easy to administer when compared to ether, and despite the known complications of its use had strong support within the medical profession. Deaths were attributed to failure of adequate ventilation or comorbidity. Equipment used to administer anaesthetic agents was evolving, as it is to this day. Clover's Bag was cumbersome and, importantly, the capacity of the bags was not always exact; and the efficiency of the bellows used to fill the bags was variable<sup>1</sup> leading to unknown chloroform concentrations being administered. The original Junker's inhaler was prone to tipping, misconnection and, although the delivery of vapour was dependent upon the rate at which air was pumped through it, there was no regulation of airflow.

Krohne and Sesemann manufactured the original of Junker's inhaler; the design was reviewed subtly by Joseph Mills in 1878. In 1883, Krohne and Sesemann developed a model which delivered measured volumes of air through the device and had a hook for hanging the inhaler from the buttonhole of the anaesthetist. Krohne later developed the feather indicator over the expiratory valve. Designs with non-interchangeable tubing and safe delivery in any position were soon made available.

As co-director of a medical equipment company and (according to a typed note found amongst the documents with the diary) a regular administrator of anaesthetics, William Krohne had a vested interest in the safety of anaesthesia. He was also known to publish in the

medical press at this time under the nom de plume 'Pro Bono Publico', and it is possible that his relationship with the press facilitated the collection of the reports of anaesthetic deaths throughout the UK. It is likely that the reason for his compilation of anaesthetic deaths will remain obscure, but it could be suggested that he recognised the records as a useful source of information, which could be drawn upon to improve the safety of anaesthesia and the equipment manufactured by his company. Could this really have been the driving force behind the compilation of deaths? Improving the safety of administration of anaesthetics did not necessitate such an enormous task, as the medical profession was no doubt acutely aware of the improvements that could be made. It would be interesting to propose that Krohne was already publishing in the press, under his pen name 'Pro Bono Publico', and so meant to reveal these figures in some context, either in the medical or lay press.

### **History of mortality reporting**

It was not long after the administration of the first anaesthetics in America in the 1840s that the first deaths attributed to anaesthesia were reported. During the establishment of a method of providing anaesthesia to facilitate surgery, the actual surgical procedures were modest in size and, apart from the more urgent situations, tended to be performed on healthy individuals. Deaths in this context were by their nature disastrous and rightly attracted the attention of the public as well as those within the profession.

Surgical procedures were not performed in the dedicated settings one expects today (note the 'anaesthetic chamber' mentioned later). The ease of use of chloroform when compared to ether in these impromptu environments, and the apparent Royal seal of approval in the light of its administration to Queen Victoria 1853 made the drug a common anaesthetic agent during the latter half of the 19th century. However, concern was growing in the medical profession as the number of chloroform related deaths continued to rise.<sup>2</sup>

In 1864 the first chloroform investigations were set up by the Royal Medico-Chirurgical Society in reaction to the uncomfortably high rate of anaesthetic-related deaths. Problems with chloroform in particular were noted and recommendations included the use of an alcohol - chloroform - ether mixture. The use of chloroform continued, although other agents were being sought. In 1877 the Glasgow Committee led by Professor Lister enquired into the use of various anaesthetic agents. Chloroform was again suspected as the cause of a disproportionate number of deaths. A number of series reviewing anaesthetic deaths were published in the medical press during the end of the nineteenth century,<sup>2</sup> each highlighting problems associated with chloroform. The results of the first and second Hyderabad Chloroform Commissions, in 1888 and 1889 respectively, were used by Surgeon-Major Lawrie to add support to the use of chloroform and his status within the profession added weight to his claims.

It is worth noting that whilst these investigations and committees were collecting their data, the busy chloroformist continued his daily activities, with improvements in the safety of his anaesthetic equipment cropping up all the time. It can be seen that the chloroformist would interpret these safety improvements as a vote of confidence in the agent itself. Administration techniques of chloroform anaesthesia were becoming more exact and makers of anaesthetic equipment were striving to improve the safety of their devices. Surely the agent itself was relatively safe when used by a skilled practitioner with safe, modern equipment? It is in this environment that Krohne himself would have worked and developed his products.

The British Medical Association set up its own anaesthetic commission in 1891. It noted that chloroform remained the most widely used agent and that it was associated with the highest number of deaths attributable to the anaesthetic. The Special Chloroform Committee of the BMA was formed in 1901, producing a report nine years later suggesting that limited doses of chloroform (maximum of 2%) were acceptable, and so the use of chloroform persisted. In 1912 the Committee on Anesthesia of the American Medical Association stated that the use of chloroform for major operations was 'unjustifiable' and the agent, already less popular across the Atlantic, was withdrawn. Unfortunately, the use of chloroform in the UK continued well into the twentieth century. The reasons behind this are extremely interesting and thought provoking but lie beyond the remit of this paper.

### **A compilation of anaesthetic related deaths by William Krohne**

In the first few years of the twentieth century the world was no less exciting and colourful than the world in which we find ourselves today. The state funeral of Queen Victoria would have attracted the same media and public interest as any recent Royal events, and no doubt Victoria's death was recognised as the end of an era that would never be repeated. Marconi transmitted the first radio message across the Atlantic Ocean, and in the USA President William McKinley was assassinated. In 1900 the Boxer rebellion was thwarted in its attempt to oust the 'foreign devils' from China, and the Paris International Exhibition included a demonstration of the first escalator and, equally useful, the paper clip was invented.

Anaesthesia for surgical procedures at this time was not new, nor was the media interest in deaths of patients whilst under the care of physicians. As would be the case today, an anaesthetic-related death would be reported, certainly in the local press. There was, however, no formal reporting, and review of these deaths within the profession would have been limited. It is a surprise, therefore, to discover a document containing what appears to be an attempt to compile a complete record of all anaesthetic related deaths in the years 1903 to 1904 by a non-medical man.

The nature of the actual document has already been revealed. As previously discussed, it is probable that Krohne's contacts with the press would have given him the means by which he could gather the information. This should not detract from the fact that such a task must have taken a huge amount of time and effort, particularly for a man in his seventies at the end of his career. The timing and wording of the last few records suggests that the author had been working retrospectively and had 'caught up' during the summer of 1904.

To illustrate the scope of the work, five deaths under anaesthesia recorded in the document and local to East Anglia, are described. The cases highlight several issues, all of which remain pertinent to the practising anaesthetist today.

### **Cases extracted from the Krohne Record of Anaesthetic Related Deaths**

Case 1 - 9 April 1903, reported in the *Eastern Daily Press*. The patient was a 13 year-old female attending the West Norfolk and Lynn Hospital for the removal of tuberculous glands from the neck. The anaesthetic used was chloroform mixed with alcohol. Near the end of the procedure the patient 'showed signs of heart failure', then as she was regaining consciousness, had a form of 'convulsive spasm and died without any warning being given'. This description is typical of the deaths associated with chloroform use. The patient was

young, the depth of anaesthesia required for the procedure was not deep, nor was the procedure long. Lawrie's pariah dogs were not prone to ventricular dysrhythmia whilst under chloroform anaesthesia but unfortunately man and other species have that tendency: 'a well established clinical fact cannot be disproved by any amount of experiments on animals' - Wood and Hare, *Medical News* (Philadelphia, 22nd Feb 1890).

Case 2 - 23 July 1903, reported in the *Daily News*, St Georges'. A 7 year-old boy underwent an anaesthetic on 11 May for tooth extraction. The anaesthetic used was nitrous oxide. It is recorded that there was difficulty during the procedure, although the exact nature of the problem is not mentioned. The boy died during the operation and the coroner, Dr Friedberger, is quoted as saying: 'the post-mortem examination showed that the windpipe was compressed by the enlarged glands. The boy was a quite unsuitable subject for an anaesthetic'. The jury are recorded to have said that the deceased should have been examined before the anaesthetic was given.

In 1982 Lunn and Mushin<sup>3</sup> emphasised that the failure of the anaesthetist to visit the patient pre-operatively, failure to keep records, and lack of communication between surgeon and anaesthetist were common themes in the 3,736 deaths reviewed in *Mortality Associated with Anaesthesia*.

Case 3 - 25 July 1903, reported in the *Bury Guardian*. A 64 year-old man had undergone at least two procedures under chloroform anaesthesia earlier in the year at the Bury Infirmary. He had returned to the hospital as an out-patient where he was given 'morphia' to ease his symptoms. He returned the next day, complaining that the analgesic was 'too strong'. He underwent a procedure under chloroform anaesthesia on the same day. It is recorded that the patient rapidly stopped breathing, to the surprise of the practitioner who felt 'the chloroform was properly administered'. The patient died. The surgeon 'did not perceive anything wrong with the deceased until the operation was finished'.

The use of chloroform in a morphinised patient, particularly an opiate sensitive individual, would indeed precipitate respiratory arrest. This example highlights the paucity of pharmacological knowledge at this time, and also the lack of airway management skills. The method of anaesthetic application is readily defended but no mention is made of the fact that the patient died of an easily reversible cause.

Case 4 - 12 September 1903, reported in the *East Anglian Times*. A 30 year-old farm labourer was to undergo a hernia repair at the West Suffolk Hospital, with chloroform as the anaesthetic. Whilst in the 'anaesthetic chamber' the patient's pulse was felt to 'fall off', the surgeon was called to join the doctors in the chamber and all three attempted to resuscitate the patient for half an hour before death was pronounced. It was commented that the patient may have had an alcoholic tendency.

The first point of interest is the recognition that the history of alcohol abuse may have had a role to play in the outcome of the anaesthetic. The exact mechanism by which the alcohol abuse led to the adverse outcome would not have been known. The second is the use of the term 'anaesthetic chamber' which has not passed into common use.

Case 5 - 19 September 1903, reported in the *East Anglian Daily Times*. A 5 year-old girl died during a second operation for drainage of an abscess at the Colchester Infectious Diseases

Hospital. The anaesthetic was again chloroform. Classically, the operation was said to be a 'slight one'. The jury expressed the opinion that 'notice of the second operation should have been given to the parents'.

The issue of consent to perform a procedure remains pertinent, and in particular the issue of consent for an anaesthetic. In this case the doctors involved acted in the interests of the patient and presumably having conducted the procedure once, felt a repeat procedure would carry no extra risks. The fact that the jury raised this particular issue suggests that even in 1903, the public were sensitive to the paternalistic approach of the medical profession, and wanted to be better informed and involved in any decision making that was to be made.

### **Recent mortality reporting in the United Kingdom in the 20th century**

The theme of mortality reporting has continued, and indeed gathered pace in the late 20th Century. Whilst the *Confidential Enquiry into Maternal Mortality* commenced in 1952, a Committee of Investigation along similar lines was appointed by Council of the Association of Anaesthetists of Great Britain and Ireland in November 1949,<sup>4</sup> the aim of which was to compile and comment on anaesthetic-related deaths that were submitted voluntarily by senior anaesthetists. The results were published in the Association's journal each year from 1949 to 1952 with a summary of 400 cases appearing in 1952. The early conclusion was that the compilation was a useful source of information and anaesthetists were encouraged to co-operate.

Details of approximately 1,000 deaths associated with anaesthesia were reported between 1949 and 1955. Five hundred and ninety eight were deemed to be anaesthetic related, the details were analysed and the result published.<sup>5</sup> A further 600 were analysed and published<sup>6</sup> in 1964. Lunn and Mushin<sup>3</sup> published *Mortality Associated with Anaesthesia* in 1982 reflecting that there remain difficulties in studying anaesthetic-related deaths, as coroners and death certificates provide limited information, and the opinion of an experienced anaesthetist was rarely sought during the process of interpretation of the events leading to death.

The culmination of this trend has been the *Confidential Enquiry into Peri-operative Death (CEPOD)*, now an annual audit.

### **Summary**

This paper has introduced an important artefact that has recently come to light, comprising what appears to be a complete record of anaesthetic related deaths during the period between 1903 and 1904. The document was compiled during the early years of anaesthesia in the UK and represents a unique collection, containing details of anaesthetics given during this period as well as the events surrounding critical incidents that culminated in the deaths of 62 patients.

The plans the author may have had for this information are likely to remain obscure. Certainly the collection would have been an arduous and time-consuming task, but one which he felt was worthy of his efforts. Possible courses of action that may have been taken by him have been proposed. Irrespective of the fate of the data, it reflects on the man himself that he recognised the importance of the information, well before formal mortality reporting had been implemented.



The document is presently the subject of greater scrutiny and is likely to become an important resource in the future. Whilst this work continues, it is hoped that the current paper has whetted the appetite of those who have a particular interest in the early years of anaesthesia, and has highlighted the direct links we have with the past.

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**WILLIAM J MAYO, JOHN LUNDY AND *CLINICAL ANESTHESIA***  
**A textbook whose time had come?**

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In 1942, shortly after America had entered World War Two, John Silas Lundy, head of the Section on Anesthesia at the Mayo Clinic, completed *Clinical Anesthesia*. Published by W B Saunders, the textbook was 770 pages long, and covered all of what was then contemporary anesthesia. In many ways, the textbook mirrors Lundy's career.

### **Dr J S Lundy**

John S Lundy was born in 1894 in the rural community of Inkster, North Dakota. His father was a family doctor. Unfortunately, his father died when John was only 18 months old.<sup>1</sup> John was, however, strongly encouraged to study medicine by his father's physician colleagues. At age 16 years, he observed a demonstration of Heidbrink's gas machine being used in dental surgery and thus started his long interest in anesthesia. He did his pre-medicine studies at the University of North Dakota from 1913 to 1917. He began studying medicine in 1917 at Rush Medical College of the University of Chicago, where he undoubtedly came under the influence of Isabella C Herb. Dr Herb was an early physician anesthetist who was hired in 1899 to administer anesthetics at the Mayo Clinic. She left Mayo in 1904 and subsequently joined the medical staff at Rush Medical College in Chicago. She became chief anesthetist at Rush in 1909.<sup>2</sup> Lundy received the MD degree in 1919 and did an internship from 1919 to 1920 at the Harper Hospital in Detroit, Michigan. Because of his long interest in anesthesia, he was the intern with the most anesthesia experience at Harper hospital.<sup>3</sup> He thus gained additional expertise in administering anesthesia during his intern year.

Following the internship, Dr Lundy moved to Seattle, Washington in 1920 to begin medical practice. While visiting a medical building to arrange for office space rental, he was invited to administer an anesthetic the next morning. Dr Lundy eagerly accepted and thus began his practice of medicine in Seattle with the administration of an anesthetic.<sup>3</sup>

### **Mayo Clinic**

John Lundy was interested in medical politics and became active with the King County (Seattle) Medical Society. He was elected in January 1924 at a Medical Society meeting (by a single vote) to the office of Secretary.<sup>3</sup> At that same meeting, the guest lecturer was a well-known surgeon, Dr William J Mayo. By virtue of his new office, Dr Lundy was seated next to the guest speaker. Dr Mayo soon learned about Dr Lundy's experience with the new anesthetic ethylene.<sup>4</sup> Since ethylene was not being used at the Mayo Clinic, Dr Mayo invited Dr Lundy to travel to Rochester and share his ethylene knowledge. Dr Lundy arrived in Rochester shortly afterwards.<sup>1</sup> He spent the next 35 years at the Mayo Clinic, most of the time as Head of the Section on Anesthesia. He retired from Mayo in 1959. Dr Lundy returned to Seattle, and died there in 1973.<sup>5</sup>

John Lundy had a very productive career at Mayo Clinic. In his first year there, the young Dr Lundy decided 'to make one contribution to anesthesiology each of the 35 years which lay ahead of me'.<sup>4</sup>

Among his accomplishments were:

- established an anatomy laboratory (1927)
- established Anesthetists' Travel Club (1929) (currently extant as the Academy of Anesthesiology);
- used thiopental sodium clinically (1934)
- refrigerated citrated blood<sup>4</sup> (1935)
- established *Anesthesia Abstracts* (1937)
- established a Recovery Room at St Mary's Hospital in Rochester (1942)
- published textbook *Clinical Anesthesia* (1942)
- elected President of the American Society of Anesthesiologists.

Part of his enthusiasm for hard work was a result of his early years in rural North Dakota: 'On the basis of experience in the country and on farms I realise that one must plant several crops if one expects to have one real harvest each year. Hence, I have tried to keep five projects in anesthesia going all the time, hoping for one good harvest each year'.<sup>4</sup>

### **Relationship with Dr William Mayo**

Drs Mayo and Lundy shared a warm relationship. This was first evidenced by Mayo placing his arm around Lundy as they walked out of the Seattle meeting in January 1924.<sup>6</sup> Mayo would strongly support many of Lundy's ideas, including the anatomy laboratory for teaching surgical anatomy and regional anesthesia,<sup>7</sup> the Anesthesia Travel Club, and the writing of a textbook on anesthesia. In the preface of his textbook, Dr Lundy wrote: 'Eighteen years ago, at the suggestion of William J Mayo, I adopted the point of view that in my work I would not only meet the recurring emergencies and demands of the daily routine, but also I would accumulate an experience which, some day, I would pass on to others in print'.<sup>8</sup> Visiting faculty had often asked Lundy for a synopsis of his techniques.<sup>9</sup> He worked on this book for a number of years.

Mayo wrote the foreword to Lundy's *Clinical Anesthesia*, which remains an intriguing detail of the book. William J Mayo died on 28 July 1939. Thus the book was most likely being written for many years before its publication. Dr Mayo wrote: 'Among the workers who have contributed most to the whole subject of anesthesia, not only from the standpoint of research and experimentation but also from the standpoint of practical use of modern methods of anesthesia, is Dr. John S Lundy'.<sup>10</sup> Dr Lundy added a footnote to Dr Mayo's foreword: 'Dr Mayo was much interested in preparation of the manuscript of this book. He wrote this foreword after one of his many conversations with the author'.

## Lundy's *Clinical Anesthesia*

The timing of *Clinical Anesthesia* could not have been more advantageous. The United States Armed Forces needed anesthesiologists to care for the wounded in battle. At the time, there simply were not enough physicians to fill the need. In the textbook's preface, Dr Lundy wrote: 'Recently, because of the present emergency (World War Two), I was asked to modify the arrangement of the material in this book, to make it useful for military as well as civil use'.<sup>8</sup> Courses were arranged to train physicians across the United States by the National Research Council's Subcommittee on Anesthesia, of which Lundy was a member. In three months, the courses were 'to instruct medical officers ... in the fundamental principles and standard procedures in anesthesia ... to prepare medical officers to take charge of the anesthesia sections of the various types of hospitals of the U.S. Army'.<sup>11</sup> All basic aspects of anesthesiology were to be covered.<sup>12</sup> The textbook used, at least at the Mayo Clinic, was Lundy's *Clinical Anesthesia*. Illustrations in the book were made into glass lantern slides<sup>13</sup> and used in Dr Lundy's lectures. At the beginning of World War Two, most anesthesia providers in America were nurse anesthetists, and most of these were female. At that time women had limited value to the military in terms of drafting and posting.<sup>11</sup> These three-month courses were important to US military medicine.

There never was a second edition of Lundy's textbook. In his personal copy, he made extensive notes for corrections, additions and deletions. Each illustration is numbered, which corresponds with the original artwork.<sup>14</sup> With the war over, did Lundy feel that more revision was needed than he could undertake? Did W B Saunders find other textbooks more popular?

## Conclusion

In many ways *Clinical Anesthesia* denotes the high point of Lundy's career, and the fulfilment of one of his long held ambitions. William Mayo's strong support and enduring friendship with John Lundy was of large importance in the eventual publication of the textbook. The book undoubtedly helped many wartime US physicians to learn the basics of anesthesiology quickly. This type of book was very much needed at that point in time; its time had come.

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## ASSESSMENT OF RISK (Abstract)

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### Introduction

By the late 1930s, anaesthetists in the United States had come to recognise the need for a system to permit graded assessment of patient risk prior to anaesthesia and surgery. Adams and Lundy at the Mayo Clinic<sup>1</sup> and Saklad,<sup>2</sup> a member of a committee of the American Society of Anesthesiologists (ASA) from Connecticut, published their views in 1941. Saklad's system relied upon the patient's physical state at the time of surgery, a view which was ultimately incorporated in the ASA classification method.<sup>3</sup> Nevertheless, the systems proposed at the Mayo Clinic and by Saklad were not very different from one another.

At the Mayo Clinic, Lundy had by 1941 introduced his brief classification of operative risk:

1. Patients in such good physical condition that they will probably tolerate any anaesthetic agent well.
2. Cases of so-called average risk, in which the risk of the operation is greater than the risk of anaesthesia.
3. Patients for whom the anaesthetic agent must be selected with care since, owing to pathological conditions, the risk of anaesthesia is as great or greater than the risk of the operation.
4. Patients who are in such serious physical condition that the use of any anaesthetic agent is dangerous. For such patients, local infiltration may be used to control the pain, but only half the concentration and half the usual amount of solution should be employed.

This system took into account the risk of anaesthesia and the risk of surgery, in addition to physical state. Lundy emphasised the importance of pre-operative history taking and physical examination, and in addition drew attention to the importance of laboratory findings.

### Cardiovascular system

Lundy's commentary concerning 'general factors contributing to the patient's risk' are of interest, both for their relevance to contemporary anaesthesia practice and for their curiosity. In regard to the cardiovascular system Lundy was well aware of the dangers of heart failure: 'Cardiac insufficiency, if advanced and uncompensated, forms one of the gravest complications that the anaesthetist has to face'. Nevertheless, Lundy and his colleagues recognised that 'provided compensation is adequate and cardiac reserve is satisfactory, (patients) stand anaesthesia and operation remarkably well'. Lundy believed that 'risk increases in proportion to the extent with which the patient's activities are limited by the cardiac condition'. He warned against the dangers of anaesthetising patients with precordial pain 'either with or without moderate exertion', and in agreement with current opinion suggested that hypertension does not markedly increase risk providing cardiac reserve is satisfactory.<sup>4</sup>

## Respiratory system

Risks resulting from respiratory disease were addressed by Lundy, and those conditions which lower vital capacity were identified as risk factors. Lundy's assessment of the respiratory system is accompanied by a strong warning against the anaesthetist permitting a 'deficiency of oxygen', emphasising that the result is damage to the central nervous system, 'particularly to the cerebral cortex'. Asthma, he suggests, does not produce untoward risk, especially as following ether 'periods of relief from asthmatic attacks have been observed'. Tobacco was noted to increase perioperative risk.

## Anaesthetic agents

A risk conferred by anaesthetic agents themselves was emphasised by Lundy, stating 'certain agents produce specific damage to certain organs, such as damage to the tissue of the liver by chloroform'. The anaesthetist was cautioned to consider certain possible organ-specific toxic effects of anaesthetics when pre-existing damage to certain organs was present.

## Body weight and temperament

Weight loss and debility were regarded as a risk, but in contrast to current anaesthesia practice Lundy had little to say concerning obesity. Also, perhaps in contrast, he was troubled by patients who are 'high strung', commenting that they seemed to be more difficult to anaesthetise than those of the 'more stolid type'. However, it is interesting to note that perceived risks for anaesthesia and surgery identified in the 1930s are not dramatically different from those recognised today. Finally, Lundy makes the noteworthy comment:

'The skill and versatility of the anaesthetist must be considered as important contributing factors to the welfare of the patient for whom the risk of operation is great. The patient's life often depends more on the way a certain anaesthetic agent is administered than on the effects of the agent itself.'

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## GUEST LECTURE

### At the Cutting Edge: Surgery in Norwich in the 18th and 19th Centuries

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#### Introduction

At the beginning of the 18th century there was no hospital in Norwich in the modern sense, although there was a prototype cottage hospital at Shotesham from the 1730s and the Norfolk and Norwich (N and N) from 1771. However there was little difference between the practice of surgery in a 'domestic' environment (often literally on the kitchen table) and in hospitals until the mid-19th century. At the end of the period we have the first X-rays (1896), the beginnings of sepsis, and greater control in anaesthesia. Along the way there are significant improvements in the range and techniques of surgery, the making of national reputations for local surgeons and the N and N hospital, and the establishment of the university educated, hospital trained, professionally assessed surgeons. All these features endorse the theme of 'improvement' in surgery, though that view may need some qualification.

The subject will be considered under four headings:

- 1) The range of surgical practice before the introduction of anaesthetics;
- 2) Surgeons at the N and N in the 2nd and 3rd quarters of the 19th century;
- 3) Local experience of anaesthetics and antiseptics;
- 4) Practical results of surgery and wider influences.

#### Surgery c1700-1840

At the opening of the 18th century there was no clear generalised definition of surgery. Of course there were all manner of interventions and procedures, largely dealing with external manifestations of disease or injury, but those who described themselves as 'surgeons' did not separate from the barber surgeons to form the Surgeons Corporation until 1745 (and the Royal College of Surgeons in 1800). Other practitioners included bloodletters, bone setters, lithotomists and tooth drawers; examples of the last two were in practice as skilled 'specialists' in and around Norwich in the 17th and 18th centuries.

The Rev Thomas Havers, clergyman at Stoke Holy Cross and licensed to perform surgery in 1692, acquired a local reputation as a skilled lithotomist, whereas Agabus Molden advertised himself as 'operator for the teeth' in the *Norwich Mercury* throughout the 1730s. At this time Benjamin Gooch (1708-76) was in practice as a surgeon-apothecary, the predecessor to the modern GP, at nearby Shotesham. Gooch was a general surgeon who attended the wealthy but he also had the cottage hospital practice, which contributed towards his three-volume text on surgery, published in 1758. He developed a particular form of splint, which combined wooden spalls with cloth and leather strapping to produce a relatively light adjustable but strong support. Gooch was closely associated with local landowner William Fellowes in the establishment of the N and N and might have been actively involved in surgical practice but he was already aged 64 when the hospital opened.



## Election of surgeons

At that time honorary surgeons to the N and N were elected by hospital governors, a system open to abuse and certainly to influence. But the late 18th century surgeon would have qualified for practice after a 5-year apprenticeship. This included lectures and courses on anatomy and dissection, and one year's clinical experience in a hospital in London, Edinburgh, Dublin or Glasgow, and then being successfully examined and licensed by the Surgeons Corporation. The surgical pupil would observe operations, attend ward rounds and assist the surgeon's dressers. Surgeons were allowed up to four dressers, who paid a substantial fee (up to 50 guineas) for this favoured role. In return, they directly assisted in operations, dressed wounds, drew teeth and let blood and could act in place of, or call in the surgeon in an emergency. Later, as a result of the 1815 Apothecaries Act, a surgeon with additional courses in physiology or pharmacy could qualify as surgeon-apothecary. By 1840 the 'College and Hall' combination was predominant among new surgeons and medical practitioners, well in advance of the specifications of the 1858 Medical Act.

## Numbers of operations

At first the N and N had approximately 150 surgical cases annually, doubling to 300 by the year 1800. Most of these did not require operations. There are stereotyped views of the 'bold, bad, slashing surgeon' of the late 18th and early 19th century and contrary views that restrictions on surgery were so great that little useful work could be done. These require qualification. Although alcohol, opiates and physical restraint featured in operations, surgeons were acutely aware of the agonies inflicted on their patients, the dangers of blood loss, shock and infection, and the need for decisiveness and speed in order to minimise pain. William Dalrymple, (1772-1847) an experienced surgeon at the N and N from 1812, told his sons how he was unable to sleep before an operation because of the suffering that he knew he would inflict on his patient. There was an increased interest in conservative surgery involving the excision of affected areas or joints, not least because the wholesale amputation of limbs produced high mortality (25% or more). Some surgeons insisted upon cleanliness or the scalding or heating of knives in pursuit of speed, efficiency or pain relief. They may have unknowingly provided partial antisepsis, but the image of the surgeon in his blood-soaked frock coat, silk ligatures threaded through the buttonhole for easy access, remains a powerful one.

## Types of surgery

Because of pain and complexity surgeons normally avoided internal operations in the abdomen and chest. In accident cases dislocations might be treated using pulleys and straps followed by cold applications. Simple and compound fractures would be cleaned up, often using leeches, bones re-set and joints excised as alternatives to amputation or massive resort to the knife. In good practice an amputation could be completed in three minutes, still a very long period for patient and surgeon alike, with an accompanying mortality rate of 25% for leg amputations and 15-20% for the arm at the N and N. These seem high rates, but the attendant trauma and risks must be considered.

Here is an example from St Thomas's hospital in 1725 (taken from Philip Wilson, 'Surgery at St Thomas', *London Journal*, 1992):

'A strong hearty man of 32 with great resolution placed himself in the usual manner upon the bench. Dr Mead threw a napkin over his face, supported his back and secured his hands. An assistant held the patient's leg steady while Mr Wellington drew up the skin and twisted the tourniquet tightly about the middle of the thigh. The operator, Mr Ferne, stood between the patient's legs and bound the tape around the diseased leg four fingers breadth above the patella. Armed with the knife he made a circular incision around the leg to the very bone and then sawed it through. Mr Ferne bore so hard upon the leg on sawing that I really thought that he had snapped it. The crural artery spurted out and was took up with a needle together with some vessels adjoining. The tourniquet was loosened and the stump cleaned with a sponge. Ferne then drew down the skin and hastened to dress up the bone with lint and applied a button cautery to the large vessel. An armed pledgit was wrapped over the stump with dry dressings over all and, lastly, the stump was bound with a long cloth. So great was the courage of the patient that he never once cried out during the operation. He was immediately carried into a warm bed and the stump laid upon a pillow where an assistant held it for 12 or 14 hours to make resistance to the force of the blood and to secure the ligature from being pushed off. .... Twenty days after the operation he was allowed to rise and sit by the fire. A month later he grew thin but his stomach was tolerable and his stump healed, he appeared to be troubled with a cough from the closeness of the hospital. Mr Ferne advised him to fly to the country for air.'

Of course the patient might die quickly from shock or blood loss, quite apart from infection, and we can see here problems arising from the hospital environment and speculate as to post-operative mortality rates in the medium term. There were 'horror' cases too. In 1812 John Green Crosse (1790-1850), then a pupil in London, observed: 'a negative lesson of the attention and foresight which the operator should have .... One surgeon was amputating and there was no saw at hand so that, having made the first incision through the integuments and the second through the flesh, he was obliged to stop till a saw was procured - from a local carpenter I believe - before he could cut through the bone'.

Leaking arteries (aneurysms) could be tied, and Dalrymple in Norwich became the first provincial surgeon successfully to repair a carotid artery in 1813. Hernias might be treated through manipulation and warm baths, followed by fitting with a truss, though strangulated hernia might produce resection, with a portion of intestine simply stitched to the margins of the wound and left open. Conditions associated with the build-up of fluid could be detected through percussion followed by draining, with septic areas sometimes washed out with a mixture of warmed water and port wine. This would normally be a relieving rather than a curative procedure, but relief was also important from 'the sufferer's agenda'. Richard Austin, again observing John Ferne at St Thomas's in 1726, described:

'A vastly big youth aged 14 who made but little urine, which often came away involuntarily. He was tapped 4 or 5 finger's breadth below the navel. Mr Ferne kept him in talk all the while the water was running and pressed his stomach. The patient never complained till all was discharged, which filled a large bucket, and then he had a pain and uneasiness at his stomach. He remained 'very hearty' in the hospital and was then discharged'.

Trepanning of the skull was carried out in cases of depressed fractures or in the hope of relieving pressure on the brain associated with the build-up of fluid. In cases of massive

excision of tumours or amputation of the breast attempts were made to preserve as much skin as possible. It was rare to produce recovery after the initial re-uniting of skin with skin stitching, but the objective was to reduce the size and openness of the wound, and healing was reckoned to be a process taking four weeks or so. Although the causes of infection were not understood, John Green Crosse observed after a visit to Paris hospitals, that surgical practice in Britain compared well with the French practice of stuffing lint into the opened wound. Attempts to deal with major tumours were usually unsuccessful, but short and long-term respites or recoveries were achievable. Some indication of early 19th surgery can be seen from Crosse's own observations in 1812-3, which included 27 cases of fracture (including 7 compound and 7 skull fractures), 9 gunshot wounds, 38 cases of inflammation of bones or joints, 11 of fluid collection, 7 bladder stone and 4 of strangulated hernia.

Lithotomy came closest to the 'routine' internal operation. The requirements of speed and decisive action, the risk of damage to other organs, the dangers of haemorrhage and infection all loomed large. The patient was normally restrained by the surgeon's assistants, who held his shoulders and legs or fastened his wrists to his ankles, with a staff used to press his legs upwards and backwards. Selecting an appropriate lithotomy knife the surgeon would then cut through the perineum, using fingers or forceps to extract the stone. At St Thomas's Josiah Paul was reckoned to perform three lithotomies each day, using a modified technique described in his case notes (1725). The patient was to empty his bladder and then take up position:

'His hips raised to throw back the intestines, gently pass a large catheter fixed to a large syringe through the urethra into the bladder. Inject the bladder with as much barley water as will fill it to its utmost natural distension. Following a two-inch incision through the perineum an upward thrust was made with a straight-edged knife to dilate the wound, and a crooked knife was used to enter the bladder and cut down upon its contents'.

Opening the bladder in this way often propelled the stones out with the barley water. If not, a pair of forceps quickly introduced was used to grasp the stones, twisting them away from the bladder wall and retrieving them. John Green Crosse, surgeon and lithotomist in Norwich from 1815, and at the N and N from 1823 recalled lithotomy procedures in London in 1812.

'I saw Sir E Home operate on a man for stone. I never saw an operation done so quickly and deliberately. Much force was required in pulling out the stone and great judgement shown in handling the forceps'.

Of a similar operation on a boy of five years: 'the child was out of the room three and a half minutes after he entered for commencement of the operation'. But he also described a bungled operation at the Middlesex hospital:

'The scalpels for the outward incision would not cut .... and were changed for a first and second time ..... the forceps were pushed about in all directions, inserted and withdrawn, and after three surgeons had been probing with their fingers for 46 minutes the patient was left in despair, the wound covered and the patient put to bed. In the evening after the operation a stone came away voluntarily, bigger than a pigeon's egg'.

The patient recovered!

### Surgery at the Norfolk and Norwich

The N and N itself had a national reputation for lithotomy. Between 1772 and 1863, 926 operations for removal of bladder stone were performed, 600 of them before 1820, and records of each case kept and the stones preserved. Virtually all operations involved an incision, which exposed the patient to infection, but a total mortality rate of 12% suggests broad success in surgery and a background environment conducive to healing. A feature here was the expertise of Crosse and Dalrymple; Crosse was often able to complete an operation in two minutes. Before them Philip Meadows Martineau (1752-1829) performed 177 lithotomies, and afterwards Thomas Crosse and William Cadge (1822-1903) had established and maintained N and N as a leading provincial hospital for surgery, in 'stones and bones' as the *Lancet* put it.

However, the N and N was also a relatively 'safe' hospital because it was laid out to a good design. It took the form of a two-storey building, the H-shaped design 'most convenient for the freest circulation of air', as requested by the physicians. John Howard visited it in 1789, finding 'this spacious infirmary perfectly neat and clean; the beds not crowded, the wards fifteen feet high, quiet and fresh'. Moreover, the honorary medical staff had insisted upon no admission of infectious cases and had blocked the erection of fever wards. Though they did not know precisely how infection spread, they attempted to minimise observed risks. This provided a sound operating environment before the advent of anaesthetics and antiseptics; a point to be borne mind for later arguments.

Before turning to these, a few other points concerning Norwich surgeons and the N and N. Edward Rigby (1747-1821) was one of the first surgeons, but later became a physician and an obstetrician. His essay on *Uterine Haemorrhage*, especially on damage or separation of the placenta in childbirth, was based on over 100 cases in and around Norwich and it suggests a less interventionist approach to childbirth. Compare this with many contemporary surgeon accoucheurs characterised by 'the urge to cut' or wield the forceps. Edward Copeman (1809-90) also began as a surgeon in the 1830s before specialising in obstetrics, again as a 'conservative', and published *Puerperal Fever* in 1860.

William Cadge carried out 384 lithotomies over four decades at the N and N and published *The Surgical Treatment of Stone in the Bladder* in 1866. He performed the first operation under anaesthesia in January 1847 at the hospital and also introduced antiseptic surgery there. Ambitious attempts by John Green Crosse to establish a medical school in Norwich in the 1820s were restricted to a private anatomy school, but the hospital was recognised as a preliminary teaching centre by the Royal College of Physicians in 1834 and by the University of London in 1863.

### Anaesthesia and antiseptics

The use of ether and chloroform suggested the possibility of surgery without pain to the patient, and offered the prospect of more time and surgical intervention in hitherto closed areas of the body for the surgeon. After William Cadge's first operation using ether most surgeons were enthusiastic, but one observer, a Dr Hull, wrote in the *Norfolk Chronicle* about the dangers of side effects from ether, notably the risk of brain damage. It was soon found

that ether also produced agitated respiration and spasms in some patients (hardly ideal from the operator's viewpoint), whilst the depressant effects of chloroform on the patient's heart sometimes led to death. In 1883 Sir Peter Eade (1825-1915) at the N and N still recommended that, in cases of diphtheria requiring a tracheotomy: 'In the latter stages the danger of the anaesthetic is so increased that it is better to trust to sufficient restraint of the feeble child and to a quick performance of the operation'. Similarly, only 40% of major operations at the West Norfolk and Kings Lynn hospital involved anaesthetics in the 1880s. Surgery was less frequent at the Ditchingham cottage hospital but chloroform was used. In 1912 electric lights and ventilation systems were installed, a big improvement as chloroform gas 'used to mix with the fumes from the lamp and cause a vapour in the room which impeded the sight considerably', to say nothing of the surgeon's judgement or the patients' respiration.

Conventionally, the need for the controlled administration of anaesthesia is stressed, but other problems arose precisely because the pain factor was reduced. Some surgeons felt that pain was essential to the healing process. Others, such as John Snow, reported the unsuitability of a surgeon's pupils or dressers acting as anaesthetists because they were more interested in watching the surgeon than the patient! Arguably a bigger problem was that with more time, surgeons might demonstrate to their pupils (literally offering hands on experience) without the precautionary methods which had previously reduced infection. More complex and ambitious surgery often had poor results. In the late 1850s the number of serious operations doubled at the N and N, and in-patient mortality began to rise steadily from the previous low average of 4.5%. In part this was a reflection of more serious cases, yet the same very competent surgeons were operating.

The problem was to reduce post-operative infection, and antiseptics seemed to be the answer. Joseph Lister's research at Glasgow Royal Infirmary built upon Pasteur's identification of micro-organisms as the bearers of infection. His solution, the use of a carbolic spray to destroy such organisms was misdirected. Attention to the surgeon's hands, instruments and dress, the surgical dressings and the use of sterile catgut ligatures, the patient's skin and the wound itself was critical. It was later understood that the carbolic spray, failing to destroy harmful micro-organisms, might destroy phagocytes, the body's own blood cells which combated infection. Lister's research was eventually superseded by the adoption of aseptic techniques, associated with von Bergmann in Germany in the 1890s. These rested upon the creation of a sterile operating environment, via steam sterilisation of surgical clothing, boiling of instruments, and wearing of gloves, masks etc. As we will see, that sort of environment was impossible to achieve at the N and N in the 1870s.

On the basis of Lister's claimed success, which probably owed most to his operating technique, William Cadge dispatched Michael Beverley (1841-1930), then the N and N house surgeon, to Edinburgh in 1871 to learn directly from Lister. (Incidentally, another surgeon, Alexander Ogston of Aberdeen Royal Infirmary, noted that Lister did not scrub up, nor did anyone else, before demonstrating the carbolic spray in an operation. He wore an aged and stained frock coat and operated with the patient laid upon a coarse-grained wooden table). When Beverley returned to Norwich he and Cadge introduced the carbolic spray in surgery. Yet the outcome was very disappointing; results were not improved, and if anything there was increased postoperative mortality.

## Practical results of surgery and wider influences

This leads us to a broader consideration of late 19th century surgery. The workload was increasing; at the N and N the average number of major operations doubled to 266 per annum during the 1860s. As surgical practice was stimulated by anaesthesia and antiseptics surgeons tackled more and more serious injuries and illnesses. In 1873 18% of inpatient deaths at the hospital occurred within 24 hours of admission; by 1883 the figure was 36%. New procedures were still fraught with danger; eight ovariectomies were performed in 1880 but five of the patients died. All this was understandable, but the deteriorating results following relatively safe procedures were perplexing. In the ten years after 1864, which included two years of antiseptic techniques, the mortality rate accompanying lithotomy operations averaged 15%, higher than the late 18th century average of 12%. One third of these patients died from pyaemia. Cadge himself admitted that he now 'unwillingly and almost tremblingly operated'. In a paper to the *British Medical Journal*, Beverley concluded that:

'the status quo cannot continue .... it would be better to do away with the hospital entirely, and let those who unconsciously run the gauntlet of its hidden dangers submit to surgical treatment in their own cottage homes, where they would have an undoubted better chance of recovery than in the wards of our hospital as it now exists'.

Surgical operations at the N and N were indeed suspended in 1875 and transferred to the 'Iron hospital', a nearby early isolation facility. It was later established that hospital diseases such as erysipelas and pyaemia were virtually endemic and that substantial rebuilding on an adjacent site was the only answer. Features such as the porous pinewood floor in the operating theatre or the proximity of the mortuary to surgical wards were clearly hazardous. So too were hospital procedures. An open coal fire in the operating theatre was tended by an orderly who performed similar duties throughout the hospital. Surgeons' dressers moved freely between accident and other wards. The house surgeon himself was expected to perform post-mortems and to receive casualty or emergency cases. Thus the hospital buildings and staff could be the prime sources of infection. It would take new buildings, a reformed nursing system, strict controls on training and research, and aseptic procedures, before the increasingly scientific hospital of the late 19th century could improve significantly on the achievements of late 18th century institutions.

## Conclusion

This seems a rather odd conclusion but, despite the more stringent requirements in the training of surgeons and the undoubted advances in their knowledge, technique, and in aids to surgery, surgical practice still needs to be seen in context. This wider consideration of surgery might include such questions as:

- a) Patient access - could those in need actually obtain surgical skills available?
- b) Were surgeons able to treat successfully a sufficient proportion of life-threatening cases to have a wider impact on health and mortality?
- c) Was the hospital environment conducive to positive outcomes from surgery?
- d) What were the levels of postoperative care, in convalescent facilities or back in the domestic environment?

These issues, as well as the surgeons' skills, concern social historians of medicine, and for most of the 18th and 19th centuries they cannot unfortunately be seen in a very positive light, even if conditions were slowly improving. That said, we should not understate the surgeon's art, nor the relief and appreciation of the individual sufferers who went through surgery and benefited from it. For most of the period I have examined, and for the personnel at each side of the 'cutting edge', we need as historians to include a sense of respect and admiration along with our critical faculties.

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## OBITUARIES

### Barbara Duncum (1910-2001)

Barbara Mary Pycraft was born on 22 February 1910. Her sister, Margaret, who has supplied some of the following information, was born five years later. Their father, William Pycraft, was an ornithologist on the staff of the Natural History Museum, South Kensington, author of several books, and for many years editor of the science page in the *Illustrated London News*. The girls went to a boarding school in Cambridge, where Barbara 'refused to fit into the jelly mould', and then to Hamilton House School, Tunbridge Wells. This was an establishment which turned out young ladies, so before entering London University to read history, Barbara found that in order to matriculate she had to repair the deficiencies in her education. This involved much hard work in Latin, and, as an alternative to maths in which both sisters were hopeless, logic.

In February 1931 the Wellcome Historical Medical Museum, still in Wigmore Street, was looking for a research assistant, and Barbara, fresh from university, aged 21, secured the job. Although the Museum had been built as a shop (now occupied by John Bell and Croydon), the cramped and congested interior was organised in a way Barbara was familiar with from her father's work. There were trestle tables and packing cases arriving frequently, from which objects were removed for cataloguing. The staff was small in number, and very friendly. The men spent much time at auctions, bidding for anything connected with the history of medicine, including books. 'In a secluded bay old Mrs French Sheldon sat, day after day for many months, writing her memoirs. She was an American lady who had been a medical missionary in the Congo, and was a personal friend of both the King of the Belgians and Sir Henry. She looked, I must say, remarkably like Mrs Tiggy-Winkle.' It is thought that Barbara was the last survivor of those who worked at Wigmore Street; in 1932 the Museum moved to the building in Euston Road.

This she described in a memoir written at the request of John Symons of the Wellcome Institute in 1982: 'Yes, the move to Euston Road did make a difference to my working conditions - not overwhelming, just mildly obtrusive. I thought it sad that Wellcome, with all his resources, should have done little more than transfer his favourite brain-child from a shop to a kind of department store. All that blue lino. And I remember jeering at a building with two consequential public faces and a yellow-brick backside which would not have graced a factory. You can see how self-opinionated I was. I jeered also at the new regime. WHMM staff who were not 'they' were required to enter by the back door, be clocked in by Chadburn the commissionaire, above or (too often in Miss Pycraft's case) below the crucial 9.30 line in the register, and then proceed through the nether regions to the front hall. There one was permitted to share a lift with unknown bowler-hatted characters who had been let in by the front door. Happily, the true Wigmore Street spirit survived these and other vicissitudes.' A memorandum dated February 1937 recording the suspension, because of persistent lateness, of Miss Pycraft's privilege of one free Saturday a month, is still preserved in the Wellcome archives.

Barbara's first work involved the classifying of items of folklore, amulets and various objects carried as mascots. Her job was to type the descriptions called out by Mr Lacaille, a model of patience and courtesy: 'There was a brief embarrassment when we came to mascots carried in the pockets of French soldiers during World War 1. "You must excuse it, Miss Pycraft",



Lacaille called "a piss-pot, gunmetal; and another". Indeed, there were many scores of them; and although many soldiers must surely have been carrying other kinds of talismans I no longer remember what they were.'

Next, she worked on the history of cinchona, for which she had to learn a modicum of Spanish, and from this she passed to descriptions of native medical procedures. At times she was assisted by someone, returning from field expeditions, whose mother tongue was Spanish, 'an engaging character, small and leathery, with eyes so dark they could justifiably be called black,' who, it was said, had been recruited personally by Wellcome from the Peruvian army. In 1934 Barbara accompanied a senior member of staff, Alec Haggis, on a tour of churches in East Anglia and Devon, listing and photographing statues, carvings, and paintings of saints with medical connections. Then in 1936 she was asked to organise and run a journal-abstracting service covering the main fields of interest to the Museum. Within a short time she found that she was being swamped with data, little of which was of interest to her colleagues, and began to feel the need for a change of direction.

She left the Wellcome Museum in November 1937, for an appointment at the Institute for Research in Agricultural Engineering in Oxford. This was a government sponsored organisation, and she found herself having to become familiar with such topics as techniques for the determination of the moisture content of soil, and struggling to translate an article on tractor trials from the German. At this point, in 1938, she was asked to produce a brief history of anaesthesia for a textbook, *Essentials of General Anaesthesia*, that was being written by Professor Robert Macintosh, director of the newly established Nuffield Department of Anaesthetics, Oxford, and his first assistant, Freda Pratt (later Bannister). Barbara researched the subject and prepared the material, to such good effect that she was offered a job, much more congenial than the one she was in, that she thought she had better take. This was the appointment of historical researcher to the Department, with the suggestion that her researches should form the basis of a D Phil thesis. The outbreak of war in September 1939 put an unexpected load of departmental administrative work on her, so that not until the end of her working day could she cycle to the Bodleian or the Radcliffe Science Library, where she would do her research until they closed at ten o'clock in the evening. But this could not have taken up all her time, because on 9 September 1940 she married Philip Duncum, an Oxford graduate, who was working as a journalist on the *Oxford Mail and Times*. Reading the history chapter in Macintosh and Pratt today, it remains a most impressive introduction, and a harbinger of the magnificent work that was to follow.

Barbara obtained her D Phil in 1945, and immediately set about rethinking, rewriting, and augmenting her thesis to make it suitable for publication. At the end of 1946 she was offered employment with the Nuffield Foundation, so the Duncums moved to London, where Philip continued his work in journalism, and Barbara researched in the major scientific libraries:

'During the first three months of 1946 all was set fair for my book. It was written and accepted by the Trustees of the Wellcome Historical Medical Museum, for publication as a major element in an exhibition being organised to celebrate the centenary of Morton's triumph on October 16. The WHMM had been allocated the third floor of the Wellcome Institute. Since the beginning of 1946 the WHMM had had a new director - E Ashworth Underwood, a protégé of Charles Singer. From the word 'go' Underwood was determined to gratify Singer by making one of his books the WHMM's first post-war major publication.

My book was not published in time for the anaesthesia centenary and I was left in complete ignorance of what was happening. I first knew that my book had been published when, in the late summer of 1947, somebody said to me: "by the way, I saw a copy of your book in a shop window in Oxford High today". By that time I had a new research job on the staff of the Nuffield Foundation, and my book was getting to be known without the publicity Underwood denied me. ... Even now, I can hardly bear to remember the non-event of 1946-7! But as you discovered, the official silence was absolute.'

[This account, and the last comment, was contained in a letter to one of us (NA), who was preparing a review exactly fifty years later, when the book was reprinted by the History of Anaesthesia Society, and could find no evidence that it had ever been reviewed in the medical press. In fact the book was published, by the Oxford University Press, in March or early April. The other of us (DZ) still has the receipt from H K Lewis, dated 14 April 1947.] It had attained its status as the classic and authoritative history of inhalation anaesthesia, and as a classic in the history of medicine also, purely on its merits, by word of mouth and frequency of citation. Its published price was £1.15.0. (£1.75), and by the early 1990s much-sought-after second-hand copies were costing more than fifty times as much.

At the Nuffield Foundation Barbara researched the history of hospital architecture for a book on hospital planning, wrote reports and speeches for the Director, and undertook general administrative duties. She retired in the late 1970s, but found herself in the limelight when, with the founding of the History of Anaesthesia Society, she was elected with acclaim as one of the first group of honorary members, a distinction that united her again with her erstwhile chief, now Sir Robert Macintosh.

Latterly travel became difficult, but Barbara attended meetings in London and contributed papers, her last being at the Joint Sesquicentennial Meeting with the Section of Anaesthetics of the RSM in December 1994, when she spoke, with much new information, about the reintroduction of nitrous oxide in the 1860s.

She died on 16 October 2001, after a short illness, at the age of 91. She is survived by her husband of 61 years of married happiness, and her sister, Mrs Margaret Frost. The History of Anaesthesia Society, the Nuffield Foundation, and the Wellcome Trust were represented at her funeral at Putney Vale Crematorium, on 2 November 2001.

Today it seems incredible that her book, *The Development of Inhalation Anaesthesia*, should, apart from a brief notice in the Oxford University newspaper *Isis*, not have received its first reviews until fifty years after it was published. Written not by a medical amateur but a professional historian, it is most readable and contains not a single solecism. It is so scholarly, authoritative, and comprehensive, that many have learned by bitter experience that it is unwise to expend much energy on a historical research project in anaesthesia without first checking that the topic is not already adequately covered in Duncum – and usually it is!

**Neil Adams**  
**David Zuck**

## Frederick Fox Cartwright



Frederick Fox Cartwright died on 22 November 2001 aged 92. When the History of Anaesthesia Society was founded in 1986 Ferdie Cartwright, as he was known to most anaesthetists, was 77 years of age and did not travel much from home. Thus, sadly he was not to grace our meetings with what would undoubtedly have been a presence as delightful as it was erudite. The Society acknowledged his distinction by electing him an Honorary Member.

Over the last 20 years or so there has been a remarkable expansion in the study of the history of medicine. Partly this has been because of the increasing involvement of professional historians, but it owes much to an earlier generation of pioneering scholars within whose company Cartwright must be counted. From the 1950s onwards he was prominent in championing the case for including history both in the undergraduate curriculum, and in the continuing education of doctors. This he did whilst he was a consultant anaesthetist at King's College Hospital, London.

Cartwright qualified at King's in 1930, acquiring a Diploma in Anaesthetics five years later and becoming a consultant in 1937. In 1948 he became one of the first Fellows of the Faculty of Anaesthetists. Whilst practising in a variety of specialties he was particularly interested in ear, nose and throat surgery, working with Sir Victor Negus, who was internationally renowned for major head and neck operations.

The range of his teaching extended from clinical to historical issues, and he established within the Medical school a small department for the History of Medicine. From this base he encouraged students and fellow doctors to acquire some deeper awareness of health issues in times past, not least by entering into dialogue with professional historians. He was President

of the History of Medicine Section at the Royal Society of Medicine from 1975 to 1977, later being elected an Honorary Member. He was active in the Worshipful Company of Apothecaries, promoting the work on continuing professional education pursued by the Faculty of the History and Philosophy of Medicine and Pharmacy. He was their Sydenham Medallist in 1978, before becoming President of the Faculty in 1981 and later Honorary Fellow.

Cartwright's many publications were notable not simply for their scholarship but also for their elegance of prose. His books included *The English Pioneers of Anaesthesia* (1952), well known to members of this Society and one of the earlier books of its kind. He followed this with four other important books and numerous articles on the history of medicine and surgery. To historians he was probably best known for the wide-ranging *Disease and History*, which first appeared in 1972 and was translated into French and Japanese. This he thoroughly updated for a new edition published on the eve of his 91st birthday, having done all the word processing himself.

Ferdie Cartwright is remembered by many younger historians for his courtesy and the personal interest he took in their ideas, often at the Royal Society of Medicine, where he invited them to join him at dinner to further his conversations with them. He was interested in anything and everything, a perfect gentleman in the best sense of that overworked term.

His final home was at Swallowfield in Berkshire, where until his death he presided over the flourishing local history society. He was a knowledgeable gardener, and an equally enthusiastic correspondent to successive editors of *The Times*, who published letters from him across a span of no fewer than 65 years. His last letter appeared eight months before his death. In submitting his obituary to *The Times*, his historian son-in-law, Professor Biddiss, particularly requested that, if cuts were necessary, the editor should preserve the reference to *The Times* itself. He wrote: 'The thought of us making, now, a final allusion to that almost unsurpassed record would, I believe, have given him particular pleasure'. Sadly, *The Times* did not adhere to this request.

Dr Cartwright is survived by his wife Patience, three daughters, six grandchildren, and five great-grandsons.

(I am grateful for the help of Professor Michael and Mrs Ruth Biddiss and Dr T D W Davies in compiling this tribute.)

**Aileen K Adams**

## **C S Ward**

Crispian Stanley Ward was born on 11 May 1925 in Sevenoaks, and died at the Kirkwood Hospice in Huddersfield on 6 June 2002 aged 77. He attended Bryanston School in Dorset, where a good deal of experience in electronics must have stimulated his lifelong interest in engineering. However, he remained nominally an amateur, for he studied medicine at Guy's, qualifying MB BS in 1949 and took up house appointments at Croydon. Called up into the RAF he took a three-year commission, giving anaesthetics. Demobilised with the rank of Squadron Leader, he continued his postgraduate training on the famous Liverpool course, and obtained his FFARCS in 1956. He was appointed Consultant Anaesthetist to the Huddersfield

Royal Infirmary in 1957 where he remained until 1989, when ill health forced his early retirement.

The life of a consultant in a busy district general hospital was arduous both day and night, but he energetically undertook additional responsibilities. He planned, commissioned and equipped an electronic and biomedical engineering department, and the anaesthetic, resuscitation, intensive care and operating facilities of the new hospital. In the town he served appropriately on the Gas Board. No wonder he was revered locally. In what he laughingly referred to as his spare time he was a committed dental anaesthetist, (never tiring of reminding me that he personally administered more chair anaesthetics than the whole of the Manchester Dental Hospital). He set up a community dental clinic for the handicapped and was a founder member of the Association of Dental Anaesthetists, and its President in 1988 at its first international meeting. He also frequently attended meetings of many other Societies, and was of course an honorary member of the HAS.

Interpolated in and informing all his activity was his love of equipment. His collected historical pieces are now on show at his hospital and in the Thackray Medical Museum in Leeds. Much in demand as consultant and lecturer at home and abroad, his down to earth approach drew admiration. But his best-known achievements were his books: *Ward's Anaesthetic Equipment*, a classic now in its 4th edition, and *Electrical Safety in Hospitals*. These were written at typical personal sacrifice for, to find the time, he wrote for an hour a day before work from 4 to 5 am!

Cris had a big and generous personality, with strongly held views and openly expressed enthusiasms, such as the grammatical use of English, and dislikes, such as Jehovah's Witnesses. The energy with which he carried them through, and his readiness always to help made him a delightful companion, and gained him lasting friendship. I first met him in the RAF in Germany when, though his French was fluent, it soon became apparent (except to him) that his German was limited. Nevertheless such was his enthusiasm and self-confidence, that with liberal use of body language, six words were sufficient for him to order his beer with the best - a necessary skill to an indefatigable partygoer, eater and drinker. He was a rarity at that time, a junior officer with his own car and thus very popular, for he was always generously giving lifts. As he said: 'such a little thing, but it means so much'. He took a brother officer and me on a splendid tour of the country, not only doing all the driving himself, but also enlivening the trip with frequent renditions of an adaptation of the song 'Three German Officers crossed the Rhine.....' (and subsequently behaved quite unspcakably!).

Back in civilian life he renovated his large family home himself to include such refinements, forward looking at the time, as central heating triggered by the external temperature, and an outside play area covered against the rain for his three sons, of whom he was very proud. He took care to provide them with much formative experience, such as dinghy sailing, in conditions calculated 'to put hair on their chests'.

In his somewhat handicapped retirement he retreated to a flat, a splendid eyrie with views over the town. There he occupied himself in handicrafts in wood and metal, besides cooking and entertaining and keeping abreast of the changing medical scene, on which, as usual, he had opinions!

In the late eighties he contracted the disease that was eventually to be his undoing. The treatment was successful, giving him, he admitted, some 15 years that he would not otherwise have had. But the side effects were considerable, unpleasant and incommoding. In his case the overused phrase 'a long illness, bravely borne' really did apply. I often heard him describe his problems, wryly and with a professional detachment, but I never heard him complain. Towards the end he tired of the struggle, and spoke of 'dying with dignity'.

After his death, consonant with his views, his life was celebrated by a non-religious Humanist committal. As befitted his popularity it was extremely well attended (standing room only), and was followed by a party, to accord with his expressed instruction that his friends should 'have a knees-up'.

Cris Ward was a 'big' man, a good man and a good friend. Many will long remember him.

**Tod Young**

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*As we went to press we heard the sad news of the death of our Honorary Member Dr W D A Smith OBE. A fuller appreciation will appear in the next volume.*

## BOOK REVIEWS

**Notable Names in Anaesthesia.** J Roger Maltby (editor). Royal Society of Medicine Press 2002. ISBN 1-85315-512-8. Paperback pp xiii + 254. Price £19.95.

Since the exit of the historical section from Lee's Synopsis there is no easily accessible list of important names in the sphere of anaesthesia. This book is about the eponyms we come across in everyday practice. The Concise Oxford Dictionary defines eponym as 'one who gives his or her name to a people, place or institution'. As Professor Maltby points out, in medicine it usually includes instruments, techniques, complications, lectures and museums. He has included other medical specialists and scientists, manufacturers and even a medico-legal case, so that the book was not entitled *Notable Anaesthetists*. The work expands our knowledge of many names and opens up their lives to include less well-known aspects, such as hobbies &c. It enlightened your reviewer about a number of the non-UK notables such as T H Seldon and Paul Wood.

There are 76 entries but some include more than one name (eg Swan-Ganz) so the total is approximately 88. Twenty seven contributors are listed for the 76 entries (some are autobiographical), but the bulk of the research was by Professor Maltby who wrote 51 and co-operated in five others. He also acknowledges the aid of others and your reviewer unwittingly helped with details of Boyle's car. He realises that not everyone will agree with his selection of notable names. This is certainly true, and a dozen more notables spring to mind as the book is read. Smith-Clarke and de Caux are of special interest to the reviewer, but Astrup, Heidbrink and McKesson (who appears in several entries but not in the index), should have a place. Perhaps Frankis Evans, Hadfield, Marrett and Shipway (in the Magill entry) have slipped from general knowledge, but Salt should be remembered and is mentioned in the entry for Sir Robert Macintosh. De Caux and Marrett are in the index since they figure in other entries. No doubt more names can be suggested to add to the next edition or a second, supplementary volume but what are the criteria? Is it required knowledge for specialist registrars and residents or in the cause of wider wisdom? 'Those who cannot remember the past are condemned to repeat it.' (Santayana).

Leaving aside these specific proposals, here are a few suggestions that would improve the usefulness of the book. Cross-references (with *qv* added) from one name to another would be helpful. The difference between the original DA and the post Faculty DA might be explained. It is curious that most of the UK entries have a fuller description of their schooling before entry to medical school but maybe this reflects the editor's upbringing. Interned is North American English for being a resident house officer, not forcibly detained, though 40 years ago it felt like that.

A number of errors of fact and typography should be corrected of which the following are perhaps the most important. The professorship Beecher took up in 1941 was established in 1937 not 1917. Asserting that Flagg's laryngoscope was 'One of the earliest to have batteries in the handle' beside a photograph dated 1942 prompts the question: when did he make it? Goldman, Macintosh and Magill laryngoscopes were all thus equipped in the 30s. Were there still water sight-feed flowmeters on the Foregger anaesthetic machines in the 50s? The photograph of injection through a Gordh needle is poor and should be replaced or removed.

Wesley Bourne of Canada in 1935 was the first overseas (and first) Royal Society of Medicine Hickman Medallist, not Guedel in 1941, and is correctly listed in the entry for the Hickman Medal. The Magill entry is for his forceps but Figure 2 shows his intubating spatula, not how to use the forceps with catheters. His breathing system, from which Lack (p112) derived his circuit, is not cited. Waterton's curare (wourali) from Guiana was not the substance later procured from the jungles of Ecuador, but a chemically different compound with a similar effect.

Your reviewer does not believe the myth that Boyle's left-handness led to the modern flowmeter arrangement. In Boyle's day intubation was not common (and he was not good at it), so anaesthetists used their stronger arm to maintain the patient's airway. The weaker hand would then be used for adjusting flow, so Boyle's sinistrality should have led to the opposite arrangement. The rubber tubing used by Charles King for making endotracheal tubes was said, at the educational meetings held on his premises in the 1960s, to have come from a firm of organ-makers and repairers in Tottenham Court Road, hence the Magill sizes which bore no relationship to any other medical catheters or tubes.

Despite these criticisms this is a book that anyone with the slightest interest in history should buy; this must include teachers, examiners and candidates for postgraduate exams. If it had been published ten or more years ago it would now be into a second edition. In other words it is highly recommended and welcomed with open arms. It has been a fascinating and informative read and a desirable addition to the reference volume bookshelf. There is ample scope for a second supplementary book; in addition to omitted names mentioned above, what about Barnet, Bennett, Bird and Cape!

Adrian Padfield

oooOooo

**The Royal College of Surgeons: 200 Years of History at the Millennium.** Blandy J P, Lumley J S P. Eds. Oxford: Blackwell Scientific Publications Ltd, 2000. Illustrated HB. pp193. ISBN 0 632 05396 8.

**The Royal College of Physicians and its Collections.** Davenport G, McDonald I, Moss-Gibbons C. Eds. London: James and James, 2001. Illustrated HB. pp 68. ISBN 0 907 383 831

**The History of the Royal Society of Medicine.** Hunting P. London: RSM Press, 2002. Illustrated HB. pp505. ISBN 1 85315 497 0.

These lavishly produced books from three of our leading medical institutions appeared in quick succession. The Royal College of Surgeons (RCS) celebrates the millennium and its own bicentenary. The Royal College of Physicians (RCP) fulfils a long-standing ambition and appears some years in advance of its own quinqucentenary. The Royal Society of Medicine (RSM) anticipates its bicentenary in 2005. All three are large, beautifully produced, superbly illustrated, and a joy to possess.

The titles of the two college books do not give a clear idea of their content. The RCP volume sets out to celebrate almost 500 years of setting standards in medicine. It covers a wide field in its relatively few pages. The authors are mostly drawn from its fellows but it calls upon an historian and a librarian as well. The first half covers the College history, and does not hesitate to show the mistakes as well as the successes of the College in the past. The section



'Themes in History' is fascinatingly diverse, and includes important topics such as the role of the nonconformists in advancing medicine, women's place in the College and the development of the *Pharmacopoeia*.

The present-day role is touched on only very briefly. The remainder of the book describes the treasures of the College's artistic heritage and library. It is not a catalogue; items are selected for their historical interest or for the personalities with whom they are associated. The result is a book that is not only scholarly but also absorbing reading. While the text is not referenced there is an extensive bibliography.

Although the RCS book is subtitled '200 years of history', only about one-third is devoted to this. Whilst young compared with the physicians, the College's roots go back to the early 14th century, though this story is told only briefly and the Second World War is reached a quarter of the way through. About two-thirds of the book is devoted to the College as it is today, showing how it has adapted to the increasing demands of government and public, at first reactively but increasingly proactively. It contradicts the widely held view that the medical royal colleges are old fashioned fuddy-duddies absorbed in their rituals and out of touch with the realities of today. It paints its picture well (albeit with a degree of self-congratulation), and may appeal to discerning members of the public as well as to potential surgeons. It too is written by its fellows and staff, and although the chapters do not have the authors' names at their head, the list of acknowledgements will enable at least some of them to be matched. There are no references, only a short list of 'Further Reading' and a small index. It was produced quickly, no doubt accounting for some of the errors, one serious one being in the chapter on the Faculty of Anaesthetists where the captions to the portraits of John Snow and Robert Liston have been interchanged.

The RSM book is different in that it is by a single author. Histories have been published in 1905 and 1955 and the present volume covers these early periods again. Dr Hunting is an historian who is making a good reputation as the author of the history of medical institutions. She writes with accuracy and detachment, relating the RSM to events in the world of medicine. Archival and other sources have been consulted and are fully referenced. The result is a definitive and detailed history of the Society and the times it has lived through.

All three books are good introductions to how institutions have emerged in response to the evolution of medical and surgical practice. All three are fascinating, but if you can afford time for only one, then the RCP volume may be the one you will find most rewarding.

Aileen K. Adams

oooOooo

**Careers in Anesthesiology. Autobiographical Memoirs.** Vol 6. K E McGoldrick ed. Park Ridge III, Wood Library-Museum, 2000. pp189. ISBN 1 889595 07 1. \$45.00

This is the sixth volume in a series that has been published intermittently since 1977. The first two volumes were edited by Dr B Raymond Fink, after which Dr Kathryn E McGoldrick, who edits the present volume, joined him as co-editor. The previous volumes, apart from one that contained two posthumous biographical memoirs, each included a varying number of autobiographical essays freely written by eminent American academic

anesthesiologists. These individuals belonged to a generation that took part in 'the protracted revolution which overtook anesthetic practice in the second half of the 20th century'.

The content of the present volume is rather different from those of its predecessors. It contains the autobiographies of four physician anaesthetists from very varied backgrounds. The first two concern an Englishman and a Japanese, who qualified in medicine in their native countries, but who emigrated and ultimately became prominent academic anesthesiologists in the United States. Thirdly, there is an Englishman who qualified in medicine and trained in anaesthesia in the United Kingdom, and then became a leading physician anaesthetist in Canada. The final essay is provided by an anesthesiologist, born and trained in the United States, who practised throughout his career in the private sector.

This volume is made particularly poignant by the fact that the first autobiography was prepared by the former editor, Dr Fink himself, shortly before his death at the age of 86 in October 2000. Raymond Fink was probably the most erudite, multilingual, and cultured anesthesiologist of his generation. He was born in Highgate, London in 1914 of cosmopolitan Dutch parents, was educated in Belgium, and graduated in medicine from University College London in 1938. He recounts the episodes in his early career competently but modestly. He served briefly as a medical officer to a gold mine in South Africa, and then, throughout the Second World War, as a captain in the Royal South African Medical Corps in the Mediterranean and European theatres. He married a British Army nursing sister and on demobilisation became a medical missionary in South Africa before emigrating to the United States in 1950 at the age of 36.

Fink briefly mentions his residency training and refers to his twelve years at Columbia-Presbyterian Hospital in New York, and his subsequent appointment as full Professor and Director of the Anesthesia Research Laboratories at the University of Washington in Seattle. He then describes, in considerable detail, his well-known pioneering research projects and his original philosophical deliberations. Finally, he gives us a short factual account of his operation for an aortic aneurysm and the complications that followed; these included a below-knee amputation. Some further details of Raymond Fink's career, and an appreciation of his pleasant and likeable personality, are supplied in reproduction of the eulogy written by his co-editor, Kathryn McGoldrick for the *Bulletin of Anesthesia History*.

Dr Luke Masahiko Kitahata was born in 1925. He was educated and trained in Japan during the Second World War, and graduated from the University of Tokyo School of Medicine in 1947. He did his surgical residency training in Tokyo and in a North Carolina Baptist Hospital. He married an American lady and returned to Japan to practise surgery for five years in Kyoto at a Baptist Hospital. He then felt a call to improve the level of anesthesiology in Japan. After the two-year rotating internship required by the New York medical licensing authority, and a further two years as an anesthesiology resident at New York Hospital, Cornell Medical Centre, it was not possible for Dr Masahiko Kitahata to return to Japan. He therefore joined the staff of the Anesthesiology Department at Yale University at the age of 36 in 1960. He ascended the academic ladder at Yale and ultimately became Chairman of the Anesthesiology Department in 1973. During his time at Yale he was finally able to foster his commitment to assist in the development of modern Japanese anesthesia by training some 60 Japanese residents and fellows who then returned home, and by forging links with Japanese scientific bodies. Luke Masahiko Kitahata's interesting story

is one of tenacity and dedication crossing two cultures. He tells it with considerable sincerity.

The third autobiography is that of Dr Roger Maltby, an Englishman practising in Canada. He is a well-known figure at anaesthesia meetings in the United Kingdom, particularly those of the History of Anaesthesia Society, to which he is a frequent contributor. He was born in 1937 and is the youngest of the contributors to this volume. He was brought up and went to school in the austere atmosphere of wartime rural Britain. His childhood was additionally overshadowed by the premature death of his father when he was four years old. He qualified from Cambridge University and the London Hospital Medical School. After statutory house officer appointments, during which he met and married a nurse who has been his career-long companion, he spent a year in general practice in a mining town in England, and eighteen months in general practice in Canada, and then decided to specialise in anaesthesia. He followed a carefully chosen combined programme of training in Sheffield (England) and Montreal (Canada). He obtained the specialist diplomas of both countries before joining the staff of the Foothills Hospital in Calgary, where he has been based for the rest of his career. His account, besides detailing his own professional progress and research, and including various periods spent teaching on secondment in Nepal, is a comprehensive and interesting review of the evolution of medicine and anaesthesia in Canada, both clinically and medicopolitically, during his career.

The final contribution to the volume is the shortest. It will be of considerable interest to the United Kingdom physician anaesthetists who are insulated by the British National Health Service, with all its faults, from the sort of difficulties that may confront anesthesiologists in the United States who practise outside the academic departments of university hospitals. This autobiography is a concise account of the professional career of Thomas T McGranahan, MD. He married before entering the University of Cincinnati Medical School. He graduated in 1958, interned with the US Army programme (including a spell in Taiwan), and he took his residency in anesthesia in Milwaukee, Wisconsin. He then practised from 1963 to 1998 successively in three centres in Wyoming and Oregon. Each move was carefully calculated to improve conditions for practice. He seems to have accepted the mounting debts in his early days with surprising equanimity, but the attitudes of independently practising nurse anaesthetists (both certified and uncertified) and some autocratic surgeons are incredible. Nevertheless, by the end, there is a strong impression of a contented man with a worthwhile mission fulfilled.

One thing that stands out is the almost incredible fortitude and loyalty of the wives who supported these four authors, particularly in the early part of their careers. It is noteworthy that three of the four were nurses. In the present era of two-career marriages, whether or not for economic reasons, it may be that this will become less usual.

The series *Careers in Anesthesiology* is fulfilling a useful historical purpose that will be interesting, and valuable as source material for generations to come. However one has some doubts about an editorial policy that allows individual authors such a free hand. This is, after all a series about '*Careers in Anesthesiology*', and these essays are not necessarily intended to be comprehensive autobiographies. It is true that the reader needs to know the early background of an individual to try to assess his motivation for specialising in anaesthesia and, in some cases, to appreciate the difficulties that he had to overcome in achieving his objective. However, family details not directly concerned with the careers of the subjects, are

probably irrelevant. Detailed discussions of research projects are also unnecessary; summaries backed by references are all that is required. A brief overview of the career of each author at the start of each contribution, such as the one at the start of the Kitahata autobiography, would also be useful, as would a name index.

A portrait photograph of each author is provided, and a few interesting photographs are interspersed in the text.

**T B Boulton**

oooOooo

**Tarnished Idol: William Thomas Green Morton and the Introduction of Surgical Anesthesia. A Chronicle of the Ether Controversy.** Wolfe RJ, San Anselmo CA, Norman Publishing 2001, pp 672, illustrated, \$125 (hardback 0 939495 81 1). Orders to: Norman Publishing, PO Box 2566, San Anselmo, CA 94979-2566, USA. E-mail: orders@juorman.com.

Although a great reader, I can think of only three occasions during my adult life when a book has kept me awake well into the small hours. The first was a day or two after 14 April 1947 – I still have H K Lewis's receipt – when, while serving in BAOR, I received my copy of Dr Duncum's classic. The second was almost thirty years ago, when I innocently started reading *The Day of the Jackal* in the bath at eleven o'clock one night, and was glued there until, having finished off all the hot water and the book, I was rescued from hypothermia at four o'clock in the morning by an agitated wife awakened by the unaccustomed coldness of the empty quarter of the bed. The third was occasioned by the volume now under review; although this magnificent production, weighing in at 1.6 kg, with its near A4 sized pages, is not a book to be taken anywhere near a bath. We are told that the pages are acid free, but, as will be seen, that refers only to their chemical constitution.

Richard J Wolfe was Curator of Rare Books and Manuscripts at Harvard University's Francis A Countway Library of Medicine for some 33 years, and also Joseph Garland Librarian of the Boston Medical Library for most of that time. Hence, apart from the advantage of his professional skills, he has had access to primary sources that few knew existed. Some seven years ago, he was an editor of and contributor to a ground breaking book on Horace Wells, *I Awaken to Glory*. His chapter, *Who was the Discoverer of Surgical Anesthesia? A Brief for Horace Wells*, touched on evidence suggesting that Morton was not an entirely honest character. When he concluded the editing of that previous work, as he now tells us in the *Afterword* to the book under review (which naturally one reads first): 'he made a solemn promise to himself never, never to become involved in a serious study of W T G Morton or the ether controversy'. He had gained such insights into Morton's unsavoury character that he determined to keep well away, but later he examined some documents relating to Morton's early history, unknown to earlier writers. These were collected by Jackson's attorneys in 1849 with a view to discrediting Morton's attempts to secure an award from Congress, and this 'was the blasting powder needed to dislodge the author from his earlier resolve and spark him to get on with the task'.

His early chapters deal with Morton's forebears, where a family tree would have been helpful to the reader, and with his early life. The years to 1842 were skimmed over in the biography ghosted by Rice, which is used as a framework throughout this book. Mr Wolfe has been able to demonstrate, from the documents mentioned earlier, that during his late teens Morton was,

in his business dealing at least, a nasty piece of work. He had engaged in deals in various parts of the country, (Rochester, Cincinnati, St Louis, and Baltimore), had falsified the books, forged bank drafts, stolen from and swindled his partners, obtained goods under false pretences, and absconded without paying. Warnings had been published in local newspapers, and he had been lucky to escape prison. Returning home chastened, he decided to take up dentistry, an occupation that required little training, and this brought him into contact with Horace Wells, and later with Charles Jackson.

Mr Wolfe covers this period, and indeed the whole of Morton's life, in great detail, analysing the account contained in the biography ghosted by Rice, *Trials of a Public Benefactor*, and comparing it with the reports of the US House of Representatives, the Charles T Jackson papers, and the registries of the relevant counties of the State of Massachusetts. He traces the progress of Morton's applications to Congress, always dogged by Jackson's determination to deny him any credit or reward, and his disappointments. There is much information in the later chapters about Morton's success for some years as a model farmer, until he was overtaken again by his obsession, and about his many land deals.

Mr Wolfe has left no stone unturned, and has not been squeamish about revealing whatever crawled out from underneath. His detailed grasp of the intricacies of the developments must be unsurpassed, and he explores every twist, turn, and cul-de-sac of the maze, enlivening his account with portraits of the many secondary characters involved. With such detailed research and exposition, this should be the definitive work on the Morton-Jackson controversy; but sadly it is not.

As J F Fulton wrote in his introduction to the annotated catalogue of books and pamphlets bearing on the early history of surgical anaesthesia published in 1946,<sup>1</sup> (one of Mr Wolfe's frequently cited sources): 'In surveying the early history of surgical anaesthesia, it is essential to maintain complete objectivity'. This, Mr Wolfe has found himself unable to do. Rather, he has appointed himself counsel for the prosecution of Morton, about whom he can find little good to say. His discovery of Morton's early commercial backslidings, and his belief that the leopard cannot change its spots, which he supports by a quotation from Shakespeare's *Richard II*, act 1, scene 1 (not 2), (the effect of which is spoiled by printing it as a monologue rather than a dialogue), has blinded him to the need for objectivity. As a result, Morton is painted wholly black, and such acts as could be interpreted favourably are given a pejorative motivation. So what kept me awake into the small hours on this occasion was the fruitless search for a straightforwardly favourable comment. And if Morton is black, then Jackson has to be white – there is no room here for shades of grey – with the result that Mr Wolfe is less analytical than the situation calls for.

Of course a leopard cannot change his spots, nor would he want to, since they fit him ideally for his environment. Morton, if not spotted genetically, may well have been conditioned, by life with a bankrupt father and a land-dealing mother, to enter and survive in the American jungle so acutely described by such writers as Frances Trollope and Charles Dickens. Though, to some extent, he did change his spots. Brought up as he was, what did he know about the niceties of medical ethics, until enlightened by Bigelow? A devoted son, husband, and father, determined to provide for his family, he saw himself as a businessman, an entrepreneur, not as a member of a learned profession; nor did Bostonian standards apply throughout the United States. In Cincinnati, the scene of some of Morton's youthful villainies, 'physicians became merchants, clergymen became bankers, lawyers became manufacturers'.<sup>2</sup>

Jackson's claim to priority was based on his assertion that he accidentally discovered the anaesthetic effects of ether inhalation when he used it as an antidote to chlorine gas, which he had breathed in around 1842; later he re-dated this to 1837 or 1838. After Morton's demonstration on 16 October 1846 he collected a few signed statements from acquaintances whom he had desultorily tried to persuade to give it a clinical trial during the preceding four, or nine, years. Compare this with John Snow, who, during the three months after 28 December 1846, when he first witnessed the administration of ether, laid down, by experiment and demonstration, the basic principles of the physiology, pharmacology, and technology of inhalation anaesthesia. Compare Jackson's immobility also with Morton, who not only risked everything when embarking on his first public demonstration, but experimented with ether, engaged in the design and improvement of inhalers, and campaigned publicly for the acceptance of surgical anaesthesia. But the fact that he sought publicity sticks in Mr Wolfe's throat. He cannot, nor did Jackson in his time, see the importance of the entrepreneur in securing the adoption of anything new.

In one of the few statements of Jackson's brother-in-law, Ralph Waldo Emerson, that is remembered today, he said: 'If a man ... make a better mousetrap than his neighbour, tho' he build his house in the woods, the world will make a beaten path to his door'. Well, perhaps a few mousetrap buffs might, but the world will come only if the man promotes it vigorously, and it is seen that there is money to be made from it. Many a good idea has withered on the vine for want of appreciation of its commercial potential. Samuel Morse, for whose development of the electric telegraph Jackson claimed credit, and took him to court over it, spent ten years promoting it at his own expense before he began to reap even a meagre reward.<sup>3</sup> Jackson built his house in the woods, and no one came. Morton put a large sign outside his. In fact, Morton's great contribution, apart from his demonstration of the feasibility of general anaesthesia, was that he saw that there was money to be made from it. Richardson reports, (although one would never draw attention to this in public), that even John Snow, after meeting a druggist bustling along with a large ether apparatus under his arm, thought to himself: 'If he can get an ether practice, perchance some scraps of the same thing might fall to a scientific unfortunate'. In our own time, when it was at first believed that five would be adequate for the needs of the whole country, the presence of the computer in so many homes is due entirely to the entrepreneurial activities of Clive Sinclair and Alan Sugar, who, in the early 1980s, saw that there was money to be made from it. Mr Wolfe, while allowing Morton his just due: 'He *did* introduce ether anesthesia to the world, and proving it was not without its concerns and risks' insists that it is his motives and methods that should be impugned. But it was those motives and methods that were needed to ensure the wide adoption of surgical anaesthesia.

In determining where the balance of credit between Morton and Jackson should lie, it is vital to consider the sequence of events. Because Mr Wolfe's approach is thematic rather than chronological, and at times discursive, this is not easy, but it is instructive to construct one's own time-line. From this it becomes evident that the crucial period in the relations between the two was from 23 October to 13 November 1846. Here there is room only for a bare account; but firstly, it must be appreciated that the events of the last quarter of 1846 were taking place against the background of the explosive take-off, after ten years of development, lobbying, public demonstrations and inducements, of Morse's electric telegraph. Here was one source of Jackson's discontent. He did not want to be left behind again.

It is not disputed that in June 1846 Morton entered into a contract with Grenville Hayden that he should, for a salary, take over the running of Morton's very successful and lucrative practice, in order to allow Morton to have more time to continue his experiments into the anaesthetic effects of ether. Also, Eddy, the lawyer, testified that Morton first enquired from him in early October about the feasibility of a patent, before his first public demonstration at the Massachusetts General Hospital on 16 October, which Jackson did not attend. Morton approached Eddy again on 21 October. Eddy enquired whether Jackson had played any part, as he had heard. On 22 October Jackson declined to be involved. He said he had not assisted Morton with his experiments, and did not want his name associated with the discovery. On 23 October Eddy urged Jackson to associate himself with Morton in the patent, and began to draw up the specification. This, having been read and approved by Jackson, was copied to Morton. On 27 October the patent papers were executed, receipt being recorded at the Patent Office on 10 November. On 12 November the patent was granted to Jackson and Morton, and the final seal was attached three months later.

Obviously the patent document is essential evidence in the adjudication of the ensuing dispute, but Mr Wolfe gives us only a broad description of it. He does not provide the full text, from which we could make up our own minds, but cites several publications where it can be found, none of them readily available to the ordinary reader. Fortunately it was reproduced by Dr Duncum as Appendix No.1 to her history of inhalation anaesthesia, of which Mr Wolfe appears to be unaware. Also, he does not tell us that since 1946, if not earlier, the US Patent Office has been unable to produce the original document.

The preamble to the patent specification states: 'Whereas, I, Charles T Jackson, of Boston, in the state of Massachusetts, chemist, have in conjunction with Wm T G Morton, of the said city, dentist, invented or discovered a new and useful improvement in surgical operations on animals, .... and likewise the said Morton is desirous of procuring a patent for the same, and whereas I am desirous of benefiting him, and not to be interested in any patent, I do, therefore, in consideration of one dollar, .... assign, set over, and convey to Morton all the right, title, and interest, in the said invention and discovery'.

In the patent specification, the applicants refer to themselves in the plural, with no indication that they are not equal participants. For example, 'we do hereby declare that the following is a full and exact description of our said invention or discovery'. Also, 'From the experiments we have made we are led to prefer the vapours of sulphuric ether to those of muriatic or other kind of ether ...'. Furthermore, it is implied that they had jointly gained considerable experience in the use of ether as a general anaesthetic: 'In order to render the ether agreeable to various persons, we often combine it with one or more essential oils having pleasant perfumes'. Also: 'We sometimes combine a narcotic preparation – such as opium or morphine – with the ether'.

But on 22 October Jackson had denied any connection with Morton's experiments. Either he was lying then, or when he signed the patent application. What does Mr Wolfe say about all this? Nothing; and whether his silence signifies embarrassment or approval we cannot tell. Not a word even when, on 13 November, the day after the granting of the patent, Jackson wrote to his friend Elie de Beaumont in Paris, claiming the entire discovery as his own. Surely the two-word epithet applied by Mr Dulles in 1956 to the best prime minister we had at that time, succinctly impugning both his uniplicity and his legitimacy, could have been applied with even greater justification to Jackson 110 years earlier. But Mr Wolfe makes no

attempt to analyse this sequence of events, passing off Jackson's action with the explanation that: 'It grated on Jackson's professional pride and ethical viewpoint that anything so beneficial to humanity should be regulated or restricted by letters patent'. But Jackson, in the preamble to the patent, had stated clearly that he was desirous of benefiting Morton. The obvious explanation, and the only one that makes sense, and is borne out by his actions up to that time and after, is that until 23 October at the earliest, Jackson had no idea at all of the importance of the discovery. Even on 27 October, when he signed the patent application, he had no conception of its significance. Only during the next two weeks did the penny drop, and it dropped with a resounding clang. Only then did he start to clamber on to the bandwagon, stamping on Morton, and trying to kick him off, as he did so.

Mr Wolfe spends twelve pages summarising the long, balanced, and ultimately pro-Morton account of the discovery by the lawyer Richard Dana, published in the popular Boston periodical *Littell's Living Age*, and reaches the conclusion in three dismissive paragraphs that it not only does nothing to advance Morton's claim, but damages it. Miraculously, *Littell's Living Age* is now available on the World Wide Web,<sup>4</sup> so we can all read Dana's article, and form our own opinion, which in this reviewer's case is quite the opposite. It is difficult to believe that Mr Wolfe was reading the same text. Then there was the occasion when Morton found his public standing and his practice virtually destroyed, because someone, purporting to be Morton himself, had threatened to take court proceedings against some patients in his debt. Mr Wolfe refers to this as a 'curious incident'.

In spite of all his shortcomings, Morton was able to inspire loyalty in some influential Bostonians, who were prepared to support him financially in his quest for Congressional recognition and reward. Mr Wolfe is scathing about Morton's expenditure in Washington, entertaining congressmen and suchlike. His comments read wryly in the wake of the Enron scandal. To paraphrase William Harvey, he writes of politics like a librarian, but that, of course, is to his credit. Mr Wolfe provides a great deal of information about Morton's applications to Congress, Jackson's blocking tactics, and the treatment that Morton received from him and the politicians, showing that trawling and digging for dirt, smearing, spinning, equivocation, procrastination, dirty tricks, false promises - even from the President himself, would you believe it, duplicity, triplicity, backstabbing, front stabbing, and stabbing vertically upwards, are not recently introduced phenomena in the District of Columbia.

In his last three chapters Mr Wolfe considers the place that should be occupied by those principally involved in the introduction of general anaesthesia. Rightly, he places Wells first, but devotes much space to the rehabilitation of Jackson. Morton receives short shrift; but without Morton nothing would have happened. It is true that Wells continued sporadically to use nitrous oxide in his dental practice, but for sustainable general anaesthesia an agent was needed that could be given with adequate air. Jackson was not going to do anything, and no one else was looking. It was left to Morton to start the wheel turning.

Fulton and Stanton, after considering all the evidence, concluded that their studies 'all support Osler and Welch in their conclusions that Morton rather than Long, Wells, or Jackson, deserves primary credit for the introduction of surgical anaesthesia'. They go on to say that: 'Morton would undoubtedly have rested his case and not reopened it in the spring of 1847, had he not been forced to do so by Jackson's aggressiveness. There can be little doubt that Morton was justified in defending himself publicly against Jackson's agitated claims and his insidious opposition to every attempt, public and private, to give Morton credit for his



achievement'. Nothing that Mr Wolfe has uncovered about Morton's early years provides a reason for disputing this judgement.

Mr Wolfe omits mention of some significant publications, for example that of the late Richard Ellis on Everett's letter,<sup>5</sup> which preceded Bigelow's. There are one or two misprints in the text, and one or two places where re-phrasing would have improved clarity. Some readers may find the amount of detail about the Morton family's land dealing excessive, but these might well be valuable to a social historian. Fortunes were being made in real estate, by J J Astor in Manhattan, for example, and W B Ogden and Charles Butler in Chicago. No doubt the Mortons, also, were hoping to strike lucky.

Mr Wolfe is, rightly, a confirmed Wellsian. He rightly considers that Morton was unfair to Wells, and was probably responsible for the slanted account of the unsuccessful public demonstration in Dana's article, which has so overshadowed his contribution. This may well be so, but the injuries done to Morton by Jackson and his lawyers were far greater, and Mr Wolfe may find that by whitewashing them he has defeated his own ends. Readers may come to feel sympathy for Morton, which is the last thing he wants. So let us hope that Mr Wolfe will find it in him to produce a more considered and balanced account in a second edition of this valuable book.

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