ISSN 1360-6891

THE HISTORY OF ANAESTHESIA SOCIETY PROCEEDINGS

Volume 31

Proceedings of the meeting in Sheffield
9th November 2002

includes Index Vols 1-30

HISTORY OF ANAESTHESIA SOCIETY

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HISTORY OF ANAESTHESIA SOCIETY
2002 Autumn Scientific Meeting, Hilton Hotel, Sheffield

Organising Committee

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Dr Neil Adams, Bury St Edmunds

The organisers would like to thank the following for their generous support:

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Proceedings of the History of Anaesthesia Society
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80 Green Lane
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Tel: 0151-722-4941
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Publication Co-ordinator: Dr F E Bennetts

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

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

Editorial

In his review of the Proceedings of the last International History Symposium in Santiago de Compostela David Zuck expressed reluctance to attribute to anyone the first performance of anything, because of rival claims. Nevertheless, the entertaining one-day meeting in Sheffield (in itself a first), hosted by Adrian Padfield our President, contained some papers with references to original achievements.

These included Ann Ferguson's historical account of arrow poisons leading up to the first clinical muscle relaxant, David King's report on the first anaesthetic critical incident (1847), and Alan Dronsfield (with introductory material by John Pring) tracing the path to the discovery of halothane, the first 'designer' anaesthetic. It was also clear from Michael Essex-Lopresti's paper that anaesthetists have been first choice to sit on planning committees for new operating theatres. Aileen Adams' title suggested a debate on the primacy of human or animal medicine, but it resolved into more of a comparison.

As well as priorities there was another thread running through the papers: that of uniqueness. The British Council would fit this description, and Keith Sykes' paper on their work for anaesthesia was valuable also because records before 1980 have apparently been lost. Marin Marais' musical impression of an operation for stone is surely unique, and Douglas Howat's use of musical illustration is another first. Jimmy Payne used the word unique to describe Norman Bethune; one of the justifications for this was that his obituary was written by Chairman Mao.

Elsewhere in this interesting meeting we heard from Jan Humphries, of the Thackray Museum, solving one equipment problem and then finding another, about Alistair McKenzie's project to catalogue Historical Books and Pamphlets on Anaesthesia, and David Lai has discovered Pentothal Advertising Postcards and a book by Humphry Davy.

We apologise to our overseas Honorary Members for omitting them from their due place in volume 30, and hope that they enjoy their reinstatement.

PMED

FUTURE EVENTS

2003 4-7 September
British Society for the History of Medicine, 20th Congress, University of Reading. Contact: Dermot O'Rourke. E-mail: Dermot@ouvip.com

8 November
HAS Autumn Meeting, East Grinstead
Contact: Dr C Barham. E-mail: chris_barham@compuserve.com or
Dr Ali Diba. E-mail: Ali.Diba@QVH.NHS.UK

2004 2-3 July
HAS Summer Meeting, Grange-over-Sands
Contact: Dr Miles Rucklidge. E-mail: Miles@ohfi.freeserve.co.uk

6 November
HAS Autumn Meeting, Liverpool
Contact: Dr Peter Drury. E-mail: pmedrury@aol.com or
Dr Anne Florence. E-mail: gasflo@btinternet.com

Members and guests attending Sheffield meeting

Dr A K Adams	Cambridge	Dr A Leslie	Altrincham
Dr C N Adams	Bury St Edmonds	Dr K McLeod	Huntingdon
Dr E N Armitage	Brighton	Dr O Mather	Dewsbury
Dr J M Anderton	Altrincham	Dr E T Mathews	Birmingham
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Dr M Barton	London	Dr I McLellan	Leicester
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Prof A Dronsfield	Derby	Dr Y Pole	Manchester
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Mrs V Drury	Liverpool	Dr R J Purnell	Norwich
Prof T C Gray	Liverpool	Dr M Rucklidge	Lancaster
Dr R Gregg	Nova Scotia	Dr M Skivington	Bournemouth
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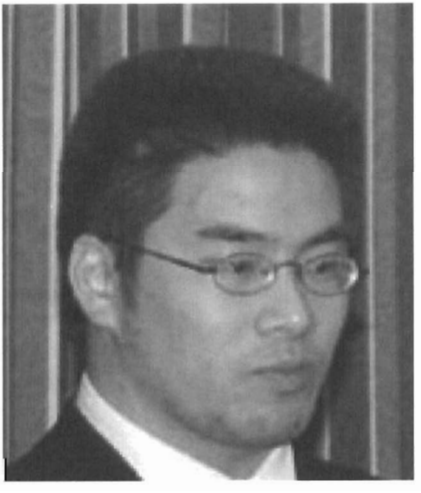
Mr A Humphries	Leeds	Dr G Whitfield	Scarborough
Dr D King	London	Mrs P Willis	AAGBI
Dr A Kuipers	Shrewsbury	Mr J Willis	Bexley
Dr J R Lo	London	Dr T M Young	Manchester
Dr D Lai	Boston, Mass	Dr D Zuck	London

Dr Ann Ferguson

Professor Sir Keith Sykes

Dr D Howat



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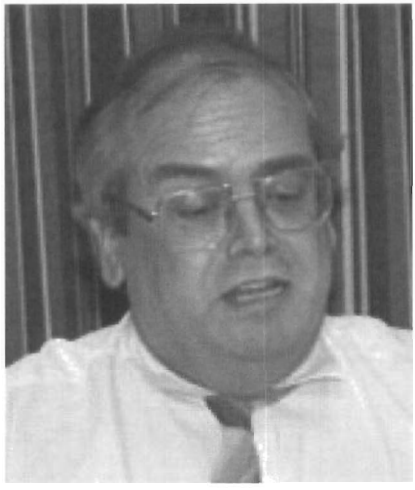

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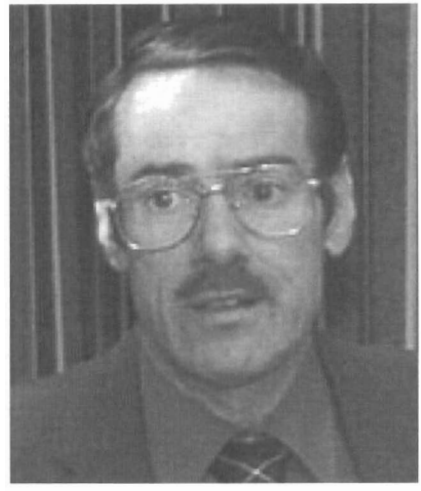

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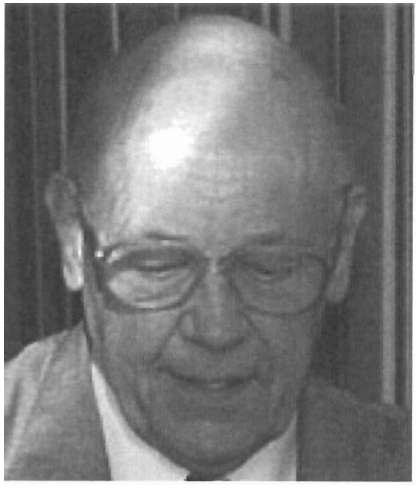

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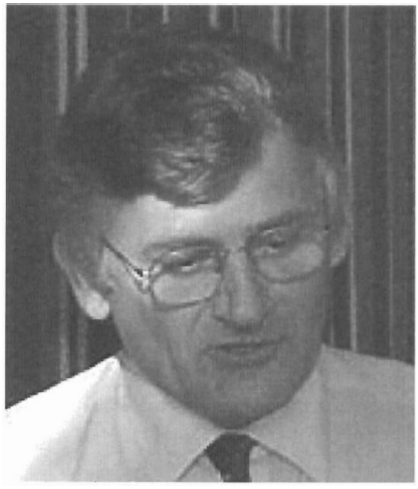

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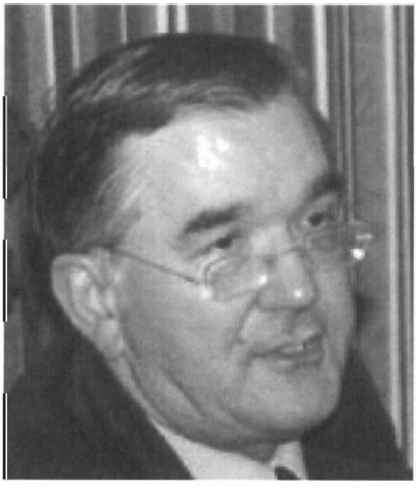

Professor A Dronsfield

Professor J Payne

HISTORY OF ANAESTHESIA SOCIETY

Papers presented at the Sheffield Meeting 9 November 2002

THE EARLY HISTORY OF CURARE

Dr Ann Ferguson, Retired Consultant Anaesthetist,
Queen Elizabeth the Queen Mother Hospital, Margate

Introduction

This lecture is on the early history of the discovery of curare. In order to investigate it, I have read some wonderful books. In one of them, *The Alarming History of Medicine*, by Richard Gordon, novelist and sometime anaesthetist, modern anaesthesia is described thus:

> 'The world's operating tables are now filled day and night with people suffering the equivalent of a hit by a poisoned dart from a blowpipe. The patient's paralysis offers the surgeon flaccid rummaging..'.[1]

My brief for today is to take you through the discovery of crude curare, from its use as a constituent of arrow poison, to 1942 when Harry Griffith, working in Montreal with a purified preparation, made flaccid rummaging a clinical possibility, and of which Cecil Gray later said:

> 'We are all convinced that this had the same significance for our specialty as Listerian antisepsis had to surgery'.[2]

Before doing this, I must describe the continuing use of arrow poisons in Equatorial South America. Methods of manufacture and use have not changed greatly. I believe my sources to be accurate. I have read a great deal, including Schultes, Gill, Plotkin (see bibliography) and the Iquitos Review, talked to a local doctor, and to naturalists in Brazil and Peru. Not a great deal has changed, and curare is still widely manufactured.

Source and Manufacture

The word 'curare' is one of very few words to come into the English language from South American Indian languages. It comes from the Indian name, uirary uira=bird eor=to kill. Curare, like rubber, can be obtained from a variety of plants. It may have developed early in the evolution of South American plants, and presumably is in some way protective. There is one plant found in Africa which gives curare. However there are certain plants which give better or stronger curare, such as Strychnos (Figure 1) and Chondrodendron.

The curare poison is made entirely by men, who disappear into the forest for days to make it. There are countless taboos about its manufacture; they won't do it if their wife is pregnant, or they have a newborn or sick child. No woman is allowed to see the process. When made, curare is stored in whatever vessel is to hand. There were descriptions of different curares being stored in gourds, calabashes etc. This just is not true, and from the 1950s onwards, the favourite vessel was a tobacco tin. Some white men have now learnt the skill; for example Richard Fowler who wrote the article in the *Iquitos Review*, and Richard Gill who was a fully qualified Brujo, complete with fancy head dress.

Figure 1

Weapons and prey

The weapons they use are the bow and arrow, and the blowgun. The arrowheads are detachable, made of palm wood (which is very hard), and are described as being like a cutting needle with grooves on it into which the curare sticks. They are stored in a bag and the head is only put on to the arrow, for safety's sake, just before it is shot. It detaches itself in the animal, and the flèche can be used again. Blowguns are used for smaller animals, and a good one would be about 9 feet long. The darts are only 9 to 12 inches long, and are notched with piranha teeth just before firing, so that they stay in the wound. When they have killed their prey, the Indians cut out the area in which the arrow poisoned tip was embedded, so that they do not eat a high concentration of curare. It is active by mouth if one eats enough. Excision and/or cautery is the only method of treatment for accidental injection.

According to Plotkin, they do not always use arrow poison. If they are hunting tapir, a very shy animal, they use big arrowheads in the vertical plane, to pass between the ribs. If they are hunting their enemy, the arrowheads are in the horizontal plane, because that is the correct orientation for their ribs. When hunting toucan, to make their head-dresses, they use blunt arrows, which stun but do not kill the bird. Monkeys, which live high in the tree canopy, are considered a great delicacy. They have long tails, which in times of danger they wrap round the branches of trees. Using curare stops them from fastening themselves to the tree canopy when attacked, so as they die, they fall to the ground.

Why don't they use guns? There are three reasons. Firstly, theirs is not a cash economy, and they need to buy ammunition, which they cannot afford, and the distances they have to travel to get it are great. Secondly, it is very humid there, and things corrode or go mouldy very

quickly. It is difficult to keep a gun in good condition. Thirdly, the noise. Although Gill said that the Indians loved the noise made, especially by muzzle loading guns, there is not that much food about and the noise of a gun frightens everything away. The early history of curare is perforce, a study of changing European perceptions about it. It was viewed initially as a weapon, then as a curiosity and finally as a potentially useful drug.

Travellers' Tales.

Soon after the discovery of the Americas, Spain and Portugal divided up the world along the line 370 leagues west of the Cape Verde Islands, in the Treaty of Tordesillas. No one could decide exactly how long a league was, or where the Cape Verde islands finished, so the line is a bit vague. To start with, the men landing in South America were soldiers. Since the discovery of the Americas, travellers' tales have always attracted attention, and the more sensational the story, the more people want to believe it. Much truth lies in the overlay of exaggeration. Wonderful stories were brought back about fighting women who cut off one breast, of arrow poisons, men with their feet on backwards, and Othello tells us of 'The Anthropophagi and men whose heads do grow beneath their shoulders'.[3]

The invaders were largely illiterate, and the main text on the discoveries there was written by Peter Martyr d'Anghera in 1516 in *De Orbe Novo*, which contains many references to deadly poisons and weapons. The description of the manufacture of curare is particularly interesting:

> 'There are certain old women skilled in the art, who are shut in at certain times and furnished with the necessary materials; during two days these women watch and distil the ointment. As soon as it is finished the house is opened, and if the women are well and not found lying on the ground half dead from the fumes of the poison, they are severely punished, and the ointment is thrown away as valueless, for the strength of the poison is such that the mere odour of it almost kills its makers.'[4]

This story, which sounds as though it is straight out of Macbeth, was accepted as the truth for two and a quarter centuries.

There were several stories of people killed in war by curare. In 1542, Orellana, cousin of the Pizarro brothers, went down the Amazon by accident. At one place where there was a battle with Indians a soldier was killed. He describes the wound as coming from a poisoned arrow. As the leg went black and it took the soldier three days to die, I do not think that this was due to curare. I am told that that there is another account of a death following a poisoned arrow in war in Western Brazil, but I have been unable to find it.

From 1592, Raleigh made several trips up the Orinoco. He also describes injuries from the arrows, but if I read the account out to you, I think you would all diagnose abdominal sepsis. Raleigh is credited with bringing curare back to Europe. I can find no evidence for this. He does not claim to have done so in his book. He does however mention antidotes, such as garlic, and total abstention from strong drink.

De la Condamine

Because of the belief that gold was present in vast quantities in South America, Spain and Portugal refused entry to travellers. In Europe, with the coming of the Age of the Enlightenment, there was a wish to investigate the world, as opposed to conquering it. In 1735, Charles Marie de la Condamine was sent to Quito by the French Academy of Science. He was to measure an arc of the meridian of 3^{o} to see whether or not the world was an oblate spheroid, that is to say, flattened at the poles. He stayed for 7 years. He was a remarkable man, described by Voltaire as having 'une curiosité ardente'. This he applied to Barbasco tree bark, (used for stunning fish), platinum ores and cinchona seeds. He was the first to use rubber to make containers for his scientific equipment, and to waterproof cotton fabric.

He travelled down the Amazon by canoe on his way home, and it took three months. He was accompanied by Indians who looked after him, and caught his food for him using 'arrows propelled by the breath'. This was the first account of blowpipes. He was interested in the poison used, and said the meat was remarkably sweet, presumably because the animal did not struggle. He wanted to find antidotes; he tried both salt and sugar. While waiting for a ship at Cayenne, he experimented with crude curare on animals, and, having brought a plentiful supply home, he repeated these experiments when he got to Leiden in 1745. It is said that Boerhaave attended these demonstrations, but as he had died in 1738 I think it is more likely to have been Van Sweeten. However, de la Condamine still wrote about the old ladies manufacturing curare, and added that they were 'criminal' old ladies. The story was given further credence by Herrissant, who had to rescue a small boy who was becoming unconscious while boiling curare. Herrissant pulled him out and he recovered.

Bancroft and Fontana

Our next interesting character is Edward Bancroft 1744-1821, an American who went to Guiana to work as an unqualified physician. While there he wrote a book on the natural history of Guiana including a recipe for making curare, although he did not see it made.

> 'Take of the Bark of the Woora six parts;
> Of the Bark of the Warracobba Coura two parts;
> Of the Bark of the Roots of the Couranapi, Baketi, and Hatchybaly of each one Part'.[5]

(One begins to understand where Edward Lear and Lewis Carroll got their inspiration). All this was to be finely scraped, simmered, squeezed and then evaporated, left to cool and then put on the arrows. Bancroft came to England, where he deposited a large amount of woorara with Mr Beckett in the Strand:

> 'for the use of any gentleman whose genius may incline him to prosecute these experiments and whose character will warrant us to confide in his hands a preparation capable of perpetrating the most secret and fatal villany'.[5]

Some of his curare was passed to Benjamin Brodie.

Bancroft qualified, lived in Downing Street, and acted as a double agent for the British during the American War of Independence. When Franklin signed a secret treaty with the French, Bancroft had it in British hands in 27 hours. The story is better than James Bond, involving

invisible ink and dead drops in the Tuileries. Unfortunately, his grandson burnt most of his papers.

Abbé Felix Fontana was sceptical about the old ladies story and did some very elegant experiments presented to the Royal Society in 1780.[6] He exposed pigeons to fumes of curare with no deleterious effects, repeated this experiment on himself, and reported that:

> 'The odour of the dry poison when burnt on the coals is very disgusting, and smells like excrement.'

He did further experiments including putting it on the sciatic nerve of a rabbit. His work is, for its time, as good as that of Bernard.

Von Humboldt

Alexander von Humboldt (1769-1859) with the surgeon Aimé Bonpland, planned a trip up the Nile. Fortunately for us, Napoleon blocked the way, so they went to South America instead. Humboldt was a master of all branches of science at the last moment in history that this was possible. His greatest contribution to science was not to discover the unknown, but to rediscover what was known by only a few, to subject his findings to a more thorough scientific analysis than they had received before, and to sift the mass of facts, theories, and nonsense through the sieve of his remorseless logic. He is famous for a current, which he did not discover, and a river, which he never saw. He has been described as the greatest man in the world and the greatest man since Aristotle.

His route took him up the Orinoco, and then down the west coast. The Spanish crown had zealously kept foreigners out of its colonies, especially heretical scientists, science being anathema to Spanish culture. No permission was granted to any visiting scientist between the time of de la Condamine and Humboldt. Although Spain allowed him into their territories, Portugal continued to refuse him entry because he was a scientist, an abolitionist (Portugal depended on slavery in Brazil), and an admirer of the French Revolution. He attended a local Indian festival, which he likened to our harvest festivals, where everyone was drunk, but the 'chemist' of the group was less drunk than the rest, and allowed them to watch him making curare. This was the first time a white man had seen it made. 'On the Orinoco banks you cannot eat chicken that has not been killed by a poisoned arrow'.

Posterity was nearly denied the benefit of the 29 books he wrote about South America, because he kept some curare in one of his socks. His feet were badly affected by chiggers and were bleeding, and if he had put a curare-laden sock on to one of his bleeding feet he would have been paralysed. Fortunately he realised his mistake in time. The curare he brought back was passed to Magendie, who taught Claude Bernard. However, with his witnessing of the manufacture of curare, the myth of the old ladies was now completely exploded.

Charles Waterton

The last of the major amateur investigators of curare (or, as he called it, woorara) was Charles Waterton (1782-1865). He was a well-to-do passionate Catholic, fearless to the point of lunacy and dreadfully accident-prone. He learnt Spanish on his grand tour and then went to

Demerara to look after the family sugar plantations, but went off on four wanderings, during the first of which he investigated curare very fully. He described both the equipment and the pharmacology of the drug in his book. The bows he described as six to seven feet long, and the arrows four to five feet long, with detachable spikes which fit into a square hole in the end. The blowpipes were ten to eleven feet long, and perfectly smooth within. The Indians kept them in the roofs of their houses and they were perfectly clean. There was a quiver made of tapir skin for the arrows and a basket of wild cotton for the ends of the darts. There were two acouri teeth along the pipe as a sight. His pharmacological studies were detailed for the time. With regard to the manufacture and storage of the drug he described the ingredients of which there were a great many. It was kept in a calabash and kept dry so that it did not go soft. He noted that the curare paste had to be fairly hard on the arrow or dart, or it would be pushed back along the dart by the skin as the dart entered the animal and therefore would not work. The man making the curare must not expose himself to the fumes.

The action of the drug in vivo interested him, and he described using curare to kill a dog. He thought it had to enter the blood, but then worked on the nervous system. It appeared to cause no pain. He tried a poisoned arrow between the skin and muscle of a fowl so that the dart did not incommode the bird, but it still died in a few minutes; therefore it had to be the curare:

> 'The quantity of poison must be proportional to the animal, and thus those probably labour under an error who imagine that the smallest particle of it introduced into the blood has almost instantaneous effects'.

He looked at the amount he had used to kill an ox, and the amount used to kill a fowl, and concluded that the fowl had received proportionally much more (dose per unit body weight was the term he would have used 100 years later), and that was why it had died so much faster. He was interested in the existence of antidotes, but believed that there probably were none. Waterton also brought lumps of curare home to Great Britain, and some in Wakefield Museum is said to be still potent.

Conclusion

The scene was now set for the scientists and physicians of the 19th century to see what they could do to further investigate the actions and therapeutic uses of this fascinating drug.

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This paper was part of Ann Ferguson's presentation for the Diploma in Medical History at the Society of Apothecaries, which she duly obtained, and as a result of which she was invited to give the Osler Lecture in 2004.

BRITISH COUNCIL COURSES IN ANAESTHESIA

Professor Sir Keith Sykes, Emeritus Professor, University of Oxford

I have always felt that the British Council has done more to promote Britain's image abroad than most people realise. However, when a recent enquiry to the Head Office in London revealed that there are now no records of British Council involvement with anaesthesia before 1980, I decided that I should document some personal recollections from the period 1956-1980.

The British Council

The British Council's main aim has been to promulgate a favourable image of Britain abroad. There are offices in many cities throughout the world, and members of its staff maintain close contacts with local establishments such as schools, universities, hospitals and business organisations. Through this network the Council has sponsored overseas visits and lectures by British experts in many fields of endeavour. It has also provided advice for those wishing to visit Britain for short- or long-term study. In some cases it has not only organised these visits, but has also provided scholarships to support study in British institutions. It has provided books and journals, so that the local population could keep up to date with developments in Britain and, in places like Malaysia, it has run centres for the teaching of English. Many British anaesthetists have given lectures abroad and have welcomed British Council sponsored visitors to their departments. However, the British Council's major contribution to anaesthesia has undoubtedly been the organisation of a number of short courses that have been a regular feature of the post-war period.

Courses held before 1974

My first encounter with the British Council courses in anaesthesia was as a Senior Registrar at University College Hospital in the period 1956-1958. By that time a number of the future leaders in our specialty had undergone training in the United States, Canada, Australasia or the United Kingdom, and had returned home to train their compatriots. The World Health Organisation courses in Denmark had started in 1950 and provided training for a further 20 or so doctors each year, but there was still a major shortage of properly trained anaesthetists in most of the European and Third World countries. The one- or two-week courses on clinical aspects of anaesthesia, run by the British Council, thus provided an ideal opportunity for overseas anaesthetists to see what could be accomplished by the use of modern techniques of anaesthesia, and to establish contacts with British anaesthetists who could help them in the future.

Seventeen such courses were held in the post-war period up to 1974. There were about 40 anaesthetists on each course and they were accommodated in a London hotel. The courses were organised by a member of the Board of the Faculty of Anaesthetists in co-operation with the British Council staff, and a British Council representative resided with the course throughout their stay. These friendly ladies were invaluable. They met the participants when thy arrived, coped with all the domestic arrangements and emergencies, accompanied them to their assignments, picked up their umbrellas when they left them behind, and generally acted as superb mother hens.

Each day coaches would transport groups to one of the twelve undergraduate teaching hospitals, or to one of the specialised centres such as the Brompton Hospital for Diseases of the Chest, the London Chest Hospital, Great Ormond Street Hospital for Children, or the Queen's Square Hospital for Nervous Diseases. Some groups also visited peripheral centres of excellence such as the Nuffield Department of Anaesthetics at Oxford (Prof RR Macintosh), the Plastic Surgery and Burns Unit at East Grinstead (Drs Hale Enderby and Russell Davies), Hillingdon Hospital (Dr HJV Morton), or Barnet Hospital (Dr JD Rochford).

Programme

In most centres it was the responsibility of the Senior Anaesthetic Registrar to see that the participants were suitably entertained. The day usually started with a brief history of the hospital and a description of the organisation of the anaesthetic service from one of the Consultants. The visitors would then be distributed round the various operating theatres, and rotated at intervals so that they could see a variety of techniques used.

This was where the Senior Registrar's tact and diplomacy was severely tested. Those who experienced the conditions at the time will remember that there was a wide variation, not only in the techniques used, but also in the standard of anaesthesia provided by different individuals. Some consultants were well-read, used modern techniques and displayed excellent clinical judgement. Others rarely read a journal, persisted with out-of-date techniques, and only passed a tracheal tube occasionally. Consultant anaesthetists would usually be present when the consultant surgeon was operating, but at other times they might demand that a registrar be sent to relieve them to enable them to undertake a private case elsewhere.

There were also problems with some of the surgeons. Consultant surgeons working in teaching hospitals were forced to tolerate the presence of medical students in the theatres, but silence could easily be maintained by an acerbic remark or a well-aimed Spencer Wells forceps. However, a group of excited foreigners, prattling away in their own tongue, or even daring to speak to *their* anaesthetist, was another matter!

We all looked forward to the lunch break, for this not only enabled us to sample a nice buffet lunch in the Board Room, but also provided an opportunity for frank discussion with our guests. We used to try and explain some of the curious techniques that they had witnessed, and we would gently remind participants that the standard of anaesthesia in many provincial centres was at least as good, and in many cases better, than in London. This, of course, was the direct result of the National Health Service and the influence of the Royal Colleges, and has to this day remained one of the unique features of our medical organisation.

After lunch the group would return to the theatres, or a consultant might give a formal lecture on some topic of interest. Occasionally, there would be a brief review of a clinical topic, a case report, or a presentation of a research project by one of the junior anaesthetists. At about 5pm the participants would return to their hotel, and they were then free to spend the evening as they wished.

At the beginning and end of the course there would be a formal dinner with officials from the British Council and some of the anaesthetists participating in the course. These dinners were usually very convivial affairs and provided an opportunity to develop friendships, to learn

about the state of anaesthesia in other countries, and to meet British Council staff. It also provided an excellent opportunity to meet colleagues from other hospitals in London whom one would never have met otherwise.

A new course format

I moved to the Postgraduate Medical School at Hammersmith Hospital in 1958. Initially, our British Council Programmes were orientated towards the clinical aspects of anaesthesia, but after 1965, when we opened a number of research laboratories, we started to offer research papers and laboratory demonstrations. We soon found, however, that most of the participants were only interested in clinical anaesthesia, and utterly bored by research. I remember saying to one of my research fellows at the time that we could have a more productive exchange of views if we sat down and talked to them over a drink. The research fellow, who was a man of action as well as having private means, took me at my word; and when I arrived to give the laboratory demonstration I found that every one was drinking champagne! Some years later, I visited Prof Karl Steinbereithner's laboratory in Vienna and complimented him on the excellent choice of wines in his laboratory refrigerator. He told me that the idea had originated with that party in Hammersmith several years before!

By the mid-seventies many more anaesthetists had been trained, and it was obvious that there was no longer the same need for a clinically-orientated course. The British Council agreed that we should develop a course for the younger generation of anaesthetists who were trying to advance the academic aspects of the subject. The aim was to create a dialogue between the potential future leaders of our profession in this country and abroad by critically evaluating the methods of organising teaching and research in our own academic departments.

The new courses

The new courses lasted two weeks and were entitled 'The organisation of teaching and research in anaesthesia'. The first was held in 1975, and was followed by similar courses in 1977, 1978, and 1980. We limited the number of participants on each course to 35. The advertisements stated that 'The course is designed to illustrate the part played by the academic departments and various national bodies in the development of teaching and research in anaesthesia in the United Kingdom'. We also stated that the course was intended for 'Professors and Heads of departments from overseas, preference being given to those who are actively concerned with the development of teaching and research in anaesthesia'.

Participants

Fortunately we had a good response to our advertisements and were able to select high quality applicants. The four courses were attended by a total of 141 anaesthetists from 39 different countries. As can be seen in figure 1, there were a large number from the British Commonwealth. This could have been a disadvantage, but actually proved helpful because

Fig 1:British Council Courses.141 participants from 39 countries.

Africa, Central 4	Iceland 3
Africa, South 9	Iraq 2
America, Central and South 5	Israel 4
Australasia 27	Italy 5
Austria 7	Malaysia 4
Belgium 3	Netherlands 2
Canada 8	Norway 4
Denmark 6	Sweden 2
Egypt 7	Switzerland 3
Far East 5	Turkey 2
France 8	Yugoslavia 4
Germany 11	Other 6

Figure 1

Fig 2. British Council Courses

1975 London, Sheffield, Edinburgh
-35 participants.

1977 London, Liverpool, York
-36 participants.

1978 London, Cardiff, Southampton
-39 participants.

1980 Cardiff, Sheffield, London
-31 participants.

Figure 2

these doctors were familiar with our methods and our problems, and were very active in discussion. Furthermore, each course contained a good mix of anaesthetists from other countries, most of whom not only spoke excellent English, but were genuinely interested in the topic. What was particularly striking was the quality of the applicants. Most of them were Professors or Heads of Departments, and many of the more junior members have since achieved professorial status.

Course format

The basic format of each course consisted of an introductory day, a series of day trips to departments in and around London, and longer expeditions by coach or rail to regional centres. The first three courses were initially based in London and then moved to the provinces, but it gradually became apparent that members only began to interact with each other when they moved away from the distractions of the big city. For this reason we started the 1980 course in Cardiff (Figure 2).

I did not travel to Scotland with the 1975 course, but feedback from participants convinced me that I should accompany future courses, so that there was always a tour guide who could comment on our itinerary, answer questions, and lead discussions with our hosts. This turned out to be a very productive idea because we spent many hours in coaches, and were able to use the time to explore common problems. It also enabled me to talk about aspects of our professional life which were not covered during our visits.

There was no problem with the tourist aspect of our trips because I had researched the route fairly thoroughly, and the British Council usually provided local guides. However, when questions moved to our political system, our football teams, the cost of council housing, or the social benefit system, my ignorance was fully exposed. I may say that few of our ambitious programmes were completed without incident, but our participants were very patient, and usually voted to extend the programme rather then curtail it.

In London participants spent the first day at the Royal College of Surgeons, where there was a programme of lectures designed to provide essential background information about the British scene. These lectures were given by senior figures in the medical establishment, and outlined the pattern of medical training and practice in Britain, the organisation of the National Health Service, and the role of the Universities, Royal Colleges and other institutions in training for specialist practice. After a buffet lunch with the speakers, participants were taken on a tour of the Charles King collection of Historic Anaesthetic Apparatus by Dr Bryn Thomas or a deputy, and then visited the Hunterian Museum.

The rest of the programme varied from year to year. For example, the 1975 and 1977 courses went to the meetings and dinners of the Anaesthetic Research Society, while members of the 1980 course participated actively in a two-day Symposium on 'Education in Anaesthesia' organised by the Faculty of Anaesthetists. Visits to one or two of the London teaching hospitals, the Research Department of Anaesthetics at the Royal College of Surgeons (Prof J P Payne), the Royal Postgraduate Medical School (Prof J G Robson), the Clinical Research Centre at Northwick Park Hospital (Dr J F Nunn), and the Nuffield Department of Anaesthetics at Oxford (Prof A Crampton Smith) were always included in the programme. Each department provided talks on the clinical service and the teaching programme, and the organisation and funding of research. There was also an opportunity for participants to see

special facilities such as intensive care units or laboratories, and to mix socially with members of the department.

Regional Visits

The other component of the courses, which also varied from year to year, was the programme of regional visits. We chose centres that were making innovative approaches to training and research. For example, both Liverpool and Sheffield were tackling the staffing problem in peripheral hospitals by the creation of SHO training programmes with enhanced facilities for distance learning, while at Southampton we examined the role of the anaesthetic department in undergraduate education. Visits to Cardiff, Glasgow and Edinburgh highlighted national differences in the delivery of health care, and provided a different slant on training and research.

It has to be admitted that the choice of regional centre was partly influenced by its tourist potential, for I was very keen to show our guests something of our heritage. We went by coach to Liverpool and stopped off for a tour of Chester on the way. We had a series of papers on distance learning techniques in the afternoon and visits to some of the peripheral hospitals next morning. In the afternoon we had guided tours of both the Cathedrals, followed by tea in the grandiose Mayoral Chambers. The surroundings were spectacular, but what also amazed us was the number of local foreign diplomats who had been brought along by the British Council to meet their compatriots. Presumably their posts had been created when Liverpool was a great port, and they had never let their countries know that conditions had changed! Our regional hosts were always extremely generous with their time, and that evening we were entertained in the homes of local consultants. Each group of three or four participants was given a bottle of wine for the host and some flowers for the hostess, and dispatched to their destination by taxi.

We then took our coach across the Pennines for an afternoon programme at the Leeds department, drinks with the Yorkshire Society of Anaesthetists and accommodation in a hotel in York, and then went to the Anaesthetic Research Society meeting in Leeds the next morning. On the Sunday we visited York Minster and then drove to Lincoln to see the Cathedral. After the visit we were all entertained to tea by Dr Fraser, an anaesthetic colleague who lived in the Cathedral Close, before returning to London.

Course evaluation

I have tried to give a flavour of what, to me, were very special experiences. I am afraid that I used my friends and what little influence I had in high places to achieve my ends, and I am aware that I gained far more from the experience than any of those on the course. What gradually became apparent was that our training programme was completely dominated by the need to pass the Fellowship examination, and by the large number of failures, particularly in the first part of the examination. Our trainees were expected to carry a huge clinical load and had little time for study, with the result that the education system was very inefficient.

But there were two other surprising outcomes from these courses. Firstly, many of the participants who came from countries where training took place in only one institution, and where progression to a career post was dependent on a professorial recommendation, were persuaded that there were enormous benefits to be gained by instituting a recognised national

standard, such as that provided by the Fellowship examination. Secondly, it was brought home to us that we were immensely privileged to have institutions such as the General Medical Council and the Royal Colleges, to maintain our independence from government in both the professional and academic fields. These were important messages, and they came across loud and clear.

Conclusion

The British Council has continued to run courses in Anaesthesia, Intensive Care and Pain Relief but its finance, and therefore its activities, have been curtailed. I think we should acknowledge its past contribution to the development of anaesthesia world-wide.

BOSWELL ON RESUSCITATION

A certain Dr Monro (Edinburgh) is reported by Boswell as saying that:

> 'It is more difficult to recover a hanged person than a drowned, because hanging forces the blood up to the brain with more violence, there being a local compression at the neck; but that the thing might be done by heat and rubbing to put the blood in motion, and by blowing air into the trachea, and introduce a pipe.
>
> 'Ten or twelve of his students had, unknown to him, tried to recover Brown and Wilson (clients of Boswell), but had only blown with their own breaths into the mouths of the subjects, which was not sufficient'.
>
> From Wain J, *The Journals of James Boswell*: Heinemann, 1990.
> (submitted by Adrian Padfield).

MUSICAL DESCRIPTION OF UNDERGOING LITHOTOMY WITHOUT ANAESTHESIA

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After hearing my paper on the experience of Fanny Burney's mastectomy; [see Proc HAS **29**;13-20] which I first gave two years ago at the History of Anaesthesia Satellite meeting at the World Congress in Montreal, Dr Fouad Salim Haddad, an anaesthetist at the American University in Beirut, was good enough to send me the score of the music which Martin Marais composed in 1725, to record his sensations when undergoing lithotomy for a stone in the bladder.

Martin Marais

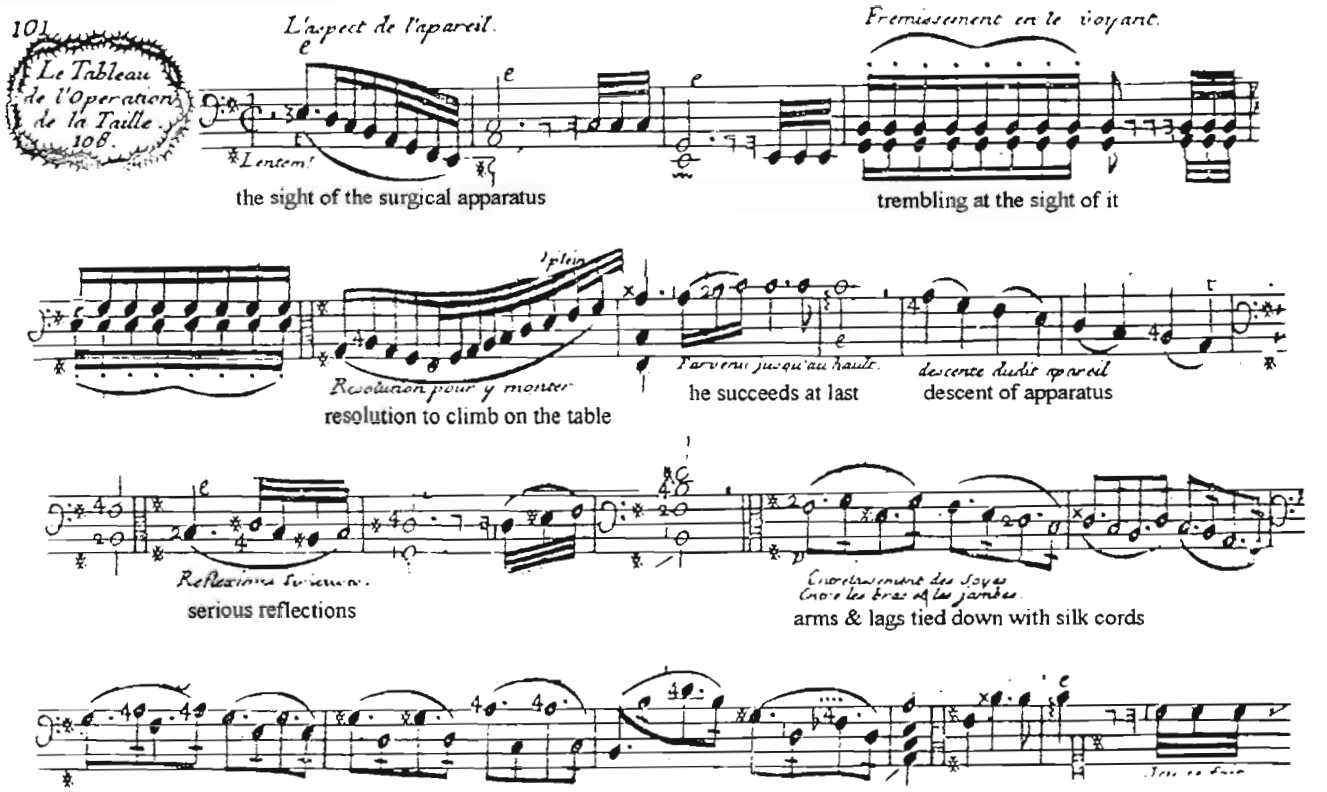
Martin Marais was born on 31 May 1656 in Paris, where his father was a shoemaker. He became a choirboy at Saint Germain l'Auxerrois, but he began studying the bass viol, and was so highly thought of that at the age of twenty he became a musician at the court of Louis XIV. Here he was taken under the protection of Jean-Baptiste Lully, who was the chief musician at the court and under whom he studied composition.[1] At the age of twenty Marais married Catherine Damicourt, the daughter of a saddler[2] and had nineteen children, of whom only nine survived into adult life. Several became musicians. Marais later became violist to the king, and composed many pieces for the viol. He went on to compose two operas, and a Te Deum on the convalescence of the Dauphin in 1701. It appears that the Dauphin, being a good Catholic, stuffed himself with fish on the day that Lent ended; and as he commonly ate more than three men would, suffered a very severe attack of indigestion![3]

The Viol

Marais became the best known composer and player of the viol of his day in France, and was well-known throughout Europe for his compositions. He retired in 1725 to cultivate his garden. He was unhappy with the increasing vogue for Italian music, although he continued to give lessons on the viol once or twice a week.[3] He died on 8 August 1728. The term viol now applies to any instrument which is a precursor of the modern violin. The term 'viola da Gamba', an Italian phrase, means the 'leg viol' and refers usually to the bass viol, itself a precursor of the violoncello.[4] It could be played resting between the musician's legs, like the modern violoncello, or held across the thighs.

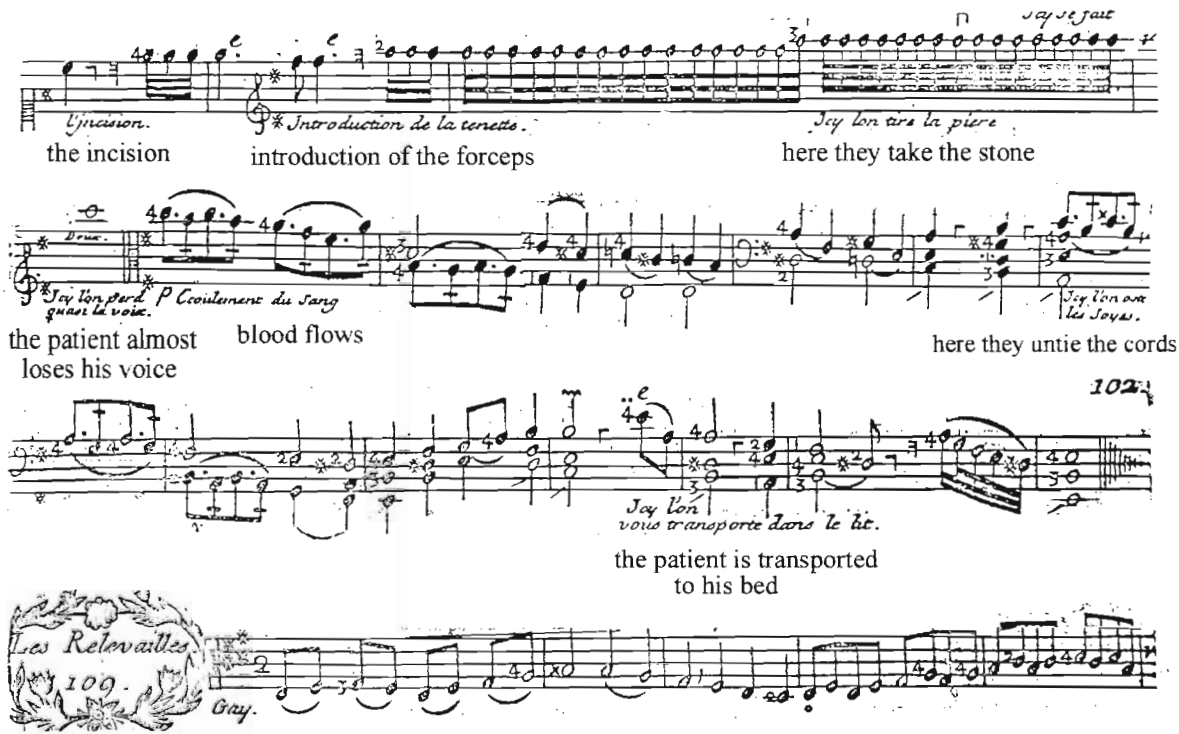
Marais' music

In the piece which follows, which Marais entitled 'Tableau de l'Opération de la Taille', or 'Description of the operation of cutting for stone', he describes his sensations in music when he had to undergo this harrowing procedure. Indeed I need hardly remind you that in those days lithotomy involved an incision through the perineum in order to open the urethra and bladder to remove the stones. Before the days of anaesthesia it must have been extremely painful, and the mortality was high. The patient had to be held down or, in Marais' case, strapped to some sort of apparatus. The exact date of the operation is not known, but it was some time between the publication of his fourth book of pieces for the viol in 1717 and that of the fifth book in 1725, in which this appears.[5]



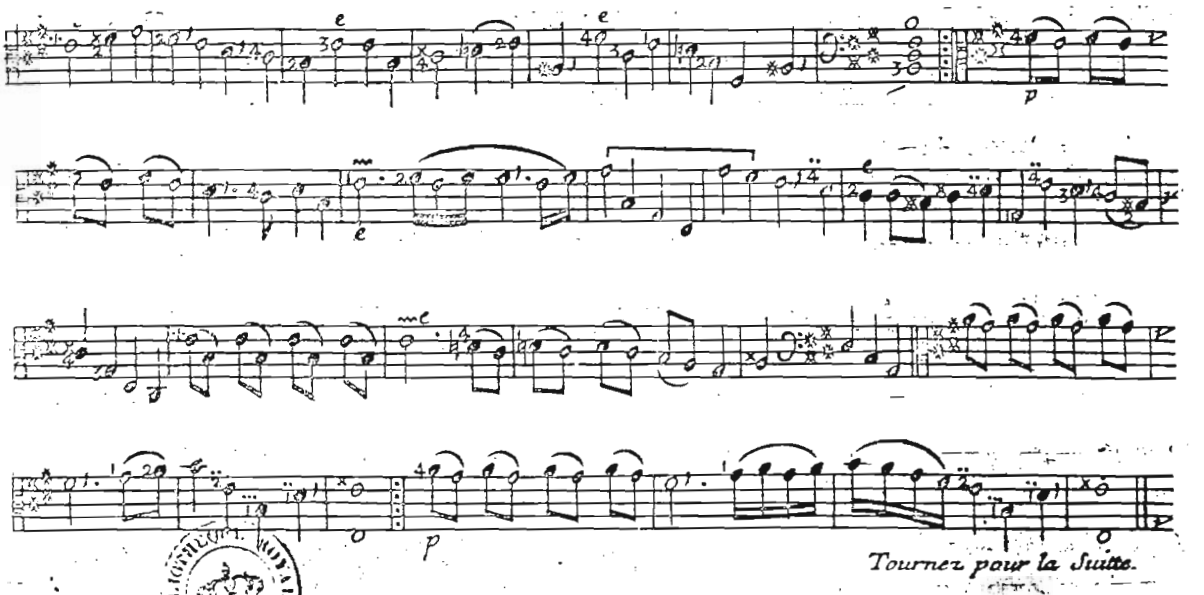
Le Tableau de l'Opération de la Taille [for stone in the bladder] - Marin Marais 1725

Figure 1



Le Tableau de l'Opération de la Taille [page 2]

Figure 2



Le Tableau de l'Opération de la Taille [page 3]

Figure 3

Much of Marais' music seems rather melancholy, but it was highly thought of. Whether or not he suffered from urinary stones for some time is not known, but it is understandable that the accompanying piece is not perhaps the most attractive of his works. One author goes so far as to state that the piece is a tribute to his sense of humour![2] It is certainly a most unusual, if not a unique, description of a surgical operation.

At this point the audience heard a recorded performance of the piece. A few copies of the bass viol score were available.

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3. Lesure F. Marin Marais: sa carrière, sa famille. *Revue Belge de Mucicologie* 1953; **7**: 129.
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RECOVERY AREA

'The roar and crackle of the flames, the shoutings of the firemen, the odd mixture of moonlight, headlights, and wavering flame, the mad juxtaposition and irrelevance of the bits of furniture, reminded him of how it felt to be coming round from an anaesthetic.'

From Tey J, *The Franchise Affair*: Peter Davies Limited, 1948. (Submitted by Peter Drury)

AROUND THE WORLD: AN INTRODUCTION TO PENTOTHAL ADVERTISING POSTCARDS FROM ABBOTT LABORATORIES 1956-1968

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Prologue

Pentothal (thiopental sodium for injection) is an intravenous anaesthetic well known to both the general public and anaesthetists. Available throughout the world, Pentothal is produced by Abbott Laboratories, North Chicago, Illinois, United States of America.

The story begins in Madison, Wisconsin where Pentothal also had its start (both John Lundy at the Mayo Clinic in Rochester, Minnesota and Ralph Waters at Wisconsin General Hospital in Madison, Wisconsin did the first clinical trials with Pentothal). At the conference 'Ralph Waters MD and Professionalism in Anesthesiology: A Celebration of 75 Years' held June 6-8, 2002, I was talking with HAS Honorary Secretary Neil Adams about the upcoming 6th International Symposium on the History of Anaesthesia to be held in Cambridge, UK, 2005. Dr Adams asked me to talk about advertising and anaesthesia. The subsequent discovery of a postcard from Lundy, UK (Figure 1), featuring three horses and a lighthouse on the front and an advertisement for Pentothal on the back prompted further research about Pentothal postcards.

The Golden Age of Medical Advertising Postcards

The golden age of medical advertising postcards was from the 1950s to the 1960s. Rather than have the advertising message on the front of the card, these postcards utilised a new concept. With the commercial message relegated to the reverse of the card, the front

Figure 1

featured a typical tourist type picture postcard intended to catch the eye of the unsuspecting physician. Exotic locations were featured with adventurous names such as: Livingston Africa Tour, Footsteps of Livingston Tour, Caribbean Tour, North Atlantic Tour, African Tour, North Pole to South Pole Tour, Columbus Tour, West Africa Tour, Mediterranean Tour, European Mediterranean Tour, Equatorial Tour, Viking Tour, Canadian Tour and United States Tour.

Obviously, some tour names were similar, and inevitably identical locations and countries were featured. Some companies attempted to build anticipation for a series by having the first postcard show a map outlining subsequent destinations. The major companies that produced these tourist type picture postcards of this era and some of the products they promoted were: La Biomarine (Plasmarine, Marinol, Ionyl), Poulenc Ltd. (Stemetil, Largactil), Burroughs Wellcome (Marezine, Methedrine, Empirin), Upjohn (Kaopectate), Squibb (Rautracyl), Pfizer (Terramycin), Ciba (Bradosol cream with Nupercaine) and Abbott Laboratories (Pentothal). With all of these companies producing tourist type picture postcards, why study Abbott Laboratories? Two reasons come to mind. First of all, Abbott had the longest run (13 years) and printed the most cards (171 known so far) during that time. Second, and most importantly, the Abbott postcards advertised a true anaesthetic - Pentothal.

Pentothal Postcards from Abbott Laboratories

Rather than being confined by the limitations of an European Tour or an African Tour like other companies, Abbott ambitiously produced a tour literally *Around The World* covering all seven continents. The seventy-five countries and entities known to date are:

Andorra, Argentina, Australia, Australian Antarctic, Austria, Bahamas, Barbados, Belgium, Brazil, Canada, Ceylon, Chile, Columbia, Comoros (Indian Ocean), Cuba, Denmark, Ecuador, El Salvador, Fiji, Finland, France, Germany, Great Britain, Greece, Greenland, Hong Kong, Iceland, Ifni (Morocco), India, Ireland, Italy, Jamaica, Japan, Jordan, Kenya, Lebanon, Liechtenstein, Luxembourg, Malaya, Maldive Islands, Malta, Mauritius, Mexico, Netherlands, Netherlands Antilles, New Caledonia, New Hebrides, New Zealand, Nicaragua, Norway, Pakistan, Panama, Peru, Philippines, Portugal, Portuguese Indies, Ruanda-Burundi, San Marino, Singapore, South Africa, Spain, Spanish Guinea, Spanish Sahara, St Pierre & Miquelon, Surinam, Sweden, Switzerland, Tahiti, Thailand, Trinidad & Tobago, United Nations, Uruguay, Vatican City, Venezuela, Wallis & Fautuna (Central Pacific).

Classification of Pentothal Postcards

Pentothal postcards may be described in several ways. They may be orientated in either the vertical (portrait) or horizontal (landscape) forms. The chromatic scheme may be black and white, grey or colour. Some cards come in both colour and black and white versions. Although all cards are rectangular in shape, size ranges from small and medium to large and even jumbo. Most cards have straight borders all the way around; others have rounded corners or are deckled-edged.

Because the majority of cards were addressed 'Dear Doctor' to physicians in the United States and Canada, they are also known as 'Dear Doctor' cards. Some 'Dear Doctor' cards were not addressed to specific physicians, but to hospitals. Other cards were not actually 'Dear Doctor' cards as they were addressed to nurse anaesthetists or even to lay people.

These latter cards were early examples of direct patient advertising of prescription drugs (as opposed to commonly advertised patent medicines and non-prescription over-the-counter medications). Most cards were written in English. Variations include cards in French to various Canadian cities, in French to Paris, in Greek to Athens, in German to Munich, and in Spanish to various countries.

The majority of cards utilised a single stamp and a single postmark. Variations on this include different stamps, different postmarks, uncancelled stamps and cards cancelled without stamps. Some cards even had a special cancellation 'BY SEA MAIL'. The different postcards with the accompanying stamps and postmarks were meant to show how widespread the use of Pentothal was. Most cards proclaimed its availability. At least one card, however, gleefully exclaimed the exception to the rule: 'Dear Doctor, We've found it at last! A place without PENTOTHAL!'

Finally, the cards may be classified in terms of their physical condition. The 1961 postcard featuring Wilkes Base in Antarctica was sent to 280,000 doctors. The numbers for other cards are probably similar - 280,000 multiplied by 171 different cards gives an astronomical figure of more than 47 million cards (47,880,000 to be exact). Even a conservative calculation of only 100,000 recipients of 100 cards each still comes out to 10 million cards. Where have all of these cards gone? How many of them have survived today? Remaining cards are often dog-eared and otherwise worn but reasonably intact and whole. Others have been subjected to various insults such as holes punched, pencil or ink defacing, and stamps removed.

In conclusion, Abbott Laboratories produced a fascinating series of advertising postcards that promoted Pentothal from the 1950s to the 1960s. Much additional research remains to be done on this little known subject.

TWO MYSTERIES, ONE SOLVED

Mr A Humphries, Librarian, Thackray Museum, Leeds

A Solved Mystery

At the Thackray Museum in Leeds, which some of you may remember from the February 1998 meeting, we have a fairly extensive collection of anaesthetic material, largely through the generosity of Dr Chris Ward [see Proc HAS Vol.22, p30], who sadly died recently.

One item in his collection had remained a mystery to him for many years, and he said he had 'hawked it round' various anaesthetic meetings without anyone being able to tell him anything about it. By the markings on the dial at the side, the device was capable of giving a range from gas alone, through gas and ether to ether and air (Figure 1). The reverse is nearly identical with the same graduations on the dial, but with a simple engraved arrow as pointer. The ether was introduced into the nickel plated cylinder at the side by a small hole with a sliding flap. Inside the cylinder there are still two original sponges (Figure 2).

At the museum we have tried to concentrate on collecting medical trade catalogues precisely because they often help in the identification and dating of instruments and equipment. A couple of months after we had been given his collection, I was able to ring Chris with the glad tidings that his mystery was at least partly solved. We had just acquired an 1887 Dental Manufacturing Company catalogue and there, on pages 121-122, was a display advert for the 'Gas and Ether Apparatus' invented by Mr Thomas Pedley MRCS. Further checking in the Medical Directories revealed that he had published the apparatus in the *British Journal of Dental Science* in 1878. Pedley had got his LSA and MRCS in 1876 studying at Guy's Hospital, and gone on to get both his LDS and an MD from Brussels in 1878. He had been the resident obstetrician at Guy's and was a member of the Obstetrical Society of London; perhaps he also used it for obstetric analgesia?

As far as I am aware this is the only example 'in captivity', but I would be very interested to hear of others. Perhaps the reason for its scarcity is the fact that Dr Pedley had moved, sometime between 1878 and 1883, to Rangoon in Burma, where he was still living in 1903. He would therefore not have been able to promote his invention in Britain.

An Unsolved Mystery

We generally acquire material from known sources, through donation or purchase, but sometimes other items just 'turn up'. One such is the airway shown here (Figure 3). It appeared on the counter in the museum reception one morning, in a carrier bag with a few other anaesthetic-related items. There was no note or other explanation for its appearance, and we assume it came from a source inside St James's Hospital. There is a large fenestration on the upper surface, and a tooth guide (?) with two holes through it at the mouth end. The most unusual aspect is that the distal end opens rather like a 'duck-bill' speculum Figure 4). The opening is by means of a screwed rod with a ring end, and on the right hand side is a hole. This appears never to have had any attachment or side branch. On the end plate is an inscription *PATENT APP. FOR* and *KING, LONDON*. I have not yet tried to check the Patent Office records, mainly because the probable time range (for reasons which will be apparent in a moment) is nearly thirty years.

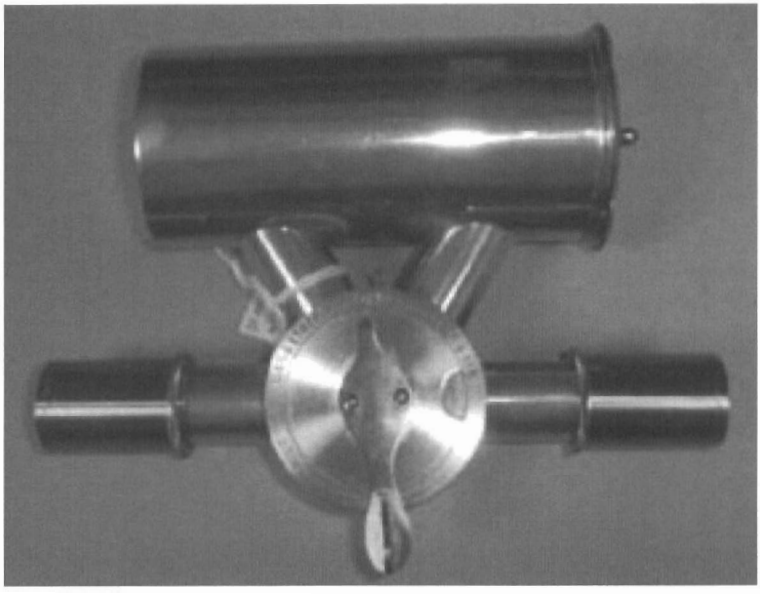

Figure 1

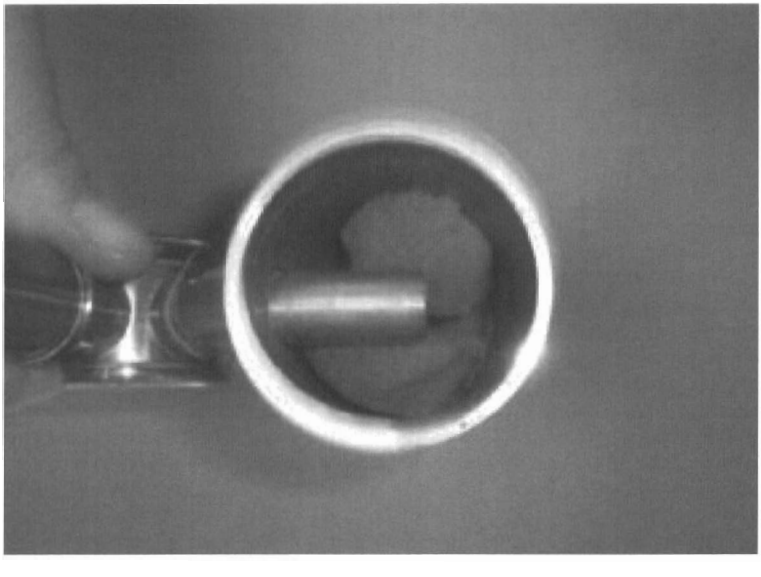

Figure 2

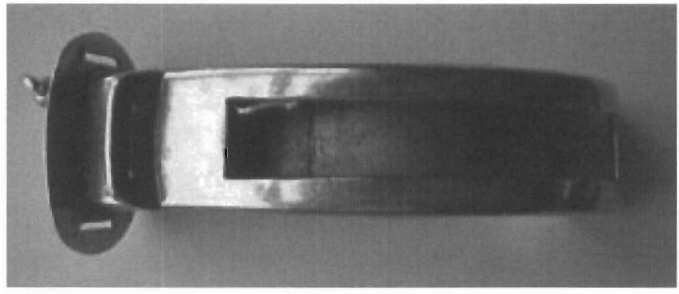

Figure 3

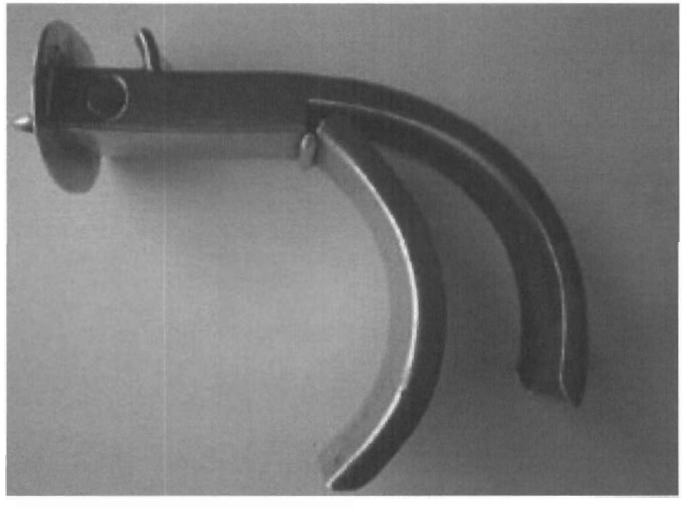

Figure 4

Figure 5

The final interesting aspect of the airway is that it is marked with the name of W Stanley Sykes (Figure 5), as was a common Hewitt airway in the bag. From the information available it seems that Sykes became interested in anaesthesia in the late 1920s, finally giving it up entirely to return to private practice in the late 1950s. The possible time range for his acquisition of the item is therefore (as mentioned before) nearly thirty years.

In the third volume of his *Essays on the First Hundred Years of Anaesthesia* there is a chapter on 'The All Important Airway' where a Hewitt airway is illustrated, and various airways designed to close off the pharynx by sponges or inflatable cuffs are discussed, but there is nothing like this one.

I have shown the airway to a few other anaesthetists and the general opinion has been that it was used in some way to assist in intubation. Any suggestions or ideas for further leads will be most gratefully received!

HISTORICAL BOOKS AND PAMPHLETS ON ANAESTHESIA 1847-1900

Dr A G McKenzie
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I have compiled a historical bibliography in CD-ROM of nearly 600 publications in Microsoft Access. The items are listed in chronological order, with the authors of each year in approximately alphabetical order. The holdings of five libraries are given plus an 'other library' column. The Access system enables the user to derive a wide range of reports from the table. The bibliography does not include journal articles unless these were reissued as reprints, nor are dissertations included.

1847 was selected to be the beginning in this compilation, as it was the first full year after the momentous public demonstration of general anaesthesia by William Morton on 16 October 1846. Morton sent out (to physicians) his first printed document on anaesthesia on 20 November 1846. This circular also appeared on the back of the *Boston Medical and Surgical Journal* of 25 November and 2 December 1846. From 26 November Morton distributed a series of circulars entitled Morton's Letheon. The text of the first was probably identical to the advertisement on the back cover of the *Boston Medical and Surgical Journal* of 9 December 1846. The 4th edition (42 pages) and 5th edition (88 pages), issued respectively in January and May 1847 are, of course, listed in the bibliography.

The number of books and pamphlets on anaesthesia in 1847 (64) far exceeded that in any other year for the first 53 years. This may be understandable, but is nonetheless remarkable. References for much correspondence on this topic are given below.[1-4] Perhaps this disk will be the stimulus for the revelation of even more.

In compiling the disk I have also drawn on numerous early bibliographies. A major source of information has been the outstanding *Bibliography of Anaesthesia* by Rosemary A B Faraday of the Nuffield Department of Anaesthetics, University of Oxford; this was a thesis submitted in 1966 for the Fellowship of the Library Association. An authorised facsimile was produced by University Microfilms Ltd, Tylers Green, High Wycombe, England.

Of course this disk will be an on-going database. More items may come to light and the holdings may change. As current Honorary Librarian for the Association of Anaesthetists of Great Britain and Ireland I hope to be able to increase that library's holdings. In time I hope to prepare additional bibliographies for 1901-1950 and 1951-2000.

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Postscript

Anyone who wants the disk may have one. For those with a computer which can receive CD-ROM it may be possible to send by email attachment. Otherwise, it is suggested that £1 per disk would cover the cost of CD plus postage and packing.

WHICH CAME FIRST – HUMAN OR ANIMAL MEDICINE ?

Dr Aileen K Adams, Cambridge

This is not a sensible title. Although some writers, notably Schwabe[1] have devoted many pages trying to prove that veterinary medicine preceded human medicine, it is not an important argument. Today our two professions are separate but this was not always the case; their paths have crossed several times. This paper is a brief account of the history of what is today referred to as comparative medicine.

Lord Soulsby was the first veterinary surgeon to be President of the Royal Society of Medicine. His presidential theme of 'One Medicine' emphasised the essential unity and interdependence of the two professions:[2]

> 'As science advances at an ever more alarming rate .... This comparative approach becomes increasingly important in understanding and dealing with the major issues of population growth, provision of medical care, environmental degradation, and the like ...'

Transmissible infections such as the spongiform encephalopathies, antibiotic resistance and cancer biology are some examples bound up with these issues, though probably the most important in today's science are the genetic studies whose potential we are only beginning to realise.

Prehistory

By about 12,000 BC the early hunter-gatherers started to team up with dogs and to hunt together. From about 9,000 BC sheep and goats were domesticated, followed by fixed settlements where cultivation of crops was practised. As the population density increased, there arose the opportunity for bacterial infection of both man and animals and the need for both human and veterinary medicine. Man soon became dependent on his animals. Cattle were valuable for working the land and for milk and meat. Horses gave mobility and the chance to trade. Wealth was shown by the number of cows or horses a man possessed, so they took good care of their animals. Animal medicine thus grew up not for sentimental reasons, but for reasons of economy and prestige and was perhaps even more important than human medicine.

At this time illness was regarded as supernatural in origin, and this fostered a belief that the human body was sacrosanct. There were socio-religious objections to studying the body by dissection, so attempts to learn about it were made indirectly by studying animals. Animal cults were common amongst early peoples worldwide and persist amongst some tribes today; even we ourselves still talk about our sacred cows. The priest and the doctor, whether human or animal, were one and the same.

Egypt

The Egyptians held bulls and cows to be sacred and the health of their animals was just as important as that of their fellow men. The priests of Sekhmet had both a medical and a veterinary vocation, and they learned about animal anatomy from dissecting and embalming

their temple animals. Only one written record of veterinary medicine has been discovered in Egypt; the Kahun papyrus. This survives in a very fragmented state, and is in the Petrie collection in the University of London. It has been dated to the 12th dynasty (1900 - 1700 BC) and is one of the earliest known papyri. Nunn has traced the first recorded doctor in Egypt to some 1000 years earlier than this.[3] The contents of the surviving fragments are varied and include human gynaecology, and eye diseases in cattle, dogs and birds. One reads:

> 'A bull . . . with his eyes running, his forehead wrinkled, the roots of his teeth red, his neck swollen: repeat the incantation for him. Let him be laid on his side, let him be sprinkled with cold water, let his eyes and hooves and all of his body be rubbed with gourds or melons, let him be fumigated . . . if he does not recover, bandage his eyes with linen . . .'

A veterinary surgeon today would recognise this as malignant catarrhal fever, even though his treatment would be different.

Greece

Whilst the Greeks improved on the medical knowledge of the Egyptians, their scientific advance was held back by their belief in the humoral cause of disease. Asklepios, the god of healing, was credited with treating both man and animal, and Hippocratic teaching stressed the value of comparative studies of disease. In the 1st century AD the Greeks provided a public veterinarian in Athens.

Other early cultures

In the east Buddhists established the first veterinary hospital as early as the 3rd century BC, whilst the Hindu belief in reincarnation encouraged compassionate treatment of animals. The elephant was held sacred in the form of the god Ganesh, and two remarkable Indian medical texts were produced sometime during the Vedic period (1800 - 800 BC). Each has more than 40 chapters covering diseases of the elephant and of the horse. In Central Asia and the Near East the horse was the most cherished animal, and Arabs studied diseases of horses from the 9th century AD onwards in centres as far apart as Baghdad in Iraq and Cordoba in Spain.

The beginning of science

Change was slow to come. In Europe the teachings of Galen continued almost until the 17th century, and were the basis of medicine in the Middle Ages and later. Then the Renaissance brought change. Medicine became an important university study, though seemingly more as an academic discipline than for the practice of healing the sick. Treatment of disease continued to be carried out by apothecaries and barbers, while the actual care of the sick remained in the hands of the Church. Knowledge of anatomy advanced when the curiosity of the Renaissance overcame the taboo on dissecting the human body. Dissection was carried out in Italy, culminating in Vesalius' classical study *De Humani corporis fabrica* of 1543.

Sadly, veterinary medicine did not share in this Renaissance but became more and more neglected. It was also slow to benefit from the 17th century age of enlightenment. It was well into the 18th century before agricultural practices changed significantly, and treatment of animals had fallen into the hands of mostly ignorant and unqualified farriers and leeches. A

few however were noted as healers and bone-setters, and there was sufficient expertise in England for a livery company of farriers to be set up in 1694.

War and epidemic disease

There was a real stimulus for change early in the 18th century, It came from two separate sources, both operating more strongly in continental Europe than in Britain. Firstly, wars were continually being waged across Europe and armies were dependent on cavalry. Secondly, and ultimately more importantly, epidemics of cattle plague swept into Europe from Russia, decimating the livestock and threatening economic ruin to agriculture. Physicians were called in to advise, but their lack of veterinary knowledge, coupled with the attitude that it was beneath their dignity to treat animals, meant that these large-scale outbreaks defeated them.

Academic development in Europe

France was the first country to take action, for before 1710 and 1714 more than half the cattle in France were lost from plagues that had by now become endemic. It was the far-sighted and scholarly Claude Bourgelat, horseman and self-trained veterinarian, who suggested it was time to set up schools to study animal health and disease. His was the prime influence in establishing the Royal Veterinary College in Lyons in 1762, followed four years later by a second school at Alfort in Paris. These schools were immediately successful in attracting good students and teachers from all over Europe, many of them already qualified physicians and surgeons who saw the new field as opportunity and challenge. The Swedish botanist Linnaeus was amongst those who sent students to France. The medical profession, relieved of the responsibility of trying to treat diseases they knew nothing about gave strong support to these colleges, and veterinary studies were soon fully accepted into the French academic community.

The Veterinary College in London

England was slow to act, and there were over 20 veterinary schools in Europe before the first one was started in England. This was not too surprising because we were to some extent protected by the Channel from the plague outbreaks in Europe, and our battles were more likely to be fought by the Navy from ships than by the Army on horseback. But cattle plague did eventually spread to England, and in 1714 George I called on his own surgeon to the Royal Household, Thomas Bates, to assist. Bates described in detail how he dealt with the outbreak. By laying down precise details of isolation, cleanliness and slaughter he controlled it in three months, whereas previously they had dragged on for a year or more. He also persuaded the King to start the practice of royal bounty, giving the farmers 40 shillings for every animal slaughtered.

Another 60 years passed before formal action was taken. A group of farmers formed a society for the improvement of agriculture. Meeting in the George Inn at Odiham they became known as the Odiham Society of Hampshire. One of their members visited the Paris veterinary school and reported ruefully that there were a hundred students from every country except England. The Society agreed to fund two students to go to Paris, but with the French Revolution looming nothing came of this.

But the movement to improve agriculture continued. Granville Penn, the grandson of the better-known William, founder of Pennsylvania, was a self-appointed reformer who enjoyed campaigning for good causes and this cause appealed to him. By coincidence a French veterinary surgeon from the Paris school was visiting England at this time. It seems that Charles Vial de Saint-Bel had fallen out with his colleagues in Paris and came here to get away from them. He fell in love, married an English wife and decided to stay. Saint-Bel, in association with Granville Penn, put forward proposals for a veterinary school in London on the lines of the one in Paris.[4] The time was ripe and their plan soon gained high level support from scientists, led by the President of the Royal Society (Sir Joseph Banks), together with the Presidents of the Royal Colleges of Physicians and Surgeons (George Baker and Everard Home respectively) who all applauded the idea. John Hunter's influence too was important,[5,6] and the Odiham Society joined in. As a result a Veterinary College was instituted in London in March 1791, with Sainbel (as he became known in England) as its Principal and Professor and with its premises in Camden Town.

John Hunter, together with his elder brother William, following the path of the Monros in Edinburgh, had long studied comparative anatomy. To Hunter the natural world was one and indivisible and virtually all his researches, anatomy, physiology or pathology were comparative. He wrote:

> 'in the course of a variety of experiments on animals and vegetables I have frequently . . . pointed out some principle common to both'.

He foresaw the need for trained veterinary surgeons when he said:

> 'the incompetence of persons to whom the veterinary practice has been abandoned has drawn contempt upon the art . . . the nation requires a veterinary school in which the structure and diseases of animals can be scientifically taught . . . men of liberal education will cease to look on veterinary medicine as a mean and degraded profession'.[7]

Early days of the Veterinary College

Hunter's support added prestige to a new profession striving to gain respect. He was Vice-Principal of the College and lectured to its classes. As had happened in France, it at first attracted good quality staff and students, many of them already qualified in medicine. Sadly it was not to last, unlike in Europe. There were troubled times ahead for the London College, and it was slow to become effective. Sainbel was not an inspired choice as the first principal; he was irascible, his English was limited and he resented the influence of the medical profession. In spite of his qualifications he seems to have had a poor knowledge of veterinary science. Indeed his death shortly after was due to an infection picked up when operating on a horse suffering from glanders, not realising that it was infectious. Teaching in the College came to a halt but was rescued by Hunter and his surgical colleagues, who continued to teach the veterinary students alongside their medical students without fee, so some of the work of the College was kept going. Hunter also made available to them nearly 1400 specimens of plants and animals from his own dissecting room.

Sainbel's successor was equally unsuitable. There were two candidates; Edward Coleman, an unsuccessful London surgeon, and William Moorcroft, the first and (at this time) only

Englishman qualified as a veterinary surgeon. Moorcroft had started as apprentice to the surgeon John Lyon in Liverpool and had been asked to treat an epidemic of cattle plague in Lancashire. Discouraged by his failure, he went to London to seek the advice of John Hunter who suggested he go to France to train as a veterinary surgeon. He took this advice and thus became the first Englishman to qualify in veterinary medicine. By the time the Veterinary College had been started, Moorcroft was running a very lucrative practice at 244 Oxford St, treating the horses of the aristocracy. Nevertheless he was at first prepared to move into the academic field after Sainbel's death. Whilst he was the ideal candidate, the surgeons perversely supported their colleague Coleman, so a compromise was made by appointing them jointly. It did not work and within a few weeks Moorcroft resigned, leaving Coleman in sole charge. An unsuccessful surgeon with no experience in animals, he was equally ineffective as principal of the Veterinary College. He lowered standards, shortening the course from three years to three months and limiting its scope to little except horse surgery. He held back veterinary development for decades, and neither the medical profession nor the government held the London College in any regard. Coleman's authority remained unchallenged, until the founding of a second veterinary college in Edinburgh by William Dick in 1823 provided a serious alternative for bright young men to go to study.

Later developments in Britain

Eventually the College sorted out its affairs and received a royal charter. In 1881 the Veterinary Surgeons Act was passed, which recognised the independent status of the profession and abolished unqualified practice. It also broke the link with the medical profession, to some extent to the detriment of both.

Moorcroft (1767-1825), the might-have-been

Whilst having a place in history as the first veterinary surgeon, William Moorcroft's subsequent career was so extraordinary that he deserves more than just being a figure in the background. After resigning from the Veterinary College, instead of going back to his Oxford Street practice he took the astonishing step of becoming superintendent of cavalry to the Army in India. He never returned to England.[8] Certainly the Army's breeding stock was in a sorry state and needed improving. Moorcroft had heard of the famous horses on whom armies of Mongols and Cossacks had for hundred of years swept across the plains of Central Asia, wreaking havoc wherever they went. Even the Chinese had been trying to get hold of what they described as these 'heavenly horses', and Moorcroft decided to search out some of their stallions for breeding purposes. He set out for Bokhara, one of the historic cities of the Silk Route (today in Uzbekistan), and to do what no European had done; to cross the Himalayas from India into Central Asia.

Moorcroft's first two attempts to cross the mountains failed, for he was delayed by hostile tribesmen and trapped by winter weather. His third and successful attempt started in 1820, and it took him over five years to get to his destination. He travelled with a large caravan carrying stores for his own needs, and also merchandise to barter, bribe and placate warlords on the way. His route was devious, for when the Chinese refused him passage one way he went another. He eventually crossed the Khyber Pass into Afghanistan, then as now a hotbed of warring armies, and continued north over the Hindu Kush mountains. He suffered arrest, robbery and attempted murder, but he persisted and survived. His medical expertise stood him in good stead. He did not hurry; wherever he went he treated the diseases not only of the

courts of the rulers he hoped to influence, but also of the villagers and their livestock. He specialised in the operation of 'couching' for cataract, and is said to have restored the sight of many people during his years in the mountains. He reviewed his results carefully, for he refused to operate on anyone unless he would be around for some weeks to follow their progress.

Throughout his travels Moorcroft sent voluminous dispatches about everything he saw, as well as transmitting his views on local politics and science. He wrote at great length, his biographer[8] describing his writings as an editor's nightmare.

Finally he reached Bokhara, the first Englishman to have visited there since Elizabeth's time, and the first ever to have come from the south across the highest mountain range in the world. He entered through the city gates that still stand and have seen so many travellers pass before and since, and he was received by the Emir in the audience court of his castle. The Emir was courteous and promised him all the horses he wanted, but he was fickle, for he delivered none. Moorcroft spent five months in Bokhara, reporting back to the Indian government that there was a strong Russian presence in Central Asia, and that he suspected they were there not merely to trade, but to find a back door to India and oust the British. This was a remarkably accurate prediction of the 'Great Game', the Anglo-Russian conflict of the 19th century that still rumbles on. Disillusioned, he left Bokhara and turned back for India. By now he was 58 and his health was undermined. Only a few days march from Bokhara he died in mysterious circumstances, whether from ill-health, by his own hand or the hand of a murderer is uncertain.

One may characterise Moorcroft as a surgeon, an intrepid explorer, a shrewd tradesman, an amateur politician or a spy, for he was something of all of these. It is tempting to wonder whether this energetic, tenacious, obsessional man would have driven through the progress of the London Veterinary College better than Sainbel and Coleman, had he chosen to devote his talents to it. One may speculate whether John Hunter would have been disappointed or proud of his protégé, but it is likely that he would have approved.

Sir Clifford Allbutt (1836-1925)

Although one of the unwanted effects of the Veterinary Surgeons Act of 1881 was the loss of contact between practitioners of human and animal medicine, some tried to maintain them, none more so than Sir Thomas Clifford Allbutt. Born in Yorkshire, he practised as a physician in Leeds for some years before becoming Regius Professor of Physic in Cambridge.[9] Here in 1919 he tried to persuade the University to set up:

> 'a central institute of comparative pathology, which must include professional units for diseases of plants and animals and the means of blending these departments with the neighbouring departments of the diseases of man . . . we cannot tell how bright will be the cross-lights which . . . will be thrown upon the fields of the several pathologies of all kinds of life'.

Whilst a small Institute of Pathology was started, Allbutt's ideas did not fully come to fruition until after the Second World War, long after his death, when the Cambridge School of Clinical Veterinary Medicine was established. If Allbutt had his disappointments in Cambridge, he had more success in London. He and the leading veterinary surgeon Sir

Frederick Hobday set up the Section of Comparative Medicine of the Royal Society of Medicine in 1923. The section has ever since continued to shine Allbutt's cross-lights on the field of comparative medicine.

Anaesthesia may take pride in having particularly strong links. Apart from joint research projects, many of our institutions are open to both medical and veterinary members. We have shared examiners and our College has honoured veterinary anaesthetists, whilst one University Medical School has had a veterinary anaesthetist heading its Department of Anaesthesia.

Today, as Lord Soulsby has advocated, science has developed in such a way that the professions are coming together. Recently the Medical Research Council has set up a Comparative Clinical Science Panel to encourage researchers from the two fields to work together. Perhaps the wheel is coming the full circle and we shall go into the future together.

Acknowledgements

I am grateful to Lord Soulsby for interesting me in this subject and to Miss E Allen, lately Qvist Curator of the Hunterian Museum, Royal College of Surgeons of England, for her help in the research of John Hunter's activities.

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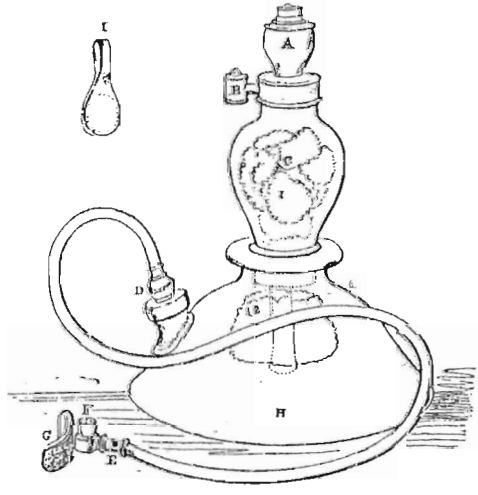
THE FIRST ANAESTHETIC CRITICAL INCIDENT REPORT

Dr D King, Anaesthetic SpR, Southend Hospital
Dr A Hassani, Consultant Anaesthetist, Broomfield Hospital
Dr S White, Consultant Anaesthetist, Royal London Hospital

If the history of anaesthesia truly began in October 1846 with the demonstration of the use of ether to facilitate surgery, then the reporting of anaesthetic-related critical incidents followed soon after. We would like to report what we believe to be the original anaesthetic critical incident report, by Dr Jonathan Perreira in January 1847.

Dr Perreira's medical career began as a pharmacist and he is most famous for producing the great work *The Elements of Materia Medica*. However, he subsequently became a Fellow of the Royal College of Surgeons. Practising as a surgeon at the London Hospital, he was involved in some of the first operations performed using ether in Britain [1]

W T G Morton had first demonstrated the use of ether to aid surgery in October 1846 at the Massachusetts General Hospital. It was not long before this new technique was applied in Britain. On 18 December 1846, Robert Liston performed the first major surgery in Britain under ether anaesthesia when he amputated a leg at the thigh, using an inhalational apparatus devised by the pharmacist Peter Squire [2, 3] (Figure 1).



A. The Urn with its stopper, into which the ether is poured.
B. Valve which admits the air.
C. Contains sponge saturated with ether.
D. Valve which opens at each inspiration, and closes at each expiration.
E. Ferule for regulating the quantity of atmospheric air admitted.
F. Valve for the escape of expired air.
G. Mouth-piece.
H. Lower vase.
I. Spring for closing the nose.

Figure 1

Dr Perreira wrote frequently to the President of the Pharmaceutical Society, Mr Jacob Bell, regarding medical matters. On 14 January 1847, just one month after the first operation using ether in Britain, he described an incident of equipment failure as quoted below, together with an illustration of the fault (Figure 2):

> 'We had a patient today brought to the London Hospital with a compound dislocation of the ankle requiring amputation. He took the ether and he became most gloriously drunk. The valve to our apparatus failed to act; it was a ball made of wood not pith and was found too heavy. We managed without the valve. An assistant put his finger over the hole when inspiration was effected and removed it when expiration took place. We took off the box containing the valve and substituted the finger'.

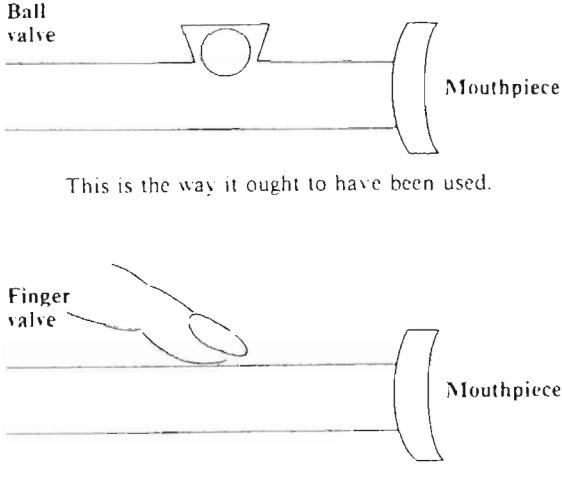


Figure 2

In those days as now, the safe administration of anaesthesia required vigilance and the ability to respond immediately to unforeseen problems. Confronted with a malfunctioning expiratory valve, Perreira recognised the fault and improvised a safe alternative. Even though no harm came to the patient, he then took steps to inform colleagues in case they should encounter the same problem. In doing so he became the author of the first anaesthetic- related critical incident report.

It is interesting to note that despite the years that have elapsed, similar problems of faulty breathing system valves continue to occur and are regularly reported in the literature.

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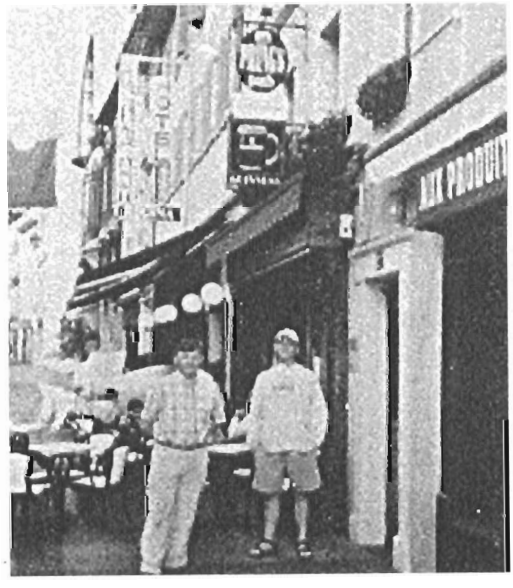
PUBS AND ANAESTHETISTS

The Arms of the Royal College of Anaesthetists depict Joseph Clover and John Snow, two of our anaesthetic heroes from the past. Snow started the ball rolling in terms of safety with his calibrated ether vaporiser, described in 1847 in *On the inhalation of the vapour of ether in surgical operations*. Of course he is equally well-known for his epidemiological adventures with the pump handle in Broad Street. This summer, whilst in tourist-mode, I wandered along to the end of Carnaby Street, turned left, and made my way to 39 Broadwick Street and had a look at the John Snow pub. The two things to note are the small plaque and the kerb. The plaque states: 'The Red Granite kerbstone marks the site of the historic BROAD STREET PUMP associated with Dr John Snow's discovery in 1854 that Cholera is conveyed by water'.

Let me finish by exploding a myth associated with John Snow, the only anaesthetist to have had a pub named after him (Figure). Should you ever visit Evian in France, on the south shore of Lake Geneva, you will find a pub dedicated to an anaesthetist who, in my humble opinion, is of great contemporary relevance. (submitted by John Pring)



A SHORT BIOGRAPHY OF DR JONATHAN PERREIRA (1804-1853)

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Dr A Hassani, Consultant Anaesthetist, Broomfield Hospital

Dr Jonathan Perreira is best known for his work as a pharmacist and for the great work *The Elements of Materia Medica* which made his name famous to scientists of the nineteenth century. However he is of interest to anaesthetists as the man who documented the earliest anaesthetic-related critical incident, in January 1847.

Jonathan Perreira was born in Shoreditch, London on 22 May 1804, the son of Daniel Lopes Perreira, an underwriter at Lloyds of London. The family was of Jewish descent and had settled in London, having left Portugal many years before. Jonathan was schooled in a 'Classical Academy' in Queen Street, Finsbury, from the age of 10 onwards. At the age of 15 he was articled to a naval surgeon and apothecary named Latham, at the time a general practitioner in the City Road. In 1821 he entered the Aldersgate Street School of Medicine, where he studied medicine, materia medica and chemistry, natural philosophy and botany. In 1822 he began to attend St Bartholomew's Hospital to practise surgery. He obtained his first qualifications in 1823 when he became a Licentiate of the Society of Apothecaries, and at the tender age of 19 was appointed Resident Medical Officer to the Aldersgate Street Dispensary.

In his new post Perreira discovered his vocation as a teacher. To assist his students he translated the *London Pharmacopoeia* of 1824 from Latin to English. This was the first of a long and illustrious list of publications. Also published around this time were the first edition of his *Selectae Prescriptis* and a *Manual for Medical Students*. After publication of a *Table of Atomic Numbers* in 1827, he concentrated his studies on collecting material for what was to become his great work, *The Elements of Materia Medica*. To help him with this book he took lessons at this time in German and French. The first edition of *The Elements of Materia Medica* was published in 1839 and a further four editions were extensively republished abroad.

In 1825 Perreira became a Member of the Royal College of Surgeons. In 1826 he was appointed Lecturer in Chemistry in the Aldersgate Street School of Medicine. He lectured two or sometimes three times a day, and his class was so large that he erected a new lecture theatre at a personal cost of some £700. In 1828 he was elected a member of the Linnaean Society.

In September 1832 he married Louisa Ann Lucas 'of the well known Hampshire family'. The marriage produced no children, but at sometime after the wedding he then left the Aldersgate Dispensary, where he had been Resident Medical Officer, to begin general practice. He was offered the post of Professor of Materia Medica at St Bartholomew's but declined because it involved relinquishing all other duties. In 1833 he succeeded Dr Gordon as Lecturer in Materia Medica at the London Hospital.

In 1838 he was elected a Fellow of the Royal Society, and in 1840 became a Member of the Royal College of Physicians, the College having declined the right to examine him on his knowledge of Materia Medica. In 1845 he was elected Vice-President of the Royal Chirurgical Society of London. In 1846 the demonstration of the use of ether at the

Massachusetts General Hospital saw the birth of a new specialty. As a practising surgeon and physician with a detailed knowledge of pharmacology Perreira was ideally suited to early anaesthetic practice. He was present at some of the first operations performed under ether anaesthesia. Indeed he was the first to document an anaesthetic mishap, as reported in a separate paper, effectively inventing the critical incident report.

On 20 January 1853 Perreira suffered premature death at the age of 48. Having been confined to bed for five weeks following bilateral rupture of the quadriceps tendons, experienced violent precordial pain. To the doctors summoned, he stated: 'Gentlemen, you can do nothing. I have broken something near my heart'. No post mortem was performed, the cause of death being stated as 'Rupture of Blood Vessel near the Heart'.

In tribute to Perreira, a committee was formed at the London Hospital to decide how best to perpetuate his memory. They recommended the execution of a bust by Mr Macdowell and a portrait by Mr Pound, both suggestions being adopted. *The Athenium*, a leading periodical of the time, made the following comments:

> 'Dr Perreira raised therapeutics from the chaos of hypothesis and absurdity and placed it upon a true scientific basis... He possessed the great faculty of laboriousness without which no one can obtain laurels in the uninteresting study of Materia Medica... To such men humanity is indebted, and the name Perreira will occupy a prominent place in the history of science in the nineteenth century'.

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Dr Perreira

THEATRE OF OPERATIONS - OPERATING THEATRE DESIGN

Dr M Essex-Lopresti
Chairman of Hospital Building Project Teams,
North West Metropolitan Regional Hospital Board,
Late Deputy Secretary, Council for Postgraduate Medical Education in England and Wales

This talk is based on my paper in the Department of Medical History section of the *Lancet*[1] and the sources of a number of my quotations are included in the references in that paper.

Introduction

Anaesthetists and theatre staff know more about operating theatres than do surgeons, who pay us a visit two or three times a week. It is not insignificant, therefore, that the doctor appointed to serve on the planning team for the Surgical Block at Guys Hospital was Philip Helliwell, senior anaesthetist, and the first doctor recruited to work on the plans for the MRC/NHS hospital at Northwick Park was John Nunn, then Professor of Anaesthesia at Leeds.

We know that operative procedures were performed from medieval times, but my story begins when dedicated theatres were built to accommodate audiences. I shall speak briefly on alterations over the years to accommodate changes in surgical practice and the interests of anaesthetists; the provision of an additional room for patient recovery before returning to the ward, and later a room for the induction of anaesthesia; attempts to reduce the risk of hospital infection entering theatre, and finally the significant changes in theatre design consequent upon revised arrangements for the sterilization of instruments and bowls.

Theatre Design

Until the 18th century operations were carried out in hospital wards, a patient's home or the doctor's surgery. An early operating theatre was built at St Thomas' in 1751 and a second theatre, which has been preserved, was built in 1821; the first was demolished when London Bridge Station was constructed. In 1880 Burdett advised:

> 'The operation room must always be kept in such a condition as to be quickly rendered ready for use in case of emergency .... Needles threaded, ligatures cut to proper lengths, sponges of various sizes in bowls etc. When required it will then only be necessary to light the fire, get a supply of hot and cold water and ice, lay out instruments likely to be required, and have at hand a little wine and brandy'.

Seats for audiences are shown in a painting of a London Hospital theatre in 1880 and in a photograph at UCH in 1898; though they provided an adequate view for heroic surgery they were most unsuitable for the more intimate surgery possible under anaesthesia. The theatres at the London Hospital had viewing galleries, and even under the NHS theatres were being built with glass windows over the operating table, with access for students on the floor above. Viewing galleries have now been abandoned and a television camera is sometimes mounted over the table.

In the past there were plenty of windows in theatres; a Ministry of Health report in 1937 recommended windows facing the north, or possibly skylights. The Hospital Building Bulletin No 1 (Operating Theatre Suites 1957) stated: 'It is desirable, however, to have some daylight in the theatre but moderately sized windows should suffice'. Nevertheless, the first new NHS Hospital (the QE II at Welwyn) had no windows in the theatres, and there has been an informal conflict between surgeons and anaesthetists since then. In theatre designs for which I was responsible I always provided a row of high level windows,[2] double glazed with blinds between the glass. This could be achieved where a theatre ceiling was higher than that of adjoining rooms or corridors.

Associated Rooms

Burdett, describing one hospital, tells us: 'the building contains, besides the operation room, a small room in which grave cases, which require rest and warmth after an operation, can be placed'. The provision of a recovery room became widely recognised, though the 1937 Ministry of Health report suggested that the plaster room 'might on occasions be used as a recovery room'.

With the advent of anaesthesia in 1847, Professor James Simpson feared that patients could be alarmed when wheeled into a theatre packed with students. He wrote 'the patient ought to be left, as far as possible, in a state of absolute quietude and freedom from mental excitement, both during the induction of etherisation and during his recovery from it'.

Infection

Staff, patients and supplies entered the theatre suite from a hospital corridor (Figure 1), and it was feared that infection could be carried into theatres on clothing, feet and trolley wheels. In the early days of the NHS a red line was drawn on the floor at the entrance; here patients were transferred to theatre trolleys, and staff were expected to change and cover their shoes. As a development of this, a transfer zone was introduced in some suites between the hospital and the theatres (Figure 2); all the staff changing rooms, anaesthetic rooms, sister's office and the recovery room were sited in this zone, and access to the 'clean side' was only through one of these rooms. The idea was sound, but one disadvantage was that the anaesthetic rooms, though close to the theatres, were not immediately adjacent to them.

Within the theatre suite plans were considered for separating the clean and dirty trolleys to and from the operating theatres. A theatre in a row has only two sides available for corridors, so initially a 'dirty' corridor was provided along the back of the row, and 'clean' supplies shared the space used by staff and patients entering and leaving the theatres. Alternatively the back corridor was used for moving 'clean' supplies into the theatres. One scheme worked upon, but never built, was to provide a split level corridor along the back to separate 'clean' and 'dirty' supplies from staff and patients (Figure 3), with clean supplies reaching the theatres at waist height and dirty supplies leaving at ground level.[3] In the course of time more reliance was placed on ventilation systems and discipline was relaxed, with no attempt made to restrict the movement of beds and staff in and out of the theatres. Nevertheless, a PHLS Report on surgical site infection, *Analysis of a year's surveillance in English Hospitals 1997-1998,* suggested that more work was needed to reduce post-operative morbidity.[4]

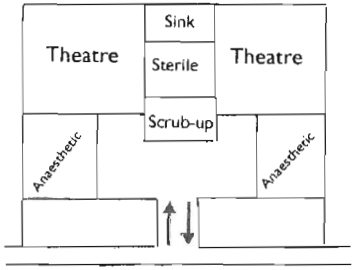

Fig. 1. Twin theatres, shared sterilising, with direct access from hospital

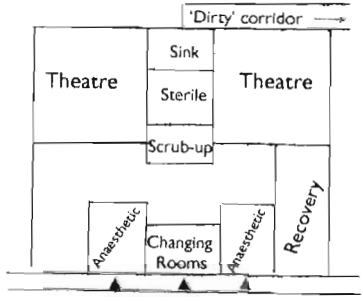

Fig.2. Twin theatres, shared sterilising, with access by 'transfer zone'

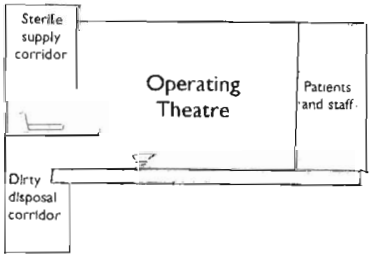

Fig.3. Proposed split-level 'clean' and 'dirty' supply corridors

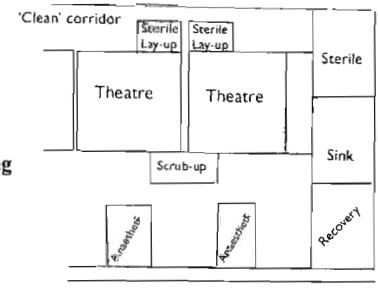

Fig.4. Suite of theatres with central sterilising

Sterilising

Originally each theatre was equipped with boiling water sterilisers for bowls and instruments, but the 1937 Ministry of Health report advocated that a steriliser and a sink room should be sited in an adjacent room, without doors, preferably shared by two theatres. This was re-iterated in the 1937 Ministry of Health *Hospital Building Bulletin*. Heat and steam made the theatre uncomfortable, the extract ventilation drew in hospital infection, and the noise of bowls and instruments being washed was amplified by the bathroom-like finish. Further, nursing staff were condemned to cleaning the bowls and instruments, boiling them and laying up trolleys with cheatle forceps. I suggested[5] that the sterilisers and sink rooms should be removed from theatres (Figure 4); this caused great consternation among surgeons who were worried about the 'dropped or forgotten instrument'. Theatre Sisters were more impressed and promised to deal with the surgeons.

Our first schemes were a twin suite at Harefield, a five-theatre suite at Edgware and six theatres at Stevenage. A 'Theatre Sterile Supply Unit' was subsequently incorporated by the Department of Health in its *Hospital Building Notes*, and now the absence of sterilising in theatres is widely recognised. Most theatres now receive their sterile supplies from a CSSD some distance from the theatres, and sometimes in different hospitals.

The Future

The Department of Health recently published a report for the Department of Trade and Industry called *The Operating Room of the Year 2010*.[6] This was produced by a team including one anaesthetist and two surgeons (one of the surgeons taking the chair). A mock-up of the suggested operating theatre was built in the Millenium Dome. Robots were much in evidence. The surgeon was sitting in an adjoining room, wearing 'virtual reality' goggles and driving surgical instruments by remote control. An anaesthetist was sitting at display consoles controlling the anaesthesia in several theatres. It is envisaged that X-rays are to be phased out because of the radiation risk, and in their place will be ultrasound and MRI. The theatre will consequently be in virtual magnetic field and industry is being asked to produce surgical instruments, including scalpels and needles, of non-metallic materials. It seems that there will be nobody in theatre except a patient.

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SOME ASPECTS OF PRE-1950's ANAESTHESIA BEFORE THE FIRST DESIGNER ANAESTHETIC

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Professor Alan Dronsfield is going to tell you about the first designer anaesthetic [see subsequent paper]. I am going to touch briefly on some aspects of pre-1950s anaesthesia.

Di-ethyl ether

No account of anaesthesia prior to the 1950's would be complete without a brief mention of di-ethyl ether, originally prepared by the German scientist Valerius Cordus in 1540, and rising to prominence in the 1840s which as you all know is another story!

An agent that stood the test of time - ether - was cheap, highly volatile and flammable with a very strong and characteristic smell. It stimulated respiration, maintained blood pressure, caused bronchodilatation, and had a slow onset, and slow recovery (with a high blood/gas partition coefficient of 12). It had a vapour density of 37 (air is 14), so it remained in the pharynx or fell to the floor (where it remained a hazard). Despite all this it was otherwise a safe and a good sole anaesthetic agent because of its analgesic effect combined with good abdominal relaxation. Any disadvantages? 'Recovery rooms awash with vomit' is how one old ODA described ether anaesthesia! Postoperative nausea and vomiting were certainly very common, perhaps experienced by P J O'Rourke, who said in *Modern Manners*: 'Actually, there is no way of making vomiting courteous. You have to do the next best thing, which is to vomit in such a way that the story you tell about it later will be amusing!'

Unlike ethylene, nitrous oxide and cyclopropane, ether is irritant to the respiratory mucosa, an important consideration during a too rapid induction of anaesthesia. One of our members, John Powell, has written 'If you have a big strong man for a hernia repair, save yourself a lot of embarrassment and give him a spinal instead'!

James C Erickson[1] summed up early 20th century practice when he said that 'inhalation anaesthesia was administered either by open drop ether or chloroform, or nitrous oxide and limited concentrations of oxygen delivered via a reservoir bag and mask'.

Ethylene

Continuing our anaesthetic odyssey I'm going to jump now to ethylene, or ethene, C_2H_4, the first member of the alkene series of hydrocarbons. It is one of the most widely manufactured synthetic organic chemicals, used to produce the plastics polyethylene, polychloro-ethylene, and polyvinyl chloride (or PVC). It was prepared by Ingenhaus in 1799, and its anaesthetic properties were discovered by the physiologist A B Luckhardt and J B Carter in 1923. It is colourless, has an unpleasant odour which was often masked by eucalyptus or lavender, is non-irritating to the airway but highly flammable, and mixed with oxygen or air readily explodes with an explosive range in oxygen between 2 and 80%; 12-20% or more of oxygen was usually required during use so that care was needed with naked flame, cautery or

diathermy. It is slightly lighter than air (vapour density 13.87) and with a boiling point of -105°C can be liquefied at 10°C under 60 atmospheres pressure. It is obtained from natural gas or coal gas, or by the dehydration of ethanol. It is also produced during plant metabolism and is classified as a plant hormone, important in the ripening of fruit. Small amounts of ethylene are often added to the air surrounding fruit to artificially promote ripening.

As what we would consider a 'safe' anaesthetic, ethylene was much like nitrous oxide - basically hopeless unless your favourite colour was blue. How did red/blue colour-blind anaesthetists cope? Cyanosis seems to have been an accepted occurrence during anaesthesia. The 1945 edition of Minnitt and Gillies *Textbook of Anaesthetics* describes 'a colour of the skin definitely blue, but not blackish blue' as one of the signs of fully developed nitrous oxide anaesthesia, with 'a blackish blue colour' one of the five signs of overdose! Ethylene was administered in a closed circuit with CO_2 absorption; the minimal loss of ethylene through the expiratory valve reduced the explosion hazard. Owing to its low solubility (low blood/gas partition coefficient 0.14 - even lower than nitrous oxide 0.47) onset of unconsciousness and recovery were rapid, but there was more nausea and vomiting than with N_2O - but less than with ether or chloroform.

Moving further afield for a moment, Greece sits at the confluence of three tectonic plates which shift and continually stretch and uplift the area, which is riddled with faults. Geologists[2,3] have found that two faults intersect directly beneath the pagan temple of Apollo and the Oracle of Delphi, located about 75 kilometres north-west of Athens. The temple was destroyed several times, and the ruins date from a reconstruction in the fourth century BC. It is said that intoxicating fumes (believed to be the smell from the decaying Python which Apollo is said to have killed) rose from a cleft in the floor near the centre of a small, enclosed chamber in the basement of the temple. Here, according to legend, a priestess sat on a brass tripod, before emerging to pronounce the oracle in the ancient Cretan tongue, which was gibberish to the uninitiated, but was translated or interpreted by the priest and given to the enquirer. Analysis of hydrocarbon gases in spring water near the site of the temple has revealed traces of ethylene - which would account for the putrid smell, the intoxication of the priestess (in the first anaesthetic room on record), and - as the temple was destroyed once by fire - what is perhaps the first reported anaesthetic explosion!

In the mid 1930s cyclopropane came into use, and interest in ethylene waned, although there were still some who continued to use it.

Cyclopropane.

The anaesthetic properties of cyclopropane, C_3H_6, first prepared by the Viennese chemist August von Freund in 1882, were discovered by Lucas and Henderson in Toronto in 1929, and its use developed by Waters in 1933. The main problems with pre-1950s agents were those of nausea, vomiting, explosions, flammability, toxicity, arrhythmias and difficulty in production. Cyclopropane was colourless, sweet tasting, non-irritant, with a vapour density of 21 (one and a half times as dense as air), but with a tendency to cause arrhythmias or bradycardia and respiratory depression, as well as being flammable and explosive (with flammability limits between 2.5 and 60% in oxygen and 2.4 and 10.4% in air). But it gave a smooth and rapid induction, and depth of anaesthesia could be rapidly altered. Moreover a high percentage of oxygen could be used with it, and the patients were therefore not cyanosed. Gale and Waters[4] first described endobronchial anaesthesia in 1931, and

Nosworthy[5] in this country used cyclopropane with controlled ventilation in a closed circuit for thoracic surgery in 1941.

One thing which puzzled me was how Ralph Waters had the luck to introduce cyclopropane into clinical practice. There was little if any mention of this at the Celebratory Meeting in Madison in June 2002 and I am indebted to our Honorary Member Lucien Morris for a personal communication which answered my question and which I would like to share with you now. Dr Samuel Johnston, Head of the Department of Anaesthesia at the Toronto General Hospital, denied William Easson Brown's request to start using cyclopropane for short surgical procedures, following three deaths involving the use of ethyl chloride in Toronto, with attendant adverse newspaper reporting. Harold Randall Griffith and Ralph Waters sat together in Montreal in 1929 to listen to Professor Velyien Henderson from Toronto, the first person to have received a cyclopropane anaesthetic, administered by Dr William Easson Brown. Waters saw the potential of this new agent, obtained 10 gallons of it at a cost of $16, and on 19 August 1930 gave the first cyclopropane anaesthetic for an appendicectomy. Stiles, Neff, Rovenstine and Waters presented a paper at the 12th Annual Congress of Anesthetists in October 1933 on cyclopropane anaesthesia used in 447 patients. Griffith was present at an Anesthetists Travel Club meeting in Madison on 7 October 1933, and on 30th October he gave the first cyclopropane anaesthetic in Canada. Early in 1934, 350 anaesthetics later, Griffith commented:

'My conception of anaesthesia with the older agents (nitrous oxide and ethylene) is that we administer the gas plus enough oxygen to keep the patient alive; with cyclopropane, on the other hand, we administer oxygen with just enough of the anaesthetic gas to keep the patient asleep' - a major culture change in anaesthesia. It is interesting to note that Waters' first cyclopropane anaesthetic, and Harold Griffith's first anaesthetic when curare was used in 1942, were both for appendicectomies.

I recently sent out a brief Questionnaire to all 63 anaesthetists in our Department in Cornwall (35 consultants, 6 permanent non-consultants, and 22 trainees) and received 59 replies. I had suspected that during a one-career time span historical trends in anaesthetic agent experience would be revealed, The 59 anaesthetists surveyed ranged in age from 61 to 24, and had spent between 34 years and 3 months giving anaesthetics. Whilst everyone had used isoflurane and sevoflurane, only 3% had used chloroform, 41% ether, and 42% cyclopropane. Interestingly, of the trainee anaesthetists, 55% had never used halothane, and 75% had never used enflurane. Usage of other agents was minimal, certainly amongst the trainees. There are one or two people who do not 'fit in', but this can be explained by their having used ether whilst working in India, or in Africa, especially under the auspices of the WFSA.

The British Prime Minister Harold Macmillan, in a speech at Bedford in July 1957[6] said: 'Let us be frank about it: most of our people have never had it so good'. Those here who were practising anaesthetists pre-1950 must have thought you'd never had it so good, but as Alan Dronsfield will shortly tell you, it was going to get even better! It is always easy to see solutions to problems when one looks back, and looking back one wonders why such awful anaesthetic agents were ever used. Of course, that's all that were available. The 100 years or so following Horace Wells' unfortunate demonstration of nitrous oxide anaesthesia saw not only the introduction of a number of important agents - ether, chloroform, cyclopropane, and trichloroethylene (each of course with its supporters) but also major developments in equipment for the delivery of these agents - from the simple apparatus used by Joseph Clover

to deliver chloroform (from Clover's 'finger on the pulse' to modern methods of monitoring could take up a whole symposium!) via the long-serving Boyle's machine and the now virtually historical Magill circuit, to the modern all-singing, all-dancing machine complete with a multitude of (usually redundant) vaporisers and a generally reducing number of flow meters.

Trichloroethylene

Trichloroethylene (Trilene) was another very cheap agent, popularised by Langton Hewer in the early 40s, and had on the one hand low volatility, and slow onset of effect - SVP at 20°C is 60 mmHg, blood/gas partition coefficient is high (9) and MAC 0.17% (eventually) - but on the other hand it provided good analgesia during and after surgery and cardiovascular stability, though with a tendency to arrhythmias. Its vapour was much less irritant than ether, with an odour similar to chloroform, so that waxoline blue was added to identify it. Trichloroethylene was relatively pleasant to breathe.

And then in the 1950's came halothane.

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HALOTHANE - THE FIRST DESIGNER ANAESTHETIC

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The discovery and rise to popularity of halothane is considered in the context of the history of inhalation anaesthesia.

History

Until the 19th century surgery was seen as an intervention of last resort. The patient (and the surgeon) recognised that the knife, scalpel and saw would be accompanied by terror and pain, and the surgeon knew that infection and subsequent death would stalk his efforts. The conquest of operative pain has a history that both pre- and post-dates Lister's work on antiseptics. Although it is essentially a 19th century story, various methods have been used since antiquity to lessen operative pain. These include hypnosis, narcotics prepared from marijuana or belladonna, knocking the patient unconscious with a blow to the jaw, stupefying with alcohol, and large doses of opium. Textbooks on surgery published in the first half of the 19th century paid scant regard to the problem of operative pain, and when they did it was to cast doubt on the efficacy of the above methods. Pre-operative preparation was normally restricted to the recommendation that enough strong men be provided to hold the patient down.

Diethyl ether was noted by the alchemist Paracelsus to have a soporific effect on fowls (1540), and in 1818 Michael Faraday noted its ability to produce a profound lethargic state. Humphry Davy reported the results of his researches on nitrous oxide in 1800: 'it appears capable of destroying physical pain, it may be used with advantage during surgical operations'. In 1824 Henry Hill Hickman reported the results of his experiments on animals which he had partially asphyxiated with carbon dioxide. He wanted to use the technique in humans, but neither this nor the previous observations were followed up.

Three Americans are generally credited with the introduction of inhalation anaesthesia. Crawford Williamson Long used sulphuric ether (diethyl ether) in 1842, Horace Wells inhaled nitrous oxide himself while a tooth was extracted in 1844, and William Morton gave a public demonstration of surgical anaesthesia with ether at the Massachusetts General Hospital in 1846. The era of truly painless operations had begun.

Anaesthesia with chloroform was announced in 1847 by James Simpson, and for the next hundred years or so chloroform, ether and nitrous oxide reigned supreme. Other anaesthetic agents came into use such as ethyl chloride, ethylene, cyclopropane, divinyl ether and trichloroethylene, but all had disadvantages and there was a need for something better.

Enter the chlorofluorocompounds (CFCs)

Refrigeration in the late 1890s and early 1900s used the toxic gases ammonia, sulphur dioxide and methyl chloride as heat transfer agents. Leakages of ammonia and sulphur dioxide were immediately perceptible due to their odour, but methyl chloride gave little indication of its escape and in the 1920s several fatal accidents occurred. The search was on for alternatives to the above gases. Thomas Midgley, an engineer and self-taught chemist working for General Motors, addressed the problem and in 1928 came up with the first of the CFCs, dichlorodifluoromethane (Freon-12).[1] By 1935 it had formed the basis of 8 million refrigerators in the USA.

Non-flammable, non-toxic and volatile, it had all the characteristics of an ideal anaesthetic, save one; it did not work. Animal studies showed that even in high doses (20% by volume in air for up to 8 hours per day), it produced mild to moderate tremors but no insensibility. Nevertheless two years later Harold Booth and May Bixby reflected that: 'the best probability of finding a new non-combustible anaesthetic gas lay in the field of organic fluoride compounds'.[2] They accounted for their approach thus:

> 'There is the indication that, like chlorine, fluorine substitution for hydrogen in organic compounds lessens the flammability; for example fluoroform burns with difficulty, whilst methane forms explosive mixtures with air. To narrow the field further for an approach to this subject, it was logical to study those organic fluorides which are derivatives of the best known anaesthetics - fluoride derivatives of chloroform'.

At the time fluoroform could not be prepared in sufficiently large amounts for animal studies, so the researchers had to make do with dichloromonofluoromethane (CCl_2HF) and monochlorodifluoromethane ($CClHF_2$). They found that neither material had anaesthetic potential. Even low doses were accompanied by distress: '1% caused the animal to continuously, vigorously and frantically scratch and bite itself during 1hr 45 min..., 4% (induced) violent tremors..., 6% unconsciousness not sufficiently deep for surgical operations'. Using CCl_2HF at 20%, despite added oxygen, caused death between 5 and 11 min.

New synthetic fluorinated hydrocarbons

In the mid 1940s E T McBee of Purdue University was busy developing new synthetic routes to fluorinated hydrocarbons, and was able to present Benjamin Robbins with 46 such compounds for consideration as potential anaesthetics. Crucial to his evaluation was his use of the FD50/AD50 ratio, which gave an indication of the safety of a compound .[3] Fatal dose-50 (FD50) was the concentration which caused death in 10 min of 50% of a mouse population. Anaesthetic dose-50 (AD50) was that required to anaesthetise 50% of a mouse population, again in 10 min. Thus for safety the FD50 figure should be high, and for efficiency as an anaesthetic the AD value should be low. To show potential, at least from a safety perspective, the ratio FD50/AD50 should be high.

Robbins tabulated his data, and included the values for ether and chloroform for comparison purposes. His conclusions were that all 46 of his fluorinated alkanes produced anaesthesia, apart from the butane which he writes (incorrectly) as C_4HClF_6. Species which had low

boiling points were associated with production of convulsions in the mice, especially on recovery. Within a group of related compounds, potency increases with increase in boiling point. The introduction of a bromine atom increases the safety of an anaesthetic and its potency.

Promising compounds

Using his data Robbins was able to select the 18 most promising compounds, and then tried them out on dogs. His results were equivocal. All 18 induced anaesthesia but all, apart from four, induced abnormal cardiac rhythms and all, in varying degrees, gave rise to falls in blood pressure. He considered those agents which did not affect heart rhythm had potential: 'The results obtained with four of these compounds ($CF_3CHBrCH_3$, CF_3CHBr_2, $CF_3CHClCH_2Cl$ and $CHF_2CHClCH_3$) are such that we feel further investigations of them as possible anaesthetic agents are indicated.

Robbins' results attracted little attention and there was no immediate follow-up work.

Charles Suckling and ICI

The story then moves to the Imperial Chemical Industry's works at Widnes, Cheshire. This was the centre for the British production of Freons (known as Arctons in the UK). Research chemist Charles Suckling recalled: 'We had at the Widnes Laboratories considerable experience in the specialised techniques of the Arcton type of compound, and in our desire to make further practical use of these substances, we decided to search among them and other fluorine-containing compounds for an anaesthetic'.[4]

Foremost in his mind were three factors guiding him to likely candidates:

> i). The inertness of fluorine in the C-F bond, especially in the CF_3- and CF_2= groups. Apart from their inherent inertness, they also conferred stability to adjacent C-halogen bonds. Thus compounds of the type $CF_3.ChalogenX_2$ (where X=H or halogen) should have high chemical stability and hence low toxicity.
>
> ii). The Arctons which had C-H incorporated had a greater margin of safety associated with them, compared with the totally halogenated alkanes. It was believed that the greater polar nature of the former species enabled them to interact electrostatically with 'brain molecules', and thus show anaesthetic effects at lower doses compared to the latter group.
>
> iii). J Ferguson had (in 1939) proposed an index of 'Relative Saturation' to assess a molecule's potential for narcosis.[5] Ether vapour induces narcosis at a volume concentration of 3.4%, that is a partial pressure (pa) of 3.4x760/100 mm Hg. Now the saturated vapour pressure of ether at body temperature (ps) is 830 mm Hg. Ferguson's Relative Saturation (=pa/ps) = 3.4x 760/100/830, namely 0.03.

Calculations based on 14 anaesthetic agents showed that 86% had index values in the range of 0.01 to 0.03. Analysis of some of Robbins' fluorinated alkanes showed, with the exception of CF_3CHBr_2, all had pa/ps values greater than 0.03. This did not rule out anaesthetic potential of the others, but it made it doubtful. Then Suckling's team re-investigated a few of

Robbins' compounds and added some of its own. Suckling evidently decided that a partial pressure of 5 mm Hg was necessary to maintain anaesthesia, not Robbins' value of 0.3 mm Hg.

Halothane

Bearing in mind Suckling's three considerations (presence of a CF_3 group, CF_3 connection to a C-H bond, and a pa/ps ratio ideally 0.01-0.03), only one member of the list stands out, $CF_3CHBrCl$, 1.1.1-trifluoro-2-bromo-2-chloroethane. Halothane, a new anaesthetic agent had been born. Charles Suckling records in his (1958) patent:

> '(it) is a particularly useful non-explosive inhalation anaesthetic, capable of producing full surgical anaesthesia over prolonged periods. ... (it) gives an exceptionally smooth and rapid induction to full surgical anaesthesia, which can be maintained by inhalation of a relatively small amount of vapour in air. ... Recovery from anaesthesia with our new compound is rapid and smooth, and no undesirable effects have been observed.[6]

The early 1950s, and the arrival of halothane on the clinical anaesthesia scene, marked the start of an exciting new era in anaesthesia. Whereas ether anaesthesia was slow in onset, and often associated with breath-holding, coughing, increased bronchial secretions and slow recovery after prolonged procedures on account of its high solubility in blood, halothane on the other hand was a potent inhalation agent with a smooth, pleasant induction for the patient. Though possessing no analgesic properties, used in conjunction with intravenous opioids and muscle relaxant drugs it provided ideal conditions for a multitude of surgical operations, and rapidly became the volatile agent of choice, enjoying huge popularity and success.

Too good to be true?

Despite this, warning bells were beginning to ring in the 1960s about the role of halothane in post-operative liver dysfunction in general and 'halothane hepatitis' in particular, especially after repeat exposures to the agent. About 15-20% of the halothane administered is broken down in the liver to trifluoroacetic acid, and bromide and chloride ions and/or bromine and chloride radicals. In the face of increasing concern - was the liver being damaged by toxic metabolites, by hypoxia due to altered liver blood flow, or by an immunologically mediated injury, with some patients perhaps genetically predisposed to hepatotoxicity? It became evident that the concept of a 'safe period' between administrations should be questioned. During the 1980s the use and popularity of halothane began to wane, whilst the use of the newer fluorinated agents such as enflurane and isoflurane increased. Of particular interest is the fact that enflurane and isoflurane are metabolised to a much smaller degree (2.5% and 0.2% respectively).

By the early 1990s the use of halothane had all but ceased, isoflurane having taken its place, and many of today's trainee anaesthetists have never used halothane or enflurane. Halothane continued to be used for the gaseous induction of anaesthesia in children, but has lost even that role to sevoflurane, a new agent with a pleasant odour and low blood-gas coefficient, with resultant fast, safe induction and recovery. Halothane maintained a role in veterinary anaesthesia, but even that has diminished, some practices having abandoned halothane in favour of isoflurane.

The future

Besides the well-known books by Duncum[7] and Atkinson and Boulton[8] there is a useful account of anaesthetic history on the internet.[9] Note also the chapter on halothane on John Powell's website.[10] But what of the future: are the days numbered for nitrous oxide and the volatile agents? Will total intravenous anaesthesia with continuous infusions of analgesics and hypnotics, whilst ventilating the patient with oxygen/air mixtures, be the state of things to come? Will the equipment used to deliver precise amounts of anaesthetic gases and vapours be found only in medical museums, and the main equipment used to induce and maintain anaesthesia be simply a motorised syringe?

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NORMAN BETHUNE, THE STORMY PETREL

Professor J P Payne
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Early Years

Norman Bethune, the Stormy Petrel, (so dubbed by Dr Edward Archibald, his mentor and director and chief surgeon in Montreal's Victoria Hospital) was a son of the manse born in the small town of Gravenhurst, North of Toronto on 3 March 1890. To pay for his university education he worked in various posts, most notably as a lumberjack and a teacher, particularly in the education of those whom he thought had been deprived of the opportunity to advance themselves. As a result his entry into medical school was delayed until 1912. His training was further delayed with the outbreak of the First World War in August 1914, when he immediately enlisted as a stretcher-bearer in the Royal Canadian Army Medical Corps. Unfortunately he was badly wounded during the second battle of Ypres, and after treatment in hospital in France and England he was invalided home to Toronto where he restarted his medical training. He graduated MD in 1916 and immediately re-enlisted in the Royal Navy as a Surgeon-Lieutenant.[1] Towards the end of the war he transferred to the nascent Canadian Air Force where he was involved in research into the causes of blackouts among pilots.

After his war service Dr Bethune occupied various junior appointments in the United Kingdom, and became a Fellow of the Royal College of Surgeons of Edinburgh by examination in May 1922, some 60 years after his grandfather (also Norman Bethune) who was elected a Fellow in March 1860. Like his grandfather before him he too went on to marry a Scottish girl a few months after obtaining his Fellowship, and in the next year the couple travelled extensively in Western Europe. This allowed Bethune to observe the work of the leading surgeons in Paris, Vienna and Berlin before returning to North America where he began practice as a surgeon in Detroit, Michigan. Both his reputation and his income advanced rapidly until he was stricken with pulmonary tuberculosis. Conservative treatment was prescribed but Bethune wanted more active management, and he persuaded one of his colleagues to collapse the infected lung. He was back in surgical practice within two months of his artificial pneumothorax.[2]

Thoracic Surgery in Canada

Possibly on the basis of this experience he focused on thoracic surgery, which led to his appointment as assistant to Dr Archibald in the Victoria Hospital, Montreal in 1928. Four years later in 1932 he was leading his own unit in the Sacré Coeur Hospital in Cartierville, North of Montreal, an appointment that he held for four years. This eight-year period from 1928–1936 was probably the most prolific of Bethune's career, certainly from the academic aspect. He promoted the use of intravenous anaesthesia, he developed new surgical techniques and refined the surgical instruments needed for this purpose, and he advanced radical ideas about publicly funded medical care and health systems in Canada.

These comments probably deserve expansion. Firstly, on the subject of intravenous anaesthesia Dr Bethune addressed the Mid-South Postgraduate Nurse Anesthetists' Assembly in Memphis, Tennessee. He told the nurses that Evipal (hexobarbitone) given intravenously was the most pleasant anaesthetic for thoracic surgery. Induction was fast, of the order of 15

seconds without struggling; anaesthesia lasted for about 30 minutes without masking, and recovery was uneventful. With the benefit of hindsight it could be argued that Dr Bethune's account was somewhat naïve, but it must be accepted that he had recognised earlier than most the potential advantages of intravenous anaesthesia. Secondly, his innovative ideas on surgical techniques and natural design come into the same category. Thirdly, his radical ideas about publicly funded medical care and health systems were to make the greatest impact. The day after his technical presentation to the nurses, Dr Bethune startled the Mid-South Medical Assembly when he presented his proposals for a socialised medical plan to meet the problems of providing health care in the poorer communities. This plan was described in more detail some weeks later at a symposium on medical economics sponsored by the Montreal Medico-Chirurgical Society.[3]

In the meantime he helped to organise and finance the Montreal Children's Art Centre, and founded 'The Montreal Group for the Security of the People's Health', consisting of doctors, nurses and social workers who met regularly in his apartment to plan a suitable medical care system for Canada. In addition he had surreptitiously joined the Communist Party of Canada. This latter political development was to lead to his next major change of career.

War in Spain and China

At the outbreak of the Spanish Civil War in July 1936 Bethune was invited to head the Canadian Medical Unit in Madrid. This he accepted and arrived in Spain in November 1936, where he organised mobile blood transfusion units which collected and delivered blood to where it was needed along the whole of the battle front. That task completed he returned to Canada to undertake a cross-country speaking tour to raise money for the continued support of the Canadian Medical Unit. His tour had only just begun when the Japanese launched a new attack on China, and immediately Bethune volunteered to go to China on the basis that Spain and China were part of the same battle. On his arrival early in January 1938 he set about organising a series of mobile medical units to support the Chinese Red Army. That involved the establishment of over twenty basic hospitals in which the staff could be trained to provide the necessary care to meet both army and civilian needs. Late in October 1939 when operating without gloves on a wounded solider, Bethune accidentally cut himself. Despite immediate though limited precautions he developed generalised septicaemia and died on 12 November1939.[4]

Posthumous reputation

Today Norman Bethune is regarded as a martyr and a hero in China,[5] and in Canada his family home in Gravenhurst is now a museum. Norman Bethune is unique. There can be no other doctor who served in the Royal Canadian Army Medical Corps, the Royal Navy, the Canadian Air Force, the International Brigade in Spain and the Chinese Red Army. It is perhaps not surprising that his obituary was written by Chairman Mao Tse-Tung.[6]

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HUMPHRY DAVY'S FIRST PRINTED BOOK: *ESSAYS ON HEAT & LIGHT*

This article details the discovery of a previously uncatalogued book by Humphry Davy. The author welcomes any additional information regarding the book, its origins, or provenance. This last item is especially tantalizing. It has been speculated that this volume may be directly connected to Humphry Davy himself and may even have been his personal copy.

A book well known to anaesthetists is Humphry Davy's 1800 publication on nitrous oxide, long recognized as his first published book. Officially, it is known as:

> *Researches Chemical and Philosophical, Chiefly Concerning Nitrous Oxide, or dephlogisticated Nitrous Air, and its Respiration.* London: printed for J Johnson, St Paul's Church-Yard, by Biggs and Cottle, Bristol.

One year earlier, Davy had two of his essays published in a book edited by his mentor Thomas Beddoes. They are: An Essay on Heat, Light and the Combinations of Light, from *Contributions to Physical and Medical Knowledge, principally from the West of England, collected by Thomas Beddoes, MD,* Bristol: Biggs and Cottle, 4-147, and: *An Essay on the Generation of Phosoxygen, or Oxygen Gas; and on the Causes of the Colours of Organic Beings*, ibid. 151-198.

These two early essays and the nitrous oxide book by Davy are profiled in the authoritative bibliography, *Sir Humphry Davy's Published Works,* by June Z Fullmer. For this book published in 1969 by the Harvard University Press, Fullmer embarked upon a 'massive program of interlibrary loans', translated Russian and Swedish entries, consulted Davy expert Sir Harold Hartley, and was helped by numerous librarians, including those at two institutions associated with Humphry Davy: the Royal Institution and the Royal Society. It is safe to say then that as of 1969, *Researches* was Humphry Davy's first published book.

In August 1999, while perusing an antiquarian medical book catalogue, I noticed the heading 'His First Book' above 'DAVY, Humphry'. Assuming this referred to his 1800 *Researches* I continued reading (I am always curious to see what the asking price is for an original 1800 *Researches* when they occasionally come up for sale). The caption instead read:

> 'DAVY, Humphry. *Essays on Heat, Light and the Combinations of Light, with a new Theory of Respiration. On the Generation of Oxygen Gas, and the Causes of the Colours of Organic Beings.* 205 pp. 8vo, attractive antique half-calf & marbled boards by Aquarius, spine nicely gilt, orig. red morocco lettering piece on spine. [Imprint printed on a slip & pasted on at foot of title]: Bristol: Printed by Biggs & Cottle, for TN Longman & O. Rees. London:1799. Signature of W.R. Stoke, dated 1910, on title.'

After checking Fullmer's bibliography a second and third time, I inquired about this book to the Wood Library-Museum in Park Ridge, Illinois, USA and the Wellcome Institute for the History of Medicine Library in London, United Kingdom. A separate edition under Davy's name was not known, but the earlier essays in Beddoes' book were. Based on this, I was convinced that

there were no other copies of this book known to the scientific community. One other concern I had was the authenticity of this book. The bookseller, Jonathan A Hill from New York City, is a member of the Antiquarian Booksellers' Association of America and of the International League of Antiquarian Booksellers and guaranteed that the book was authentic and as described. Mr Hill purchased the book at a German auction in 1998. It had belonged to Dr Maria Conradt of Hamburg who was a collector/dealer. With that, and the overwhelming fear that someone else might buy the book, I purchased it.

Opposite the title page, a printed dedication reads 'To Dr Beddoes, and to the subscribers to the Pneumatic Institution, these essays are respectfully inscribed'. How can we explain the known existence of only one copy of this book? Perhaps the remaining copies were destroyed or lost over the past two hundred years. Perhaps there was only one copy printed because it was Humphry Davy's personal copy. Biggs & Cottle printed both the Beddoes book and the Davy book in Bristol in 1799 for two different London companies; the Beddoes book for J Johnson and the Davy book for Longman and Rees. The next two known owners are W R Stoke, June 1910 and Dr Maria Conradt of Hamburg. Hopefully these clues will lead to more information on this exciting book.

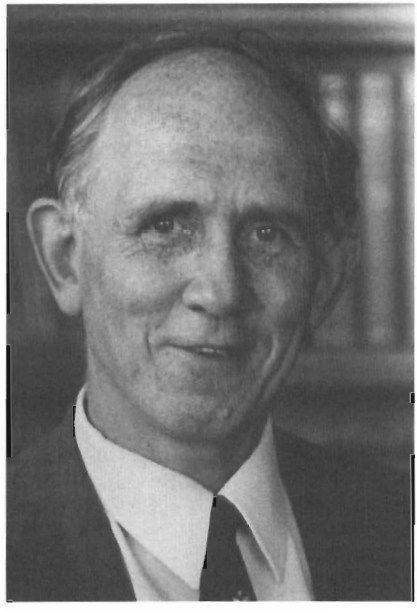
David C Lai

OBITUARY

William Denis Ashley Smith OBE MD MB BS FRCA - 1918-2002

Denis Smith was born on 5th July 1918, but did not come to anaesthesia until 36 years later. The intervening years were not wasted. He was educated at Imperial Service College, Windsor and at Northampton Engineering College where he became enthused by the new radar technology. The outbreak of war interrupted his course and he served in the Signals-Radar Branch of the Royal Air Force from 1939 to 1946. During this time he was at the forefront of the deployment of radar, serving on the South Coast and in East Anglia, India and Burma. He operated a key radar station which was repeatedly bombed during the Battle of Britain, and he was the first to detect birds on radar. In Burma, he was serving in Imphal when it was attacked by the Japanese. He was promoted to Wing Commander and appointed OBE in 1945.

On demobilisation, he entered St Mary's Medical School, qualifying in 1952. His first house job was at the King Edward VII Memorial Hospital, Ealing and then his powerful streak of individuality took command. His second house job was at University College Hospital of the West Indies. Fortunately for our specialty he was attracted to anaesthesia and started his training in Jamaica. In 1954 he took his Velocette motor cycle to British Honduras, and rode north through Mexico and the United States into Canada, carrying his belongings with him, and sleeping most nights in a tent. At least one night he was woken by bandits but suffered no harm. His goal was the Department of Anaesthetics of Saskatoon, headed in those days by Gordon Wyant, where he continued his postgraduate education, before returning to Southampton where he worked under Patrick Shackleton.



His career then moved into research, first in bioengineering at Vickers and, in 1961, as a research fellow under Professor Ronald Woolmer at the Royal College of Surgeons. He started a major study on the administration of nitrous oxide and oxygen for out-patient dental surgery. If genius is defined as infinite capacity to take pains, Denis rapidly established his position as a genius. He published seventeen masterly papers from 1961 to 1964, dealing with instrumentation, studies on volunteers and detailed observations on 410 anaesthetics in the dental chair at the Royal Dental Hospital, employing his bio-engineering skills and familiarity with the latest technology.

In 1964 Denis was appointed first assistant to the new professorial Department of Anaesthesia of the University of Leeds. In addition to a substantial clinical load, the academic department initiated a massive programme of undergraduate and postgraduate teaching. The former involved taking groups of 8 students at a time for a full-time two-week course, comprising tutorials and supervised clinical attachments. This threw a huge burden on the staff, and Denis responded with distinction and meticulous attention to detail. The regional postgraduate didactic teaching programme comprised one whole-day a week devoted to lectures, yet another burden for the staff. Finally we pioneered a do-it-yourself laboratory series of experiments for post-graduates to learn methods of clinical measurement. Denis Smith excelled in the very difficult preparation of many of these experiments.

He also started writing his MD thesis on nitrous oxide in relation to dental anaesthesia, soon becoming aware that the historical background of his subject contained substantial areas of ignorance. His reaction was typical of his remarkable capacity to take infinite pains. He embarked on a re-examination of the experiments of the pioneers, but with modern techniques for measuring uptake, including a body plethysmograph which he made himself, and in which he was often anaesthetised.

His experimental work was combined with historical research, and it is hard to see how he found the time for so much work. A classic series of nine articles on the history of nitrous oxide anaesthesia was published in the *British Journal of Anaesthesia* (1964-1966) and became a supplement to his MD thesis (1969). These articles were reproduced in his celebrated book *Under the Influence*, published in 1982 by Macmillan. A tenth article on early manufacture, storage and purity of nitrous oxide was triggered by the release of a small batch of cylinders of nitrous oxide heavily contaminated with nitric oxide, and resulting in two fatalities. His work on Priestley was particularly appropriate to a scholar working in Leeds.

The history of nitrous oxide soon became Denis's consuming interest, and he set new standards of excellence in this field. In particular were the remarkable studies of nitrous oxide uptake in volunteers (again including Denis himself) undertaken in the hyperbaric chamber in Glasgow, to repeat the observations of Paul Bert and others, but with intensive monitoring. In his extensive field research of the pioneers he showed particular aptitude for recruiting local helpers, and he distinguished himself by the discovery of the 'Antiquack' letter in the *Lancet*, and gained enormous insights into the life, times, and work of Henry Hill Hickman.

Denis was appointed Reader in 1966 and became Regional Educational Adviser (1977-1981). He sat on the Council of the Association of Anaesthetists (1976-1979), and was awarded the John Snow Silver Medal in 1984. He was President of the Section of Anaesthesia of the Royal Society

of Medicine (1986-1987) and presented his last papers to the History of Anaesthesia Society in 1988.

He retired in 1983 and his last publications were in 1986, based on papers presented at the 50th Anniversary Meeting of the Australian Society of Anaesthetists in 1984. His health began to deteriorate while he was writing a book on Hickman. A manuscript for this book is in the possession of the History of Anaesthesia Society and hope remains that it may one day be published.

Denis died on 12 October 2002, and will long be remembered for his outstanding qualities of humanity, dedication, insight and attention to detail in so many aspects of anaesthesia, particularly its history. He is survived by his wife Shirley, their children Ru, Adrian and Lucy, and three grandchildren.

J Nunn and M Hargreaves

BOOK REVIEWS

The History of Anesthesia - Proceedings of the 5th International Symposium on the History of Anesthesia, Santiago, Spain, 2001. Diz J C, Franco A, Bacon D R, Rupreht J, Alvarez J, eds. International Congress Series 1242, Amsterdam, Elsevier, 2002, pp623, hb £124, $180, €180, pb £52.

Dr Rupreht introduces this volume with a brief history of the international symposia on the history of anaesthesia, of which he was one of the founding fathers. From Rotterdam in 1982, to London in 1987, spinning off both the ASA and the HAS en route, to Atlanta in 1993, Hamburg in 1997, and Santiago in 2001, the movement has gathered a momentum that must be very rewarding, with an interval of only four years to the next meeting, due to be held in Cambridge in 2005.

The book is divided into nine sections, the first being on *Anaesthesia in Antiquity*. Opium, of course, features heavily, and mandragora is not forgotten. There are papers on physostigmine and strophanthin, neither of which is as obsolete as might be expected. While it is unexpected to see ether and the intravenous barbiturates among the agents of antiquity, this presumably was a dig at the more senior participants.

Oxygen and Anaesthesia follows. Papers that one will refer to often are by Drs Severinghaus and Pole, on the development of oxygen monitoring, and Lucien Morris on carbon dioxide. Also of interest is local research into the Spanish and French pioneers of the use of oxygen in anaesthesia. One of the great values of these symposia is that they have stimulated research in host and allied countries. This has broadened enormously the knowledge and outlook of those of us who have been brought up to regard the development of inhalational anaesthesia as having been largely confined to the English-speaking countries.

Spinal Anaesthesia is the next heading, with papers on the early history, and on its application to obstetrics. Professor Caton's claim that the Swiss obstetrician Oskar Kreis, who published in July 1900 on the use of spinals in vaginal deliveries, introduced a new era in anaesthetic practice, reinforces this reviewer's reluctance to ever attribute to anyone the first performance of anything, since in the United States Dr S Marx was breaking the same new ground at the same time. Other papers review the early history of spinals, working around the framework of existing knowledge. At this point one wonders where history begins. In the paper on the use of spinals in severe pre-eclampsia, fifteen of the twenty eight references date from 1995 or later, and only seven predate 1980. It is said that as one gets older the professors get younger and younger, but now it seems that one can be a museum piece at thirty! On the other hand, the revelation that morphine was injected intrathecally more than one hundred years ago helps to restore a sense of proportion.

The section on *Resuscitation* begins with a historical review and personal account by one of the godfathers, Peter Safar. The use of intravenous agents, small volumes of hypertonic solutions and Ringer lactate follows. Here something might have been said about Sidney Ringer and his work on ions and the heart. Then back two centuries to resuscitation of the drowned in Spain by rectal tobacco smoke, with illustrations of apparatus very similar to that on display in the AAGBI Museum. The authors mention the debt to the Dutch and English Humane Societies, but show no understanding of the theory of sympathy that was the rationale of the method.

Among *Pioneers in Anaesthesia*, Dr Calmes dispassionately reveals the strong misogynistic bias that pervaded the Wisconsin Department under Waters. This contrasts starkly with the well-known determination of British anaesthetists, from 1892 onwards, that equal rights should be enjoyed by their female colleagues. A remarkable woman anaesthetist is the subject of a paper by Gerald Zeitlin and Michael Goerig. David Wilkinson gives a detailed account of the life of Edmund Boyle, but leaves unanswered his own question about Boyle's real contribution to the development of anaesthesia. Obviously Boyle was one of the 'characters' of his time, but not everyone would describe his small textbook, even in its third edition, as very important, and his part in the ethanesal fiasco is quietly passed over. The indefatigable Michael Goerig and his colleagues greatly extend our knowledge of the early history of nitrous oxide in obstetrics in their excellent paper on Paul Zweifel. Goerig, who was the co-author of ten papers, (and surely must, or ought to be, writing a comprehensive history of anaesthesia in the German-speaking countries) contributed also to the paper on Knipping, a pioneer of the continuous monitoring of inhaled gas mixtures. This is, in effect, a spin-off from his earlier paper on acetylene, or narcylen. Presumably the time limit required a separate presentation, but the two could have been combined for publication to save fragmenting the story.

We learn that Ritchie, the New Zealand inventor of the eponymous, or bosun whistle that our more senior readers will remember, had much more to him than this one device, both as an inventor and a teacher. Nearer home, Adrian Padfield pays homage to one of his own teachers, Massey Dawkins, pioneer of epidural anaesthesia in the UK. But which of the Dawkins space indicators does he find complicated? One of them could be knocked up from the barrel of a disposable insulin syringe, and worked beautifully.

The papers in the section on *Society and Education* deal broadly with the place of the anaesthetist in the medical pecking order, and the conception of him by the general public. Dr Harper rightly perceives that there is much social history to be found in journals and textbooks. Sadly, a most valuable source was lost when the RSM Proceedings stopped publishing verbatim reports of Section meetings. Earlier textbooks also contain indications of the anaesthetist's status. In 1922, for example, Blomfield was able to rejoice that anaesthetists were now represented on the medical committees of ten out of the twelve London teaching hospitals. A number of papers were devoted to the social position of anaesthetists in Spain, and in the United States, and the struggle in the latter to establish an independent Board of Anesthesiology. Jean Horton discovered from the 1847-8 issues of the *John O'Groat Journal* that local practitioners were not afraid to use chloroform even in those early days. Adrian Padfield gave a brief history of anaesthesia in the dental chair in Britain, and reviewed the statistics that showed what a relatively safe procedure it was.

Spanish Anaesthesia opens with two papers on Macintosh's visit to Spain during the civil war, and its influence on the course of Spanish anaesthesia. The remainder of this section discusses the contribution of a number of pioneers. Particularly interesting is the revelation that warm ether vapour was being used in 1889, and that an adaptation of the Ombrédanne inhaler to the Oxford bellows system, the OMO apparatus, was very popular during the 1950s. The temperature controlled Lostau-Osejo anaesthesiometer of 1908 bears a conceptual resemblance to the Alcock apparatus of the same year. One looks with envy at the photographs of the very spacious National Museum of Anaesthesia and Critical Care Medicine, which comfortably accommodates large pieces of apparatus, including an iron lung.

An interesting innovation is the section on *Anesthesia and the Arts*. Dr Catherine Ross, who will be remembered for her contribution to the joint meeting in Bristol, spoke about Davy's friendship with the Romantic poets Wordsworth, Southey, and Coleridge, and developed her earlier argument that the split between the Arts and Science, the origin of the Two Cultures, dates from this period. The unearthing of the graduation thesis on pain by the great Spanish novelist Pio Baroja reveals a medical curiosity. Baroja (1872-1956), one of the 'Generation of 98', as the writers with whom he is grouped are known, practised medicine for barely two years, then became a baker for ten, before embarking on the career that made him the most popular and famous novelist in Spain. His best-known work, *El Arbol de la Ciencia* (The Tree of Science) is based on his years as a medical student and young doctor. The turn of the century saw a number of the medically trained turning to literature, Somerset Maugham, Francis Brett Young, and Austin Freeman, all now unfairly neglected, among them.
The commemoration of anaesthetists on coins, plaques, and stamps, was the subject of two papers. Those of us who failed to persuade the Post Office to memorialise the sesquicentenaries of nitrous oxide, ether or chloroform during the 1990s will empathise with Dr Nemes, whose table of some seventy anaesthetists who have not yet been immortalised suggests the need for a further list of those who did not make it to *his* list, and so on ad infinitum. One would like to know more about the triptych painted by Plá to represent the discovery of anaesthesia, since the centre panel is more suggestive of the death of Marat being observed by the royal couple from *Las Meninas* of Velazquez. A J Wright's paper deals with anaesthesia as depicted in cartoons and comics, including Gillray's Humphry Davy, and Punch's scolding wife, which Neil Adams reminded us of several years ago. Dr Petermann's paper on the representation of critical care medicine in the fine arts mentions Robert Dooling's satirical novel *Critical Care*, sadly out of print in the UK, but surprisingly omits an early example of high dependency, the emplastered 'white man' in the first chapter of *Catch 22*, whose output and intake are endlessly and interchangeably recycled.

The origin of the intensive care physician is considered in the final *Miscellaneous* section. A very interesting paper comes from the West Suffolk Hospital, with the story of the 'blue light' which seems to have had an hypnotic effect. Alistair McKenzie spoke about the elucidation of the cause of the supine hypotension syndrome by Frank Holmes and Bruce Scott. Birgit Griesecke, in her paper on Davy's nitrous oxide experiments, intellectualises the problem that it is not possible to know exactly what went on, because the subjects were unable to express themselves lucidly while recovering. This is a minor example of the von Ranke difficulty, the impossibility of reconstructing the past 'as it actually was,' which was treated in a masterly fashion by Ludwig Fleck in his classic *Genesis and Development of a Scientific Fact*. This paper raises a number of other questions. Is it the job of the historian to elegantly rearrange intermingled threads? And when the novelist Robert Musil said that 'hardly anybody knows the name who gave humanity the untold blessing of anaesthesia', was he really challenging the ambition of all historians of anaesthesia to get the story right, as the author would have it, or just revealing his own ignorance? Dr Goerig has investigated the early history of malignant hyperthermia, from well before the condition was recognised and understood. This reviewer is convinced that he witnessed such a case in the British Military Hospital in Hamburg in 1947, but the temperature, and the death, were ascribed to fulminating pneumonia. A paper whose title suggests that there was a controversy between Freud and Koller over the discovery of local anaesthesia reveals that there was no controversy, so the author suggests that there might have been, if Freud had been less generous. Is this really history?

The book is very nicely produced, though the index could have been much more comprehensive. Some of the papers show evidence of wide research into primary material, and are valuable sources of information. Others do not, and a number largely rehash from secondary sources. Some try to find significance beyond the facts where there probably was none.

Finally, what should be the status of such publications? The papers are accepted on the basis of abstracts or summaries, and the evidence is that they are published without peer review, and with little or no editing. That they appear in a book makes them citable; but should they automatically be granted this authority? Is it not the editors' job to search for errors of fact, and also to help those whose first language is not English, by replacing infelicitous dictionary translations with idiomatic expressions? As long as there is no loss of meaning, I think it is. So all in all this is a useful aide-memoir for those who were present at the meeting, and a useful indication of the content of the programme for those who were not; but not all that is in here should be taken on trust.

David Zuck

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Careers in Anesthesiology: Autobiographical Memoirs. Volume VII. D Caton & K E McGoldrick (eds). Wood Library-Museum of Anesthesiology, Park Ridge, Illinois, 2002. Pp 315, illustrated. Hard cover edition: ISBN 1-889595-09-08.

What can one say that has not been said before about the seventh volume, the third that I myself have reviewed, in this series? I have previously queried whether each will become just 'more of the same'. Yes, of course, this is inevitable when many people describe similar events. Even when they take different approaches, there is a limit to how different they can be. In the beginning we all welcomed the idea as one of the ways to perpetuate the personalities and events of a rapidly changing period in the history of anaesthesia.

Who is going to read autobiography? Certainly the research historian, and we cannot foretell in whom or what we shall become interested when we become researchers ourselves. To this extent the blanket approach of compiling a large archive of life stories is fully justified. In contrast the general reader will have more limited interests. He would like to read about his own institution, his friends, his colleagues and those role models he admires or whom he sees as having contributed significantly to our knowledge. In reading these stories we may, coincidentally, learn some social history and pick up some useful advice. However, the written essay has disadvantages. It tells only what the author wants to reveal, unlike the recorded discussion where a skilled interviewer may bring out aspects that even the subject had not realised were there, whilst film and video will reveal personality as well. We know too that the written word survives for centuries, that film and photograph does not, and that the survival time of video and audio-tape is as yet untested. We may conclude therefore that this apparently old-fashioned form of compiling history is as reliable as any we have. It has the additional advantage that the page is much easier to scan through than is film.

Memoirs of many of the real pioneers have appeared in the earlier volumes, whilst some no doubt have chosen not to. Volume III has three contributors, all American. *En passant,* why so few from elsewhere? (Though the reviewer must confess to having failed to respond to the request to write her story, on the grounds that the motivation has not yet struck). Where do the three fit in?

Bernard V Wetchler is clearly a worthy person who has made a worthy contribution to anesthesiology in the Mid-West, and at national level, as officer and, finally, President of the American Society of Anesthesiologists (ASA). He makes a modestly realistic assessment of his contribution.

Daniel C Moore has the lion's share of the volume, filling more than half of the 300-odd pages. He claims he was reluctant to contribute, but was persuaded by his colleagues to provide detailed information on certain events; specifically, the move of the ASA and the Wood Library-Museum to Park Ridge, Illinois; how he became the youngest President of the ASA, and how he facilitated the transition from inhalation and intravenous anesthesia to regional block, which he describes as the dominant anesthetic technique. Perhaps it is by sticking rigidly to this brief that his contribution is so tedious. Detailed indeed it is; a typical instance tells us that the Park Ridge building has elevators from basement to second floor. His essay is festooned with footnotes and cross-references, and there is a full list of the author's publications and lectures appended. One of those who persuaded Moore to write asked him: 'Are you so egotistical that you want to take this information to the grave with you?' Moore's reply is that: 'In hindsight, I should have answered 'yes'.' Sorry, Dan, I tend to agree with you, your essay is barely readable, but who can say that someone will not find your information invaluable?

Jay Jacob's essay is only 31 pages, of which 24 are devoted to his experiences in the Army in World War II. I enjoyed his gently humorous account of the vicissitudes of his wartime service that included a period in England before taking part in the Normandy invasion. He returned to America in 1945 and was astonished to find how much civilian practice, even in the major centers, fell below the standards of the Army anesthetists. He tells the story of how Arthur LeRoy (who is he?) had previously learned the technique of tracheal intubation in England from Magill. Being too old for the draft LeRoy volunteered for Army service and concentrated on teaching intubation, but first making every trainee promise to teach others. Jacoby recalls how he himself learned and become competent and hence was baffled on his return to civilian practice to find that intubation was seldom practiced and often actively discouraged. He decided his mission in life was to teach, and he ends his essay with a short account of how his subsequent career was devoted to teaching anyone and everyone who wanted to come and learn: 'I learned a new technique in the Army and promised to teach it to others. I have been doing that ever since.' Perhaps with his simple message 'to pass it on' he contributed more to patient safety than many more distinguished people.

The editors' practice appears to be to give complete freedom to their authors. These three contributions show both the limitations and the value of this approach.

Aileen K Adams

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Fibres – The Life of William Sharpey, the Father of Modern Physiology in England. Alan H Sykes. York: William Sessions Ltd, Ebor Press, 2001. ISBN 1 85072 270 6. £18.50.

Dr Sykes is a Cambridge graduate in zoology and physiology, with an Edinburgh PhD. He taught at the Universities of Edinburgh, Liverpool and London, and now lives in the Lake District. His special field of historical research has been the development of academic physiology in Great Britain, and his talk on A D Waller at the Liverpool meeting of the HAS

in 1997 was much appreciated. With William Sharpey, Dr Sykes has started right at the beginning of physiology as an academic discipline in England.

Sharpey was born in Arbroath (a small town on the east coast of Scotland well-known for its fishing industry) on 1 April 1802. He entered Edinburgh University at the age of 15, as was usual then, and qualified MRCSE in 1821. After some time in London and Paris he returned to take the MD in 1823. Among his contemporaries were Knox and Syme, and Dr Sykes provides a lively account of the Edinburgh scene at this time, the problems of securing subjects for dissection, and the quarrelsome temperament of Syme.

He continues with the story of the founding in 1828 of London University, as it was then called, the 'godless college at the northern end of Gower Street' and of its rival King's College, 'the godly college in the Strand', in 1831. The situation was resolved in 1836, when London University was founded by Act of Parliament as an examining authority, and the Gower Street establishment became University College, with a strong faculty of medicine. Sharpey was elected to the Chair of Anatomy and Physiology in August 1836, and Dr Sykes gives much information about the politics of the appointment, the people who were active in medicine and physiology (including the Quain brothers), and the various altercations that erupted from time to time. It is most interesting to discover that Francis Boott was a very active member of the Council of University College, and of the Committee of the Hospital also. This not generally known fact explains his closeness to Liston, and how UCH came to be the scene of the first operation in England under general anaesthesia.

Sharpey was one of the early microscopists, but Dr Sykes admits that he was not a great experimenter, and his original contributions were limited. He discovered cilia, and the eponymous microscopic fibres that attach skeletal muscle to bone. He provided facilities for others, notably A D Waller for his researches into cervical sympathectomy. But he was a great teacher, and his contributions to textbooks and his editorial work were outstanding. Dr Sykes deals with this in much detail.

Sharpey was elected to the Fellowship of the Royal Society in 1839 and became very active in its affairs, serving as Biological Secretary for 19 years. He was a member of the General Medical Council from 1861 to 1876, and with Syme was responsible for the decision to divide the curriculum into pre-clinical and clinical stages. In 1875 he gave evidence to the Royal Commission on Animal Experimentation. All this, and Sharpey's other commitments, are described fully.

Sharpey's reaction to the news of the first anaesthetic, contained in a letter to his friend Allen Thomson, has been commented on as singularly offhand. From the anaesthetist's point of view it is to be regretted that the book does not do justice to his contribution, albeit indirect, to the physiology of anaesthesia. He provided the laboratory facilities for the Royal Medical and Chirurgical Society's chloroform committee (1862), of which Clover and Harley, a lecturer in the department, were the most active constituents. They used the haemodynamometer to indicate the effect of chloroform on the blood pressure, but do not appear to have had a recording kymograph. Harley is noted in the history of anaesthesia for introducing the alcohol-chloroform-ether (ACE) mixture, which was used widely until the turn of the century.

For Dr Sykes 'Sharpey's Fibres' has a second connotation. They were Sharpey's Men, those of his students who during part or the whole of their career advanced physiology by their researches, and taught and trained a new generation of creative physiologists. They included George Harley, Joseph Lister, Michael Foster, John Burdon Sanderson, Sidney Ringer, and George Oliver who, together with the last of Sharpey's men, Edward Albert Schafer (later Sharpey-Schafer) discovered the pressor effect of an extract of the adrenal gland. The book contains substantial information about all of them.

Sharpey is described as a most congenial man, excellent company, and the life and soul of any party. A confirmed bachelor all his life, he announced to the astonished Harley that he intended to marry a beautiful young woman of 17 or 18. He explained that for the last fifty years he had been paying Scottish Widows for a life policy, and was determined that someone should benefit from it to the utmost. But alas, as Mrs Harley said, he did not carry this project to fruition. Sharpey died on 11 April 1880, and was buried in Arbroath. The medical journals carried most laudatory obituaries.

The book is very readable, very well illustrated, and nicely produced. There is evidence of much research into hitherto untapped primary sources. For anaesthetists its great value and interest is that it fills in the background of the medical (and especially the academic) world in which John Snow lived, and in which Joseph Clover, who was a student of Sharpey's at University College, was trained. There are a small number of misprints, and it is surprising that the author was unable to find Boott's dates, and does not appear to have appreciated the significance of his role at UCH.

Dr Sykes is very generously donating all profits from the sale of the book to the Sharpey Physiological Scholarship at University College, London.

David Zuck

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