Contents of Volume 43

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We are sad to report the deaths of our Society members, Dr S McGowan and Dr G Clark.

HISTORY OF ANAESTHESIA SOCIETY

2011 Autumn Meeting, the British Racing School, Newmarket

9 October 2010

Organizer: Dr Ken MacLeod

The organizer is very grateful to Kirstie MacLeod, Jenni Keating and Aditi Karandikar for their assistance. Special thanks are also due to Amy Burns, Conference Manager at the British Racing School

Proceedings of the History of Anaesthesia Society
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HISTORY OF ANAESTHESIA SOCIETY

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EDITORIAL

Ken MacLeod's enthusiasm and imagination paid off with a memorable meeting at the British Racing School in Newmarket.

After a warm welcome we had an enjoyable first session – a mixture of mechanics (Heimlich manoeuvre) and chemistry (Lidocaine). Then a friendly coffee break refreshed us for the symposium on veterinary medicine and anaesthesia, to celebrate the life of Leslie Hall. This began with a very appropriate citation to the great man by Ken MacLeod. Next there were four lectures which dovetailed perfectly. Owing to a plumbing emergency, Aileen Adams was unable to attend initially, so her paper on John Hunter was kindly read by Anne Florence.

The lunch break included a stimulating tour of the Stables. Then we reconvened for the guest lecture by Helen Rappaport. She expertly compared and contrasted the backgrounds, performances and achievements of Florence Nightingale and Mary Seacole in the Crimean war and thereafter.

Next in the afternoon we were treated to the first anaesthetics in Wales (trainee presentation), and the history of anaesthesia in Switzerland (by nurse anaesthetist Marianne Riesen, who had travelled all the way from Zurich).

After tea, the final session had a wartime theme: first the British medical team in the Vietnam War, and then management of shell shock in conflicts since 1936.

Ken MacLeod was congratulated on arranging a stimulating and thoroughly enjoyable meeting!

Alistair G McKenzie
Hon Editor

FUTURE EVENTS

2011 3-4 June. HAS/ Lad o Pairts Meeting, Edinburgh (part of the James Y Simpson Bicentenary Celebrations)
Contact: Dr Alistair McKenzie (mckenzie_alistair@hotmail.com)

2012 29-30 June. HAS 25th Anniversary Meeting, Reading
Contact: Dr C Neil Adams (cna.adams@btinternet.com)

Speakers at Newmarket

Dr Y Pole

Prof JAW Wildsmith

Dr K MacLeod

Dr Ann Ferguson

Dr Aileen Adams & Dr Anne Florence

Dr A G McKenzie

Dr Barbara Weaver

Ms Helen Rappaport

Dr Danielle Huckle

Ms Marianne Riesen

Dr M Inman

Tour of the stables

Members and guests attending Newmarket meeting

Dr Aileen Adams	Cambridge	Dr Adrian Kuipers	Near Shrewsbury
Dr Neil Adams	Bury St Edmunds		
Dr Moyna Barton	London	Dr Ronald Lo	London
Dr Colin Birt	Rochford	Dr Alistair McKenzie	Edinburgh
Dr Elizabeth Bradshaw	London	Dr Ken MacLeod	Huntingdon
Dr Ted Cockayne	Newmarket	Ms Kirsty MacLeod	Huntingdon
Dr Peter Featherstone	Cambridge	Dr Yash Pole	Manchester
Dr Ann Ferguson	E Kent	Dr John Pring	Penzance
Dr Anne Florence	Warrington	Ms Marianne Riesen	Schlieren, Switzerland
Dr Michael Gough	Grimsby		
Dr Ronald Griffin	Colchester	Prof Sydney Ricketts	Newmarket
Dr Helen Hannah	Chippenham	Dr Sheena Ross	Thrapston
Dr Jean Horton	Cambridge	Dr Jeanne Seager	Rhuddlan
Brig Ivan Houghton	London	Dr Barbara Weaver	Winscombe
Dr Danielle Huckle	Cardiff	Prof Tony Wildsmith	Dundee
Dr Michael Inman	Plymouth	Mrs Patricia Willis	London
Dr Glenys Jones	Edinburgh	Dr Chris Woollam	Norwich
Ms Jenni Keating	Huntingdon		

Guest Lecturer:
Helen Rappaport, Oxford

THE EVOLUTION OF THE HEIMLICH MANOEUVRE *

Dr Y Pole
Retired Consultant Anaesthetist, Manchester

The Heimlich manoeuvre is known world-wide as a first aid measure to dislodge a food bolus obstructing the glottis. It was invented by Henry J Heimlich, who was born in Delaware, USA in 1920 and obtained his MD at Weill Cornell Medical College in 1943. He embarked on a career in thoracic surgery, settling in Cincinnati in 1969. At that time his attention was drawn to the topical "café coronary", a fatal collapse initially presumed due to heart attack, but shown by autopsy to be asphyxiation from a bolus of food in the airway.

Experimenting with partially anaesthetised dogs, Heimlich demonstrated that a thrust in the epigastrium would push the diaphragm up and compress the residual volume of the lungs, thereby forcefully expelling a bolus stuck in the larynx. He published this in 1974 with instructions on how to do it on a choking human. By 1985 the technique was known as the 'Heimlich manoeuvre': holding the patient from behind, the operator jerks a clenched fist into the victim's epigastrium.

* Abstract only

LIDOCAINE: A MORE COMPLEX STORY THAN 'SIMPLE' CHEMISTRY SUGGESTS

JAW Wildsmith, Professor Emeritus, University of Dundee

Lidocaine is one of the great drugs (not just anaesthetic drugs) of the 20th century, but the story of its development is neither well known nor recorded formally in the scientific literature. The death during 2010 of Professor Torsten Gordh, probably the last of those who were closely involved in its development, seemed an appropriate stimulus to describe events as well as they can be established.

Pesticide to local anaesthetic

The story started a long way from medicine, let alone anaesthesia, in the Stockholm laboratory of Professor Hans von Euler (the 1929 Nobel Laureate for Chemistry) at Stockholm's *Högskola*, an independent research institute. During the early1930's von Euler became interested in the alkaloid gramine which had been found in pest resistant strains of barley. Thus, von Euler's hypothesis was that gramine might be the starting point for the development of a new range of pesticides. From gramine (Figure 1), only four relatively 'simple' changes in molecular structure are needed to produce lidocaine[1], but the course of events was much more complex than this implies.

To study the structure of gramine, von Euler employed (on a temporary basis in 1934) a young researcher, Holger Erdtman, who had received poor marks for his doctorate, unfairly so because his knowledge was more up to date than that of his examiners! The low marks meant that he could not obtain the definitive lectureship to which he aspired, but a temporary post did allow him to work with the great man. Erdtman's initial task was to synthesize gramine to confirm its structure, but a theoretical error meant that isogramine was produced instead. The tasting of compounds was then one of the few 'analytical' methods available and isogramine was found to produce the interesting effect of numbing the lips and tongue.

The significance of the observation was recognized by Erdtman, but isogramine (like gramine) is poisonous so he set out to find related compounds which might be useful clinically. In this project he was joined in 1935 by Nils Löfgren, an undergraduate who was also an assistant lecturer, having already worked closely with von Euler. Löfgren was interested in the then new topic of structure activity relationships and this project provided him with an opportunity to pursue it. Together they produced 16 compounds with some minor funding from

a (then) small pharmaceutical company called Astra. The ten best (as judged by tasting) were passed to Astra's medical consultant, Ulf von Euler (son of Hans), a physiologist at the Karolinska Institute, who tested them on rabbit corneas and concluded that none was as good as procaine.

As a result Astra lost interest, and so did von Euler when it was found that gramine did not stop nematodes from attacking barley. Thus, the funding for Erdtman's post was cancelled and, although the results were published [2], there was no more work on local anaesthetics. Löfgren completed his degree and, in 1936, was appointed as an assistant lecturer in the General Chemical Laboratory of the Institute of Biochemistry. In 1940, he went to work for another (then) small pharmaceutical company, Pharmacia, where he was asked to produce a local anaesthetic, war-time conditions having interfered with the supply of procaine which was manufactured in Germany. This resulted in the production of a procaine analogue called *Lokastin* which, although not as good as procaine, was deemed clinically acceptable for use when the latter was unavailable.

The definitive stage

In 1941, Löfgren returned to the *Högskola*, again as assistant lecturer, initially with major teaching duties. However, in 1942 he was able to form his own research group (of undergraduates) working in his own laboratory – one small windowless room in the basement of the building! The group began a major project on the structure activity relationships of local anaesthetic drugs, Löfgren's interest presumably having been re-awakened by his work at Pharmacia. Many series of homologous compounds were later produced and studied, but lidocaine was synthesized very early on, probably in January 1943, but possibly in late 1942. It was a development of one of the compounds synthesized with Erdtman, differing only by the addition of a second methyl group in the 'ortho' position on the ring structure (Figure 1).
This apparently minor change seems to have been made very deliberately, and in the light of Löfgren's growing interest in electron theory. Many of the advantages of lidocaine over procaine are due to the substitution of the ester linkage in the long side chain by an amide group, but the presence of the two 'ortho' methyl groups is vital also. They increase the lipid solubility (and thus potency) of the drug, and the electrostatic forces which they generate decrease pKa (increasing tissue penetrance) and turn a planar (or 'flat') molecule into a curved (and thus 'bulkier') one. This latter feature is thought to improve the drug's interaction with the 'receptor' in neuronal sodium channels, so improving efficacy.

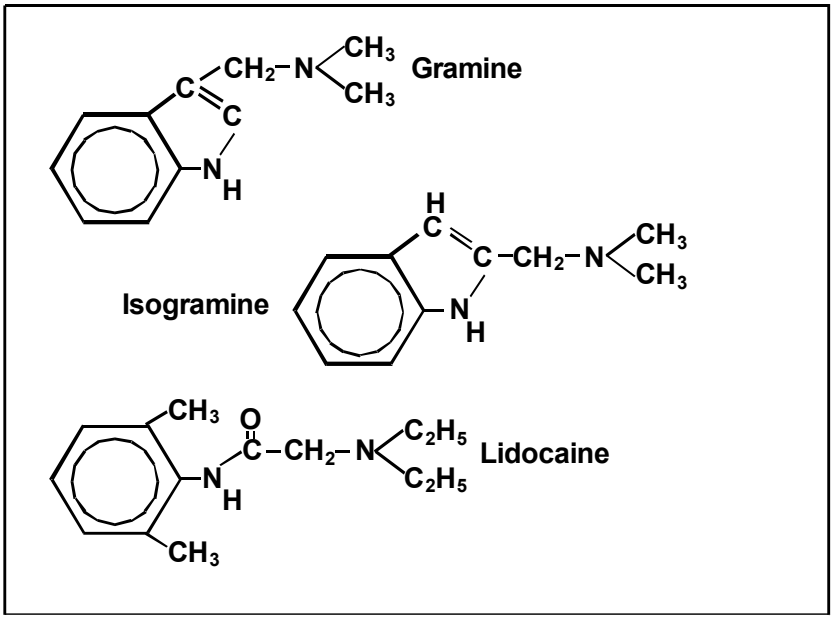

Fig. 1 Chemical formulae for gramine, isogramine and lidocaine

Shortly after lidocaine was first synthesized Löfgren's group was joined by another undergraduate, Bengt Lundqvist, with immense enthusiasm and some contacts (due to his status as a fencer of international standing) vital to the story. Lundqvist, pestering Löfgren for a compound to study, was given what quickly became known as LL30, and immediately upset his supervisor by disappearing with the whole supply of his favourite compound! However, he returned after a few days with evidence that this was a drug of huge potential so was equally rapidly forgiven! Lundqvist had realized that 'tasting' compounds (still Löfgren's primary method of comparison) was inadequate and discussed this with a fencing colleague, Bengt Lagergréen. He was a medical student at the Karolinska who, fortuitously, had just been attached to Sweden's first specialist anaesthetist, Torsten Gordh, from whom he had borrowed a book on nerve block procedures.

In turn Lunqvist borrowed this book from Lagergréen and quickly identified digital (ring) block as a simple, convenient method for comparing local anaesthetics. He also used it to teach himself a range of nerve block techniques which he proceeded to perform (possibly even spinal anaesthesia) on himself

using LL30. The results showed that here was a potent agent, well worthy of more formal study, and another fencing contact provided the way forward. Tore Kornerup, an ophthalmologist at the Karolinska, spoke with Torsten Gordh about the possibility of clinical study, but he advised some preliminary animal work, as much because he was busy preparing his own doctoral thesis as for any view on the proper sequence of evaluation of a new product. It was, to some degree, a delaying tactic and Gordh was perhaps lucky that he was Sweden's *only* specialist anaesthetist at the time or Löfgren might well have gone elsewhere!

Thus a pharmacological analysis was undertaken by Leonard Goldberg, also at the Karolinska, where he was filling in time before defending his own thesis and had 'advertised' his availability to help with projects by putting a notice on his office door! In two weeks he demonstrated that LL30 was a potent agent with an acceptable toxicity profile, and his data were a major part of the patent application filed on July 15th 1943. Lofgren then sought a commercial sponsor, and approached Pharmacia, his earlier employer, and that company bought an option to purchase the drug, but this expired without any more interest being shown. Tore Kornerup appears again, this time because his wife was related to Jacob Wallenberg, a major shareholder in Astra, and that contact seems to have led to Astra paying 10,000 Swedish Kronor for LL30 in November 1943, with a promise of 5,000 more on launch and 4% royalties thereafter.

The route to market

Astra then started a major project (with Gordh leading the clinical studies) to refine the knowledge of the agent, establish a commercial manufacturing process and develop the clinical products which would be released. This all took nearly three years, with the patent application finally being approved in November 1947. This may seem like a long time, but European patent law then was based on methods of production, not the structure of the compound, and the patent grant included no less than ten different methods of production to preserve the rights to the drug. In the same month the clinical product was approved for human use and launched in Sweden in January 1948. Many other countries followed, a US patent (for the compound) being granted in May 1948, with FDA approval in November and launch in 1949 (for events in the UK, see later). A new star had appeared in the anaesthetic firmament.

The nomenclature

LL30: an abbreviation for 'Löfgren & Lundqvist, compound number 30'. Although Lundqvist did not join his group until after LL30 had been synthesized, Löfgren recognized how much he owed Lundqvist, hence the abbreviation.
Xylocain & lidocain: The original (and still current in Sweden) proprietary and trade names chosen for LL30 by Löfgren: Xylocain because *m*-xylidide is the major reagent in its manufacture, and lidocain because it is an acetanilide.
Xylocaine & lidocaine: the 'e' was added to each in the USA initially.
Lignocaine: the generic name in the UK from 1950 until European law required the use of Recommended International Non-proprietary Names. [3] The name was derived using the Latin equivalent ('ligno') of the Greek, 'xylo', both originally meaning 'wood'. [4]

So why lignocaine?

In 1943 UK law granted 12 months automatic protection to the subject of a patent filed in any other country so Astra should have made their application by 15th July 1944. They were two weeks late, but were given nine months 'grace' to complete because of wartime conditions. However, this was not followed up, allowing other companies to market the same drug, albeit under a different name. After the war the patent was pursued by Astra, but apparently the High Court was unimpressed!

This suggests commercial incompetence, but that is perhaps a little unfair. In the 1940s Astra was a very small Swedish company with no overseas organization, only becoming a major international company because of the success of its new local anaesthetic. Its then meagre resources were probably distracted by identifying all of the possible methods of production for European patent purposes, sourcing sufficient supplies of *m*-xylidide for large scale production (a great worry at one stage) and establishing itself in the major market, the USA. The importance of lidocaine to Astra's development is shown by the presence, at the very heart of the company's original headquarter's complex near Stockholm, of a metal, three dimensional 'statue' of lidocaine (Figure 2).

And what of the protagonists?

Three men clearly played a key role in the development of LL30, and two (Löfgren and Lundqvist) shared hugely in its commercial success. The third, Erdtman, was left without a job when von Euler lost interest in gramine and had to resort to secondary school teaching for a while. He eventually returned to

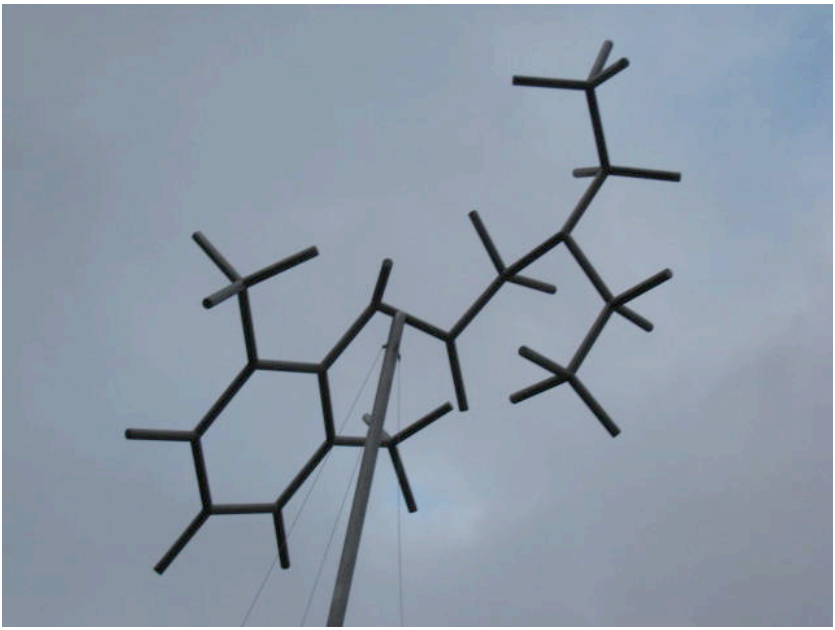

Fig. 2 Photograph (courtesy of Dr Jan-Robert Jansson) of the lidocaine 'statue' in the grounds of the AstraZeneca complex, Södertälje, Sweden.

chemical research in 1939, and was appointed to a Chair of Organic Chemistry in 1949, but there is no evidence that he pursued any interest in local anaesthetic drugs during that decade. However, as the details of LL30 spread Erdtman became increasingly concerned at the lack of credit, especially in regard to his original recognition of the 'numbing' effect of isogramine. How much of this was concern about lack of scientific recognition and how much about financial reward is impossible to say, but Löfgren's generosity towards Lundqvist (30% of the royalties) is in stark contrast.

Once Astra had taken on the project Löfgren continued with his academic career, and in 1948 obtained the highest possible marks for his doctoral thesis on the structure activity relationships of local anaesthetics, arguably the high point of his career. In 1950 the royalties started to accumulate, generating much jealousy (some real and some imagined) because he was, in academic terms, still very junior. To escape from this, and to advance his career, he spent the 1951/52 academic year in Memphis, Tennessee, but proscribed teaching and minimal research opportunities made this an unhappy experience. On his return

to Sweden the royalties from LL30 made him one of the country's highest earners, a situation which continued for many years and resulted in a move to Switzerland as a tax exile in 1953. The University of Lausanne provided a laboratory, but he did not like Switzerland and was again deeply unhappy, this hardly being helped by the death of his young friend and collaborator, Lundqvist.

Lunqvist's share of the royalties had also compelled him to move to Lausanne for tax reasons, and allowed him to pursue his interest in sailing. Back in Sweden to prepare his boat for a long cruise he had to dive repeatedly to repair the boat's propeller and became unwell, suffered a major stroke and died, aged 30. The stroke was thought to have been a late consequence of a fractured skull sustained in 1943 as the result of a fall down stairs, his unsteadiness at the time probably the result of his self-experimentation with LL30. He was an only child and in 1955 his parents used his royalties to establish a memorial fund to help young researchers.

In 1955 Löfgren was back in Stockholm as an Associate Professor and bought an estate on the island of Värmdö, in the woods of which he set up a small laboratory where he studied plant alkaloids and fish breeding - and drank. As the years passed he received many awards, but became increasingly 'anxious' about his academic status, finally being appointed to a Chair of Organic Chemistry in 1963, the year in which his other great local anaesthetic, prilocaine (Citanest) was launched. However, his joy was short lived because he found the bureaucracy of his new post untenable and created a furore in 1964 by resigning. He retreated to his laboratory in the woods where, just over two years later, he committed suicide, aged 53.

Sources and Acknowledgements

There are three definitive publications describing, in turn, the chemistry, pharmacology and clinical features of lidocaine:

Löfgren N, Lundqvist B. Studies on local anaesthetics II. *Svensk Kemisk Tidskrift* 1946; **58**: 206-17

Goldberg L. Studies on local anaesthetics. Pharmacological properties of homologues and isomers of xylocain (alkyl aminoacyl derivatives). *Acta Physiologica Scandinavica* 1949; **18**: 1-18

Gordh T. Xylocain – a new local analgesic. *Anaesthesia* 1949; **4**: 4-9, 21

However, they are primarily scientific publications which give little indication of the human story behind the discovery. This was described in a book published in 1993 by Astra to mark the 50th anniversary of the discovery. It is essentially unreferenced, but based on company archives and the reminiscences of those who were involved and still alive at the time of its writing:
Lindqvist K, Sundling S. *Xylocaine - a discovery - a drama - an industry*. Södertälje: Astra 1993 (English translation by Taylor B).
My knowledge draws heavily on this work, supplemented by personal communications from Professor Holger Erdtman, Professor Torsten Gordh, Dr Bertil Takman (all close associates of Löfgren) and Dr Jan-Robert Jansson, medical advisor to AstraZeneca, Södertälje, Sweden who was also kind enough to provide the photograph for Figure 2.

Other references

1. Wildsmith JAW. 2005: Centenary of procaine (well not really!). In: Drury PME, Armitage EN, Bacon DR *et al* (Eds) *The History of Anaesthesia*: Proceedings of the Sixth International Symposium on the History of Anaesthesia. Reading: Conservatree Print and Design, 2007; 667-72
2. Erdtman H, Löfgren N. Über eine neue gruppe von lokalanäthestisch wirksamen verbindungen. *Svensk Kemisk Tidskrift*; **49**: 163-174
3. http://www.pharmj.com/noticeboard/info/drugnames/index.html (viewed 16/10/10)
4. Anonymous. Lignocaine. *in* Pearson J (Ed) *The Concise Oxford Dictionary* (10th edition revised). Oxford: Oxford University Press, 2001

Editorial comment
Hans von Euler's full surname was von Euler-Chelpin, which was used for the award of his Nobel Prize in 1929 (jointly with Arthur Harden).

LESLIE HALL (1927-2010)

Dr K MacLeod
Retired Consultant Anaesthetist, Huntingdon

This symposium on the History of Veterinary Medicine and Anaesthesia is being held in memory of Leslie Hall, who died earlier this year. He has been described as the founding father of modern veterinary anaesthesia, and it is impossible to overestimate the contributions which he made to the speciality.

He was born in 1927, and began his undergraduate training at the Royal Veterinary College, London, in 1945, qualifying BSc, MRCVS, in 1950. He stayed at the RVC to complete his PhD., and was then appointed as a lecturer at the newly established veterinary school at Cambridge University. He spent the remainder of his career there, eventually as ad hominem Reader in Comparative Anaesthesia.

He was a superb clinician and scientist. He, together with Barbara Weaver, appreciated the advances that had been made in human anaesthesia by the 1950s had not been matched in veterinary anaesthesia. His collaboration with medical anaesthetists led to the introduction by him of mechanical ventilation, muscle relaxants and balanced anaesthesia, dosage regimes, monitoring, and postoperative analgesia.

These advances were evidence based, and much high quality original research was carried out in his department, notably his work on the respiratory physiology of the anaesthetised and awake horse. He was also the first to describe porcine malignant hyperpyrexia.

Although non-political, he played an equally pivotal role in the development of the speciality. In Cambridge, he established research scholarships which were to become the pattern elsewhere. He was a revered teacher, and the editor of the standard textbook on veterinary anaesthesia. He was a Fellow of Trinity, St Catherine's, Woolfson, and Girton Colleges.

He was one of the founders of the Association of Veterinary Anaesthetists, and was instrumental in establishing the Diploma of Veterinary Anaesthesia, both now under the aegis of the European College of Veterinary Anaesthesia and Analgesia. He was the organiser of the first World Congress of Veterinary Anaesthesia in 1982.

Dr Leslie W Hall (1927-2010)
(By kind permission of Mrs Lys Hall)

He was awarded honorary fellowships of the Association of Veterinary Anaesthetists, and of the European College of Veterinary Anaesthesia and Analgesia, an honorary Diploma of the American College of Veterinary Anaesthetists, and an honorary doctorate by the University of Utrecht.

He received the Francis Higg Prize of the Royal College of Veterinary Surgeons in 1955 for "the most serviceable work for the advancement of small animal practice" in 1955, and the Blaine Award by the British Small Animal Association in 1967. Also in 1967, he received the Livesey Medal of the Royal College of Veterinary Surgeons "for his role in the alleviation of pain and fear in animals".
The Faculty of Anaesthetists of the Royal College of Surgeons awarded him the Faculty Medal in 1977, the first veterinary anaesthetist to receive this honour; and in 2001 he became an Honorary Fellow of the Royal College of Anaesthetists.

In the oration at his award of the Faculty Medal, he was described as "The John Snow of animal anaesthesia". These two great men were both instrumental in creating their speciality and setting it on a scientific basis.

GEORGE STUBBS AND A YORKSHIRE CURE FOR COUGH

Dr Ann Ferguson
Retired consultant anaesthetist – East Kent

In 2008, this society met in York, and this coincided with an exhibition of the work of the artist, George Stubbs at the newly renovated York Art Gallery, centred round a painting, *Whistlejacket*, on loan from the National Gallery in London. It is nearly ten feet tall, and in order to get it into the gallery, they had had to remove the newly renovated doors from the newly renovated doorway.

There are very few portraits of Stubbs, but one, in a private collection, was done by his friend Ozias Humphry, and it is thanks to Humphry that we know anything about Stubbs life, as he wrote a memoir *Particulars of the life of Mr Stubbs*. All subsequent biographies draw on this work. Stubbs left very little in the way of papers and letters.

George Stubbs' early ambition to become a painter

Stubbs was born in Liverpool in 1724, in the time known as "the long eighteenth century" – Restoration to Regency, also known as the Enlightenment, during which there were great advances in knowledge, art and science.

His father was a leather dresser, the smelliest job imaginable, and as a child, he learnt to read and write, and was keen on drawing and anatomy. He was lent bones by a local doctor who encouraged his interest.

By the age of 16 he had decided to become a painter and attempted to become apprenticed to Winstanley, a Liverpool painter who painted the head only, and then sent the portrait to London for the drapery to be done. This apprenticeship lasted only a matter of weeks, and Stubbs started out on his own as a portrait painter.

Stubbs in York

By the age of 20, he was in York, initially to do some portraits. While there, he attended the new County hospital, founded in 1740 to study human anatomy, as there was no facility for this in Liverpool. The study of anatomy was surprisingly widespread at thattime. Cunningham has guessed that there were as many as 200 anatomy teachers in Europe at any one time during the 18th century. Very soon, Stubbs was giving the anatomy demonstrations and lectures.

Dr John Burton, (1710-71) who had trained at St John's Cambridge, Leiden, Paris and Rheims was, in 1740, a prime mover in founding York Hospital. He was the hospital's first physician and man-midwife. He was a difficult character, whose reputation has been tarnished by his association with the Jacobite rebellion of 1745. He was the model for Dr Slop in *Tristram Shandy*.

Burton's most important contribution to medicine was his essay on midwifery, *An essay towards a complete New System of Midwifery.* A copy of this book, which belongs to the Royal College of Surgeons, was in the York exhibition. Time was of the essence because Burton had invented some new obstetric forceps and wanted his book published before the book that Smellie was due to publish on the same subject, illustrated by Rymsdyk.

Stubbs did the drawings for him, and then had to learn how to engrave, a technique with which he was unfamiliar, but he worked out his own way of doing it. As he was not very satisfied with the results, he did not sign them. Technically the plates are not as good as Rymsdyk's, but the drawing is good.

There were, of course, problems getting bodies, and when there were problems, Stubbs took the blame.

While in York, Stubbs fathered two sons.

There is no evidence that he painted horses while in York, although he and the house surgeon, Charles Atkinson formulated a plan to dissect some horses. This partnership never came to fruition.

At this time, "patronage" in the sense that a patron would employ an artist full time, had ceased. Royalty led the way, as the first three King Georges were, according to Roy Porter, either boorish or stingy and the whole social and artistic framework was no longer court based.

There was an emerging middle class that had enough money to commission their own portraits. There are only two by Stubbs that are known from this time. Unlike many other artists he did paint his own drapery.

Stubbs' visit to Rome

In European art, neoclassicism was currently the dominant movement, partly stimulated by a more scientific approach, as Pompeii had just been rediscovered. The order, and clarity of Greek and Roman art appealed greatly in the Age of Enlightenment, and it was almost mandatory for artists of this period to do the

Grand Tour, usually lasting 2-3 years. Although Stubbs arrived in Rome in 1754 at Easter time, he appears on a census in Rome as *Gio Stubbs,* but was back in England by the end of 1755. He did, however, see a statue of a lion attacking a horse, and this was a theme he returned to later. He was possibly more influenced by what he saw in Rome than he realised but as Gainsborough pointed out regarding historical neoclassical art, *There is no call for it in this country.*

Stubbs told Humphrey that his purpose in visiting Rome was *to convince himself that nature was and is superior to art whether Greek or Roman, and having renew'd this conviction, immediately resolved upon returning home.* In other words, he went to Italy to confirm his prejudices.

Study of the anatomy of the horse

On his return from Rome, he determined to carry out his study of the anatomy of the horse. One serious book had been published by Carlo Ruini (1530 – 1598) published in 1598. This equine anatomy was published soon after the human anatomy of Vesalius and is very similar in style. One plate was used in 1983 for the cover of a Booker prize nomination.

At this time, horses were important both economically and socially; selective breeding of racehorses was well established, In 1619 James I had attended a race at Newmarket which immediately made it the most important and fashionable place for racing. Charles I had kept up racing stables at Newmarket, and Cromwell imported good horses. In 1751 a group of people styled themselves "The Jockey Club" in an attempt to regulate racing and they rapidly established themselves at Newmarket. The gentlemen supporters of the Jockey Club later became Stubbs' early customers.

From 1756-8 Stubbs worked at Horkstow, just south of Barton on Humber, where he rented a large barn and a farmhouse across the road, with his common law wife, Mary Spencer, mother to his three children. He bought live horses, destined for the knackers yard, bled them and injected the arteries with wax, as he had done with human corpses in York. This would be a very smelly business, although he was used to smells from his childhood.

He used about twelve horses, gutting them, then stringing them up by chains and hooks to a bar fixed below the ceiling, and suspending the limbs on boards in a lifelike position. Each horse had a "useful life" of six to seven weeks. This was a job requiring physical strength and the risks to Stubbs were tremendous.

He had a picture of the skeleton of a horse and used Albinus, the Dutch anatomist's technique of grids so that he could draw his pictures to a standard size. The similarities with Albinus, published in 1747, are great, but unlike Albinus, who employed Wandelaar to do his drawings, Stubbs did both dissections and drawings. He did not illustrate the viscera, and there was no classical background. He worked for eighteen months. Forty two drawings survive with detailed notes.

Stubbs' move to London: Whistlejacket

A dealer saw a painting of a horse that he had done, and told him that if he moved to London, he would make a fortune, so he took his drawings, and moved, with his family to London. His first commission was arranged by Joshua Reynolds, and he rapidly got commissions for painting horses. In 1762 he did a portrait of Whistlejacket, a 13 year old Arabian stallion, owned by the young Marquis of Rockingham. This painting has a painted but monochromatic background, with just two shadows behind the hind legs to ground the horse. The National Gallery conservation department have investigated this painting and there is no indication that there was ever any intention of putting a rider on it. It says in the Humphrey memoir that Whistlejacket saw the painting and tried to attack it.

Another portrait of the same horse was done the same year, with his groom, Mr Cobb, also with only shadows to ground them. It is, to my mind, one of Stubbs best, being an excellent portrayal of the relationship between horse and groom.

Prosperity: completion of the anatomy of the horse

By 1763 Stubbs had made enough money to buy a new house, 24 Somerset Street, where he lived for the rest of his life. This area was being developed, and Oxford Street was soon built. The street was still there on a London map of 1951 but is now Selfridges Food Hall.

This gave his time and space to finish his work on the anatomy of the horse. He did all the 36 etchings himself. There is little evidence of the engravers burin. It took six years, and he had to publish it by subscription. His aims in producing this book are interesting. It is quite clear from what he wrote that this was to be a scientific anatomy book. Cunningham, in his new book says that his was *the greatest single-handed accomplishment in the anatomising of an animal.*

Petrus Camper, the celebrated Professor of Anatomy at Groningen wrote at least two letters to Stubbs.

In 1771 *How is it possible a single man can execute such a plan with so much accuracy and industry?...Give me leave to ask you, was you the engraver?*
And in 1772 *I'm amazed to meet in the same person so great an anatomist, so accurate a painter, & so excellent an Engraver.*

More paintings of horses

Stubbs was still painting recognisable portraits of individual horses. One, of Lord Bolingbroke's bay colt Hollyhock, had no background, but when it was sent to Paris, someone added a rural idyll. Stubbs painted backgrounds really well, often using Creswell Crags, just south-east of Sheffield as a backdrop to his paintings.

Racehorses were often portrayed at this period at full gallop with all legs extended. Stubbs rarely did this, and it was not until 1877 that Eadwerd Muybridge got a galloping horse to trigger the shutters of a bank of cameras to show whether or not all four legs were off the ground at the same time.

As a result of the increasing number of people rich enough to commission their own portraits, the *Conversation Piece* became popular, several members of a family portrayed together, often with their animals. It is the inverse of ceremonial painting and thrived in a society with a large and powerful middle class. In the 18th century "conversation" meant "social gathering" rather than "chat", and later came to mean "intellectual exchange". His series of paintings of mares and foals are much chattier.

Commissions by the Hunter brothers

Stubbs became known as a painter who could do "an exact representation of an animal" which is what the scientifically minded Hunter brothers, of whom he was a contemporary and near neighbour, wanted. Between 1770 and 1790 they used Stubbs to paint nearly all the newly arrived animals in London.

The first of several commissions for the Hunter brothers was a portrait of a nylghau, commissioned by William. This animal was brought from India and presented to Queen Charlotte. Hunter read an account of the nylghau to the Royal Society in 1771 and had this picture on an easel in front of him while he spoke.
A painting of an Indian rhino 1790-1 was purchased and commissioned by John Hunter for his museum and is now at the Royal College of Surgeons.

There is no correspondence existing between Stubbs and the Hunters, probably because they were such near neighbours. It has been suggested that it was Stubbs who introduced William Hunter to the Royal Academy, where he became the first professor of anatomy.

Ascendancy in the art world

Stubbs was a great experimenter, and this included art techniques. He wanted to increase the range of enamels. Most artists used enamel for miniatures, but Stubbs wanted to do them large, so he got Josiah Wedgwood to make large ceramics for him, but this partnership was not a great success. He did, however do some low reliefs on ceramics for the Wedgewood factory.

The Society of Artists was formed in 1759, so that artists, now devoid of patronage, could exhibit and sell together. Stubbs was president in 1772-3. In 1768 The Royal Academy was formed, with its own accommodation and Stubbs started to exhibit there, but never became a full Academician as there was a row over the hanging of his enamels. Gainsborough and Wright had similar difficulties.

His painting was ignored by the Royal family, until His Royal Highness the Prince of Wales commissioned several portraits from him.

One full sized portrait of a distressed horse, *Hambletonian rubbing down* expresses what Stubbs sometimes thought about the treatment of horses. The stallion had just finished a race during which the *Sporting magazine* recorded that he was shockingly goaded, but won by half a neck. When the owner refused to pay for the painting, Stubbs took him to court.

"In the year 1795 Mr S projected his plan of making a series of anatomical experiments in order to prove the analogy there is in the structure of the human frame with that of various animals, quadrupeds, fowls and vegetables."

These are the first of his works that are done with graphite. The pencil, as graphite in wood, was first used in 1790. Previously, a pencil had been a small brush.

Although he published some as engravings, in 1802, he did not give any text to go with them, and it would seem that he was both sorting out the anatomy for the sake of painters, but also seeking out analogies between the anatomy of these three, rather than homologies as in the post Darwin comparative anatomies.

He did not live to finish this, but shortly before he died, he said "I fear not death, I have no particular wish to live, I had indeed hoped to have finished my comparative anatomy eer I went, but for other things I have no anxiety."

Death and eventual recognition

He died July 1806 from what sounds like a 'coronary', having remained throughout his life on the fringe of the establishment. He disappeared from view for nearly two hundred years. All his papers and sketchbooks have gone. He does not appear in Gombrich's book on the history of art, but Cunningham, in his new book, gives him 19 pages!

He has been revived in Judy Edgerton's book, which I have found invaluable while writing this talk.

Yorkshire cure for cough

So, what about the Yorkshire cure for cough?
I have to thank Jennie Alexander at York Art Gallery for the explanation of this. It was a mixture of treacle and either gin or brandy. When made with brandy, it was the colour of a dark chestnut horse, and was called a *whistlejacket.*

Acknowledgement

I would like to thank Jennie Alexander of York Art Gallery for staging this exhibition, and for help with the recipe for a *Whistlejacket.*

References

1. www.bbc.co/northyorkshire/content/articles/2008/04/28/whistlejacket_ exhibition_fearture.shtml
2. Edgerton J. *George Stubbs, painter. Catalogue Raisonné*. New Haven & London: Yale University Press, 2007; 8
3. Humphry O. *Particulars of the life of Mr. Stubbs*. Liverpool Record Office. Reproduced in: *Fearful Symmetry George Stubbs Painter of the English Enlightenment*. New York: Hall & Knight Ltd., 2000; 195-209
4. Cunningham A. *The Anatomist Anatomis'd*. Farnham: Ashgate Publishing, 2010; 72
5. Dunn PM. Perinatal lessons from the past. Dr John Burton (1710-1771) of York and his obstetric treatise. *Arch Dis Child Fetal neonatal ed.* 2001; **84**: 74-76
6. Sterne L. *Tristam Shandy*. New York & London: WW Norton & Co., 1980; 74, 86

7. Burton J. *An essay towards a complete new system of midwifery*. London, 1751
8. Cunningham A *op.cit.*; 176
9. Porter R. *Enlightenment*. London: Penguin, 2000; 35
10. *ibid*.; 34
11. *Sir Henry Nelthorpe and his second wife* – Private Collection; *George Fothergill* – Hull Art Gallery. Reproduced in Edgerton J *op.cit*.; 14
12. Chilvers I. *Oxford Concise Dictionary of Art and Artists*. Oxford & New York: Oxford University Press, 1996; 364
13. Hall NHJ (Ed.) *Fearful Symmetry George Stubbs Painter of the English Enlightenment*. New York: Hall & Knight Ltd., 2000; 44
14. Anatomia del Cavallo infermita et suoi rimedii. Venice Foravente Prati (historical anatomies on the web http://www.nlm.nih.gov/exhibition/historicalanatomies/home.html
15. Saunders JB de C, O'Malley CD. *The illustrations from the works of Andreas Vesalius of Brussels*. New York: Dover Publications, 1973
16. Fuller J. *Flying to Nowhere*. London: Penguin, 1983
17. Edgerton J *op.cit*.; 36-39
18. *ibid*.; 31-35
19. Stubbs G. *The anatomy of the horse*. New York: Dover Publications, 1976; Introduction
20. Hale RB, Coyle T. *Albinus on anatomy*. New York: Dover Publications, 1979
21. http://www.nationalgallery.org.uk/paintings/george-stubbs-whistlejacket
22. *Whistlejacket with the head groom Mr Cobb and two other stallions* – Private Collection. Reproduced in Edgerton J *op.cit*.; 164
23. Cunningham A *op.cit.*; 340
24. Hall NHJ *op.cit.*; *Letters from Petrus Camper*; 210
25. *Young Boligbrokes young bay colt*. Reproduced in Edgerton J *op.cit*.; 148
26. *The Duke of Ancaster's grey Turkish horse with a Turkish groom at Cresswell Crags* – Private Collection. Reproduced in Edgerton J *op.cit*.; 193
27. Tate Circular. Aug-Sept 2010; 8
28. Shawe-Taylor D. *The conversation piece, Scenes of fashionable life*. London: Royal Collection Enterprises Ltd., 2009; 14-15
29. *ibid*.; 19
30. Edgerton J *op.cit*.; 438-9
31. *ibid*.; 69-71
32. *Prince of Wales at the age of 28 riding in Hyde Park with the serpentine and Westminster Abbey in the background* – The Royal Collection. Reproduced in Shawe-Taylor D *op.cit*.; 152-3
33. *Hambletonian rubbing down* – National Trust, Mount Stewart. Reproduced in Edgerton J *op.cit*.; 622-25

34. Humphry O *op.cit*.; 207
35. Cunningham A *op.cit.*; 359
36. Humphry O *op.cit*.; 208
37. Gombrich EH. *The story of art*. London: Phaidon Press, 1999
38. Cunningham A *op.cit.*; 340-359
39. Edgerton J *op.cit*.

JOHN HUNTER'S LEGACY TO VETERINARY SURGERY *

Dr Aileen K Adams, Cambridge

This symposium in memory of Dr Leslie Hall, pioneer in the development of veterinary anaesthesia, is an appropriate occasion to review how academic veterinary medicine developed through the ages and particularly its progress in England. This history, together with the story of William Moorcroft (1767-1825), the first Briton to qualify as a veterinary surgeon, was described to this Society in more detail at a previous meeting. [1]

John Hunter (1728-93) is widely regarded as the first scientific surgeon. The Royal College of Surgeons of England holds him almost in the role of a patron saint. Its Hunterian Museum, based on over 13 000 specimens collected or prepared by Hunter, was founded soon after the establishment of the Royal College in 1800. It shows that as well as a surgeon, he was also an anatomist and pathologist who was fascinated by the comparisons he found between man and animals. This is best illustrated by quoting from his own writings, many of which are reproduced by one of his biographers. The most famous of these is his response to a query by Edward Jenner: 'I thank you for your experiment on the hedgehog; but why do you ask me a question by way of solving it? I think your solution is just; but why think? why not try the experiment?' [2]

Less well known is the influence Hunter had on the early days of academic veterinary science in Britain. He had deplored the fact that the scientific Enlightenment of the 17th and 18th centuries had completely bypassed animal medicine and he took up this cause. The role that he played, both in encouraging the academic study of medicine and surgery in animals, together with the practical support he gave to the founders of the Veterinary College in London, were of great importance. Because of incompatibilities amongst the senior staff the College was nearly still-born, but Hunter convinced them to persevere whilst he himself and some of his colleagues continued to lecture to the students. [3]

William Moorcroft, a young surgeon from Liverpool, had sought Hunter's advice regarding the treatment of diseases in animals. Hunter strongly advised him to go to college to study veterinary science. Moorcroft had to go to France to find an academic body, the veterinary school in Lyons, where he could study, as this was before the foundation of the London college. After briefly and very lucratively practising as an equine specialist in Oxford Street in London, Moorcroft unaccountably accepted the position of stud superintendent to the British Army in India where he spent the rest of his life. In searching for good stallions he was the first European to travel across the Himalayas into Central

* Abstract only

Asia, where he became caught up in the secretive politics of the 'great game' during the time of the British Raj. Whilst his career is fascinating, this first qualified British veterinary surgeon made no contribution to the development of the subject in his own country. [1]

It was for others, strongly encouraged and helped by Hunter, to set up what was to become the Royal Veterinary College in London in 1791.

References

1. Adams AK. Which came first - human or animal medicine? *The History of Anaesthesia Society Proceedings* 2002; **31**: 37-43
2. Dobson J. *John Hunter.* Edinburgh and London: E and S Livingstone, 1969
3. Adams AK. Hunter's Veterinary Legacy. *Annals Royal College of Surgeons of England (Suppl)* 2001; **83**: 208-211

Further reading

Hobday F *The debt veterinary science owes to John Hunter.* 1934, Archives Royal College of Surgeons of England: CR/HUN:J/49. E 107

Cotchin E. *John Hunter and the Foundation of the Royal Veterinary College.* 1986, Archives Royal College of Surgeons of England: TRACTS (H) HUN;J/COT

Wilkinson L. *Animals and Disease*. Cambridge: Cambridge University Press, 1992

Alder G. *Beyond Bokhara, the life of William Moorcroft.* London: Century Publishing, 1985

SCOTTISH CONTRIBUTIONS TO VETERINARY ANAESTHESIA AND ANALGESIA *

Dr A G McKenzie, Consultant Anaesthetist, Royal Infirmary of Edinburgh

James Clark

Veterinary medicine began with the farriers, as until the 20th C., the horse was the major means of overland transport. The first outstanding British contributor to veterinary medicine was James Clark (1732-1808), who was a very experienced farrier in Edinburgh and Appointed Farrier to the King in Scotland. He published three books as follows. [1] [2]

1. (1770) *Observations upon the shoeing of horses: with an anatomical description of the bones in the foot of a horse*.
   He pointed out that many diseases of horses' feet were iatrogenic. He called for reforms – avoiding errors of excessive paring, and ensuring the correct size of shoe. As he predicted, acceptance of his reforms was slow.
2. (1788) *A treatise on the prevention of diseases incidental to horses from bad management in regard to stables, food, water, air, and exercise. To which are subjoined observations on some of the surgical and medical branches of farriery*.
   This included a chapter on kindness to horses.
3. (1806) *First Lines of Veterinary Physiology and Pathology*.
   This was intended to be a textbook for students on the establishment of a veterinary school in Edinburgh with Clark as Professor. But unfortunately the Government backed out of this (Clark having already declined the post of (second) Principal at the London Veterinary College).

Clark's legacy was twofold:

- promotion of humane and compassionate treatment of animals
- the alleviation of their suffering. [2]

These qualities are of course **central** to veterinary anaesthesia.

William Dick

In 1823 William Dick, a blacksmith and farrier (who had studied at the London Veterinary College) set up veterinary instruction at his forge in Clyde Street, Edinburgh. By 1836 his 'veterinary college' was receiving students from all over the UK and also from America. In 1837 this was formalised into the Edinburgh veterinary school [3] and established by Royal Charter in 1842. [4]

* A version of this paper was presented at the 10th World Congress on Veterinary Anaesthesia in Glasgow, September 2009

Ether

After the news of ether anaesthesia reached Britain (in December 1846) little time was lost in offering ether anaesthesia to animals. On 15th February 1847 Robert Dobson V.S. in Tranent, Haddingtonshire successfully administered ether to a cow for amputation of a leg with severe infection of the hock joint. For this purpose an ether inhalation apparatus was produced by Mr Kemp, an instrument maker in Edinburgh – providing a tube for each nostril. [5]

James Simpson, chloroform and animals

James Young Simpson was the first to use ether in obstetrics (19th January 1847) but finding that ether presented problems, he began to search for a better anaesthetic agent, experimenting with numerous inhalational drugs on humans and animals. [6] He was rash enough to try almost any substance he could lay his hands on. Fortunately the chemist, Lyon Playfair, refused to supply any ethylene dibromide unless Simpson first tested this on rabbits. Two rabbits were quickly anaesthetised and emerged therefrom. The next day Simpson proposed to try the ethylene dibromide on himself and his assistant. The latter suggested that they should first check on the rabbits – both were found to be dead! [7] Nowadays ethylene dibromide is used as a fumigant and pesticide; it is well known to be a renal and hepatic toxin.

On the suggestion of David Waldie, [8] Simpson and his assistants tried chloroform at a dinner party held at his house, 52 Queen St, Edinburgh on 4 November 1847. Four days later Simpson used chloroform in obstetrics, and within two weeks he published his experience on about 50 cases. [6] Simpson tested the effectiveness of chloroform on domestic animals.[1] Soon the use of chloroform in the horse was common practice all over the UK. [9]

In February/March 1848 Simpson explored the *concept* of local anaesthesia by the experimental application of chloroform to lower animals – earth worms, crustacea and fishes. He proceeded with this work on frogs, rabbits and guinea pigs. [10]

In 1858 Simpson turned his attention to haemostasis by means of acupressure. He demonstrated the obliteration of the carotid artery of a horse with iron pins – almost certainly the horse was anaesthetised by chloroform.[11] In further work Simpson anaesthetised cats, dogs and pigs. He had friends in the country, who may have looked after the animals. He was very fond of animals – dogs were much loved in the Simpson household. [11] As late as 1865, Simpson experimented with carbon tetrachloride as an anaesthetic on himself, others and animals.[12]

Glasgow Veterinary College

The Glasgow Veterinary College was set up in 1862 by James McCall, a graduate from the Edinburgh school. It had premises at Parliamentary Road, including a surgery, a shoeing forge and a rudimentary hospital, where mainly sick and injured dray horses were treated. [13] Joseph Lister collaborated with McCall in his experiments on antisepsis up to 1865. [1] George Armatage demonstrated the value of thermometers at the Glasgow Veterinary College in 1869. [1] The College prospered – moving to Buccleuch Street, where the new College opened in 1874. [13]

Advancement of the Royal (Dick) Veterinary College

Although Professor William Dick (Figure 1) was renowned mainly as a veterinary diagnostician and educator, [14] many graduates from his Veterinary College travelled to various parts of the world and made numerous contributions to veterinary anaesthesia and analgesia. [1]

Fig. 1 William Dick (1793-1866)
Courtesy of Edinburgh University Fine Art Collection

After Dick's death in April 1866, the Edinburgh Veterinary College was administered by Trustees. There was much disagreement between the Trustees, staff and students – fuelled partly by Dick's formidable sister (Mary) who (in terms of his will) had much financial control. Hence there were four new Principals in the space of eight years. [4]

Facilities were improved in the 1880s and the College survived. [4] In 1895 Finlay Dunn, lecturer at the Royal (Dick) College (as it had become named) described variation of response to morphine by different species – in the 9th edition of *Veterinary Medicines, Their Actions and Uses*. [1]

The Royal Zoological Society of Scotland was established in 1909 by Thomas Gillespie. In 1913 he opened his 'Zoo for Scotland' in Edinburgh. From the outset veterinary support came from the 'Royal Dick' – anaesthesia being provided as required. [15]

The 'Royal Dick' continued to prosper and in 1916 the University of Edinburgh opened new premises for the 'Royal (Dick) School of Veterinary Studies' between Hope Park & Summerhall Square. [16]

Inspiration of the "James Herriot" books

The Glasgow Veterinary College acquired a new principal in 1922: Prof AW Whitehouse ('Old Doc'). Over the next decade funding was poor, as it was felt that Scotland did not need *two* veterinary colleges. However, the college survived. 'Old Doc' persuaded a young scholar, Alf Wight, to pursue a career as a vet – the young man duly entered the college in 1933. Decades later, after

country practice in Yorkshire, he published the "James Herriot" books, which were also the basis of films and a popular television series. [17] The books include many passages on veterinary anaesthesia. These works brought veterinary practice under the public eye and stimulated many to launch their careers as well as attracting funding.

Epidural anaesthesia

In 1935 *The Veterinary Record* featured a series of articles by Geoffrey Brook on epidural anaesthesia in domestic animals. Much of the information was from his DSc thesis at the Royal (Dick) Veterinary College. [18] This was the ground work for the development of epidural anaesthesia in UK veterinary practice.

Veterinary anaesthetic machines

The Department of Anaesthetics at the Royal Infirmary of Edinburgh was founded in 1940 by Dr John Gillies, who the following year designed a new anaesthetic machine – probably the first British true circle apparatus. This went through a number of improvements until 1951. [19] Of proven worth in human anaesthesia, it was adopted also in Scotland for veterinary anaesthesia – and found satisfactory for sheep, pigs, small ponies and immature cattle. [20]

In 1950 work began on a new site for the Glasgow Veterinary College at Garscube on the south side of Maryhill Road. There the Animal Hospital was officially opened in 1954 and the site remains the home of the Faculty of Veterinary Medicine, University of Glasgow. [21]

Sydney Jennings of the Glasgow Veterinary School (working with EW Fisher) found that the standard Boyles or Gillies machines were unsatisfactory for larger animals, and so in 1957 built a closed circuit apparatus with large airways sufficient for horses and cows. [20] This was called the ALMA, an acronym for Animals Large, Maintenance of Anaesthesia.

The following year Campbell and Lawson at the University of Glasgow Veterinary School published a paper on the signs and stages of anaesthesia in domestic animals, modifying Guedel's classification. [22] At the same time Fisher and Jennings were the first to report the use of halothane in horses and cattle. [23]

Pharmacological advances: etorphine, propofol and TCI

In the 1960s the extremely potent opioid, etorphine (M99), was developed in Edinburgh and eventually marketed as Immobilon. This, with the antidote Revivon, revolutionised wildlife management. [24]

Frank Alexander, Professor of Veterinary Pharmacology in Edinburgh, produced in 1960 a well known textbook *An Introduction to Veterinary Pharmacology*, which went through many editions – 4th edition in 1985 (Alexander 1985). [8]

Total intravenous anaesthesia (TIVA) with propofol was developed over a 25 year period by veterinarians representing the west of Scotland. In 1980 JB (Iain) Glen, BVMS $_{\text{Glasgow}}$ who was working for the Biology Department of ICI Pharmaceuticals, published a landmark paper on the anaesthetic activity of ICI 35868 in animals. This was 2,6-Diisopropylphenol in 10% Cremophor EL, which he tested on mice, rats, rabbits, cats, pigs and rhesus monkey. [25] Two

years later Glen successfully defended his PhD thesis "Studies on the pharmacology of injectable anaesthetic agents" at the University of Glasgow. The solvent Cremophor El caused an unacceptably high incidence of allergic reactions, so that reformulation was necessary. Use of soybean oil emulsion (intralipid) was found to be satisfactory in 1984, and the product 'Diprivan' was born. [26]

'Diprivan' achieved tremendous popularity in human anaesthesia, particularly because its rapid suppression of laryngeal reflexes promoted the slick insertion of the newly introduced laryngeal mask airway (LMA). Furthermore propofol was found to be eminently suitable for TIVA. Computerised infusion systems were developed in the late 1980s, led by Dr Gavin Kenny at the Department of Anaesthesia, University of Glasgow. [27] From 1990 Dr JB Glen organised international meetings on Target Controlled Infusion (TCI), and Zeneca Pharmaceuticals (formerly ICI) supported this – resulting in the launch of the 'Diprifusor' TCI in the UK in 1996. The use of propofol in veterinary anaesthesia lagged behind its burgeoning success in humans. In 1993 Drs Andrea Nolan and Jacqueline Reid at the Department of Veterinary Pharmacology, University of Glasgow reported on the pharmacokinetics of propofol infusion in dogs undergoing surgery. [28] Evaluation and optimisation of TCI (propofol) for dogs undergoing dental surgery was reported by Beths, Glen, Reid, Monteiro and Nolan in 2001. [29] This work was continued at the Division of Companion Animal Sciences, University of Glasgow Veterinary School, where Musk, Pang, Beths and Flaherty in 2005 reported that a propofol blood level of 3.5 μg/ml appeared optimum for dogs undergoing minor to moderate surgery. [30]

Research in animal pain

Research in animal pain was intensified at the Department of Veterinary Clinical Studies, University of Glasgow in the 1990s. Reid and Nolan began to look at the reliability of commonly used pain scales for assessment of *acute* pain in dogs, in the hospital setting. [31] In 1998 Holton and colleagues reported that the simple descriptive scale (SDS), the numerical rating scale (NRS) and the visual analogue scale (VAS) were *unreliable* for this purpose. [32] They proceeded to develop a behaviour-based scale, which they reported as a validated and reliable composite scale for assessing acute pain in dogs in 2001. [33] In 2007 Reid, Nolan and colleagues described the short form Glasgow Composite Measure Pain Scale (CMPS-SF) and derivation of an analgesic intervention score. [34] The Department of Veterinary Clinical Studies, University of Glasgow, has also made major advances in management of *chronic* pain in dogs. [35 36]

Ethics

In the year 2000 the Declaration of Helsinki was amended in Edinburgh to include (section B12) "welfare of animals used for research must be respected". [37] Reference to the revised Declaration of Helsinki in the context of ethics in research and experimental science involving animals, was made in the 6th edition (2002) of *Law and Medical Ethics* by Mason, McCall Smith and Laurie of the University of Edinburgh. [37] For anaesthetists this was particularly relevant with regard to studies in pain and analgesia.

First anaesthetic on a clone

In 1993 the Roslin Institute (Midlothian) was established, having evolved from the Institute of Animal Genetics founded by the University of Edinburgh in 1919 with research funding from 1947 onwards by the Agricultural Research Council. [38] There in 1996 Ian Wilmut supervised the cloning of Dolly the sheep – news of which leaked out in 1997. [39] A new Hospital for Small Animals opened at the Easter Bush Veterinary Centre (Roslin) in 1999. In 2003 a general anaesthetic was administered by Dr Eddie Clutton to Dolly the Sheep to keep her still for a CT scan (Figure 2). This revealed advanced lung tumours. Before fully emerged, she was "put down" by lethal injection of barbiturates. Taxidermists prepared her for exhibition in the Royal Museum of Scotland. [39]

Veterinary anaesthesia as a specialty

Recently much research in veterinary anaesthesia has been conducted in Edinburgh. Examples from the Easter Bush Veterinary Centre include studies resulting in recommendations of edrophonium for reversal of neuromuscular block in sheep [40], and morphine for enhanced recovery of horses from halothane anaesthesia. [41] Such activity has promoted the development of veterinary anaesthesia as a specialty: Dr Eddie Clutton was awarded a Personal Chair in Veterinary Anaesthesiology by the University of Edinburgh in 2010.

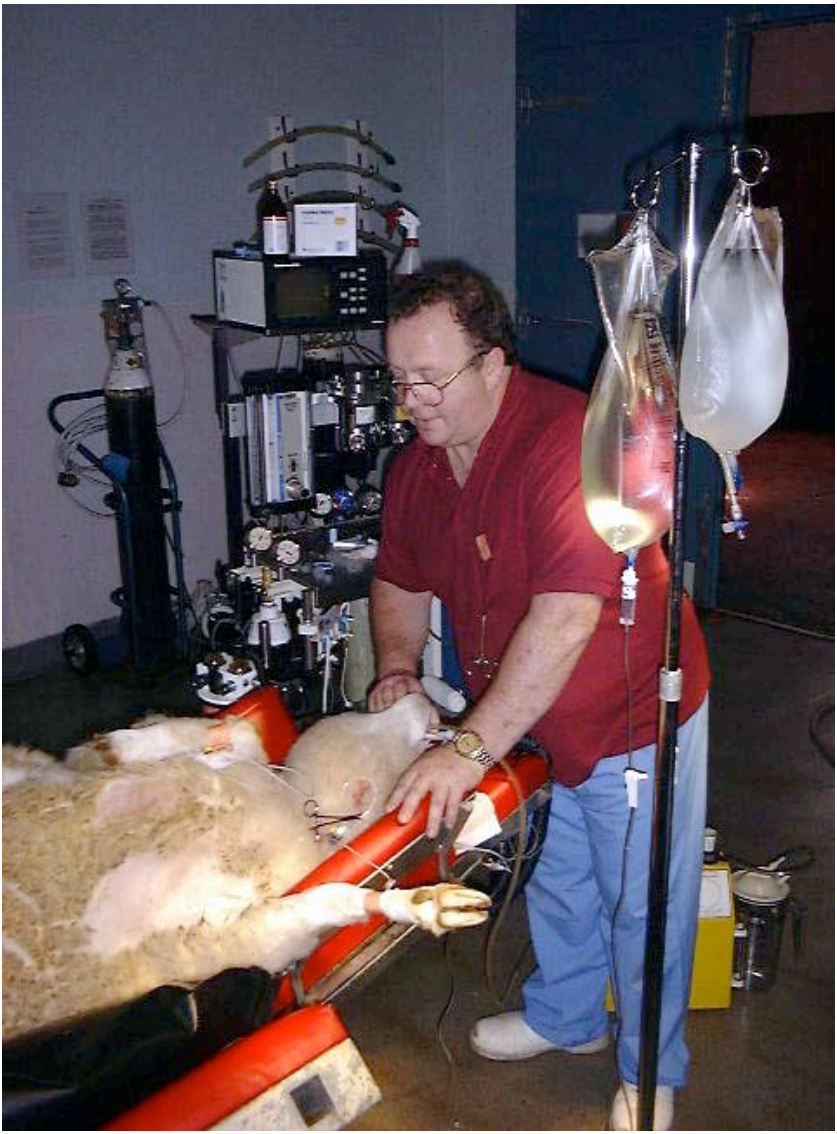

Fig. 2
Administration of anaesthesia to Dolly the sheep by Dr Clutton 2003
Courtesy of Professor R Eddie Clutton, Easter Bush Veterinary Centre, Roslin

References

1. Dunlop RH, Williams DJ. *Veterinary Medicine: an Illustrated History*. St Louis, USA: Mosby, 1996; 286-8, 348, 398, 534, 550, 606, 648, 661
2. MacDonald A, Brown F, Warwick C. Edinburgh University Library Special Collections book of the month June/July 2007. www.lib.ed.ac.uk/resources/collections/specdivision.botmjunjul07.shtml
3. Comrie JD. *History of Scottish Medicine* Vol II. London: Balliere,1932; 701
4. Macdonald AA, Warwick CM, Johnston WT. Locating veterinary education in Edinburgh in the nineteenth century. *Book of the Old Edinburgh Club* 2005; New Series Vol **6**: 41-71
5. Dobson R. Case of amputation of the leg of a cow under the influence of aether. *The Veterinarian* 1847; **20**: 196
6. Simpson JY. *Account of a new anaesthetic agent, as a substitute for sulphuric ether in surgery and midwifery*. Edinburgh: Sutherland & Knox, 1847
7. Reid T Wemyss. *Memoirs and Correspondence of Lyon Playfair*. London: Cassell & Co. Ltd., 1899; 183
8. Dundee JW. David Waldie – facts and fiction. *Anaesthesia* 1953; **8**: 218-229
9. Alexander F. *An Introduction to Veterinary Pharmacology* (4th edn). Harlow: Longman, 1985
10. Simpson JY. Local anaesthesia: Notes on Its Artificial production by Chloroform, etc., in the Lower Animals, and in Man. *Provincial Medical & Surgical Journal* 1848; **S1-12**: 365-71
11. Shepherd JA. *Simpson and Syme*. Edinburgh: Livingstone, 1969; 176, 223
12. Simpson JY. On the anaesthetic and sedative properties of bichloride of carbon, or chlorocarbon. *Medical Times and Gazette* 1865; **ii**: 651-2
13. Moss M. *The origins of the Glasgow Veterinary School* (2009) www.gla.ac.uk/faculties/vet/aboutus/history/theoriginsoftheglasgowveterinaryschool/
14. Obituary (William Dick). *The Veterinarian* 1866; **39**: 439-40
15. Hunter P. *Veterinary medicine: a guide to historical sources*. Ashgate: MPG Books, 2004; 457
16. Smith CJ. *Historic South Edinburgh*. Edinburgh: J Donald, 2000; 26
17. Lord G. James Herriot: *The Life of a Country Vet*. London: Headline Book Publishing, 1997; 51, 81
18. Brook GB. Spinal (epidural) anaesthesia in the domestic animals. *Veterinary Record* 1935; **XV**: 549-53, 576-81, 597-608, 631-5, 659-65

19. McKenzie AG. The Gillies anaesthetic machine. *Anaesthesia* 2008; **63**: 771-7
20. Fisher EW, Jennings S. A Closed Circuit Anaesthetic Apparatus for Adult Cattle and for Horses. *Veterinary Record* 1957; **69**: 769-71
21. Website of Glasgow University (2011) www.gla.ac.uk/faculties/vet/aboutus/history/garscube
22. Campbell JR, Lawson DD. The Signs and Stages of Anaesthesia in Domestic Animals. *Veterinary Record* 1958; **70**: 545-50
23. Fisher EW, Jennings S. The Use of Fluothane in Horses and Cattle. *Veterinary Record* 1958; **70**: 567-73
24. McKenzie AG. The story of M99 (Immobilizing drugs in wildlife manage-ment). In: Drury PME *et al* (Eds) *The History of Anaesthesia* (Proceedings of the Sixth International Symposium on the History of Anaesthesia). Reading: Conservatree, 2007; 639-43
25. Glen JB. Animal studies on the anaesthetic activity of ICI 35 868. *British Journal of Anaesthesia* 1980; **52**: 731-42
26. Healy TEJ *et al* (joint Eds.) Propofol ('Diprivan') – a new intravenous anaesthetic. *Postgraduate Medical Journal* 1985; **61** Suppl. 3
27. White M, Kenny GNC. Intravenous propofol anaesthesia using a computerised infusion system. *Anaesthesia* 1990; **45**: 204-209
28. Nolan AM, Reid J. Pharmacokinetics of propofol administered by infusion in dogs undergoing surgery. *British Journal of Anaesthesia* 1993; **70**: 546-551
29. Beths T, Glen JB, Reid J, Monteiro AM, Nolan AM. Evaluation and optimisation of a target-controlled infusion system for administering propofol to dogs as part of a total intravenous anaesthetic technique during dental surgery. *Veterinary Record* 2001; **148**: 198-203
30. Musk GC, Pang DSJ, Beths T, Flaherty DA. Target-controlled infusion of propofol in dogs – evaluation of four targets for induction of anaesthesia. *Veterinary Record* 2005; **157**: 766-770
31. Reid J, Nolan AM. A comparison of the postoperative analgesic and sedative effects of flunixin and papaveretum in the dog. *Journal of Small Animal Practice* 1991; **32**: 603-608
32. Holton LL, Scott EM, Nolan AM, Reid J, Welsh EM, Flaherty D. Comparison of three methods used for assessment of pain in dogs. *Journal of the American Veterinary Medical Association* 1998; **212**: 61-66
33. Holton L, Reid J, Scott EM, Pawson P, Nolan A. Development of a behaviour-based scale to measure acute pain in dogs. *Veterinary Record* 2001; **148**: 525-31

34. Reid J, Nolan AM, Hughes JML, Lascelles D, Pawson P, Scott EM. Development of the short-form Glasgow Composite Pain Scale (CMPS-SF) and derivation of an analgesic intervention score. *Animal Welfare* 2007; **16(S)**: 97-104
35. Wiseman-Orr ML, Nolan AM, Reid J *et al*. Development of a questionnaire to measure the effects of chronic pain on health-related quality of life in dogs. *American Journal of Veterinary Research* 2004; **65**: 1077-1084
36. Wiseman-Orr ML, Scott EM, Reid J *et al*. Validation of a structured questionnaire as an instrument to measure chronic pain in dogs on the basis of effects on health-related quality of life. *American Journal of Veterinary Research* 2006; **67**: 1826-1836
37. Mason JK, McCall Smith RA, Laurie GT. *Law and Medical Ethics* (6th edn). London: Butterworths, 2002
38. Website of Roslin Institute (2009) www.roslin.ac.uk/information/roslin.php
39. Wilmut I, Highfield R. *After Dolly: the uses and misuses of human cloning*. London: Little, Brown & Co., 2006
40. Clutton RE, Glasby MA. Cardiovascular and autonomic nervous effects of edrophonium, and atropine combinations during neuromuscular blockade antagonism in sheep. *Veterinary Anaesthesia and Analgesia* 2008; **35**: 191-200
41. Clark L, Clutton RE, Blissitt KJ, Chase-Topping ME. The effects of morphine on the recovery of horses from halothane anaesthesia. *Veterinary Anaesthesia and Analgesia* 2008; **35**: 22-9

THE DEVELOPMENT OF EQUINE ANAESTHESIA

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Equine animals have been friends and servants of man from earliest times - in war, as draught animals, in hunting, polo matches and competition events and they are ridden for pleasure. Importantly, they are used for racing.

Newmarket, where this meeting is being held, is the town of the horse and early in the morning, strings of race horses can be seen exercising on the Heath.

Early equine anaesthesia

Historically, the horse contributed to research in the development of anaesthesia as evidenced by the demonstration of blood pressure by Stephen Hales in 1773 when he cannulated an artery and vein and measured the height to which the blood would rise in a cast and restrained animal.

The earliest use of anaesthesia in veterinary practice was reported in *The Times* on 29th January 1847 which described the successful administration of ether to a **horse** at the Royal Veterinary College, London, just three months after William Thomas Green Morton's successful demonstration of ether anaesthesia in a human on 16th October 1846 and the acceptance that anaesthesia was a reversible state of insensibility that could be used clinically.

At around 1900, the operating theatre at the Royal Veterinary College, London was a straw covered yard, the straw acting as a cushion upon which to cast horses and in those days it was customary for veterinary surgeons to wear bowler hats.

In the 1930's the Royal Veterinary College was rebuilt but still there was no purpose built operating theatre for large animals as would be expected in any Veterinary School today. When necessary, the ride at the back of the College was used to operate on horses.

Also in the 1930's, although, chloroform had been used, diethyl ether was considered to be the safer agent and a number of attempts were made to find more effective ways by which it could be administered.

Advancement of veterinary anaesthesia

In 1934, Henkels [1] described an apparatus for administering ether to horses which was an extension of an auto-inhalation method used for small animals. An ether container was connected to the horse via a mask and was surrounded by another container filled with water heated to about 80º C. Air was drawn into the ether container as the horse inspired and passed for some distance along tubing submerged in the hot water before the ether vapour it contained was inhaled by the horse. A bottle containing ether replenished that used from the container and the flow was controlled by a regulating disc.

Students in the 1940's were taught that anesthetising horses meant being able to cast them using ropes such as 'side lines' or 'heavy hobbles'. Then once the horse went down, it was most important to sit on its head to prevent it from getting up.

During the 1940's, an agent was introduced by Imperial Chemical Industries Ltd. (ICI). This was beta-naphthoxyethanol [2]described as having 'anaesthetic-like' properties when it was undergoing pharmacological tests for anthelmintic properties. It had, however, many side effects and there was doubt as to whether the apparent loss of consciousness could properly be classed as anaesthesia because it seemed to work from the rear end of the animal towards the brain. It was named 'Anavenol'[3] but as criticisms mounted, it was mixed with a thiobarbiturate called Kemithal and the product was then named'Anavenol-K'. Needless to say, it did not last long and neither did Kemithal as it was no rival to thiopentone.

In 1950, Longley tried using thiopentone as a general anaesthetic for the horse. [4] As a sole agent however, the occurrence of narcotic excitement soon made it seem unsuitable.

During the 1950's it became apparent to Leslie Hall and myself, that veterinary surgeons were about 50 years behind the 'medics' with our anaesthetic techniques. We were working at the Royal Veterinary College, London and there we adapted techniques of anaesthesia for humans to the small animals in the clinic. We also made an attempt to do the same for the horse, using ponies that could be persuaded into the dog kennels in the basement of the building….the ataractic agents, notably the phenothiazines were arriving and we used chlorpromazine for sedation prior to giving thiopentone intravenously to induce anaesthesia which was then maintained, after endotracheal intubation, with cyclopropane and oxygen.

In 1954, we wrote a paper, which was published in the *Veterinary Record*, on 'balanced anaesthesia in the dog and cat' describing our efforts to upgrade anaesthetic practice to the standard of human anaesthesia**.** [5] We stated in this article that **more research was urgently required for similar upgrades to be made for the horse.**

Various masks were devised for horses, to assist inhalation. One was described by Hooper in 1847 and was known as a 'Horse Inhaler. [6] Chloroform emerged as more popular than ether due to its greater potency and a frequently used mask for its administration was the Cox type one. In spite of the risks with chloroform and the likelihood of asphyxiation, deaths were reasonably rare due most likely to the fact that anaesthesia was of short duration.

The pharmacology of the narcotic agent, **chloral hydrate**, prepared by the action of chlorine on ethyl alcohol, was described by Marcenac and Lemetayer [7] in 1930 although its first use on horses was first described by Humber back in 1875.

Professor J.G. Wright reported his experience of using chloral hydrate on some 500 horses over a period of 20 years. [8] He concluded that it remained for many years 'the best narcotic at our command for the horse but at the same time it is far from ideal'. It was administered intravenously using a 'flutter valve' type of giving set.

Sir Frederick Hobday was a pioneer of anaesthesia for the horse and he wrote the first known textbook on Veterinary Anaesthesia entitled 'Anaesthesia and Narcosis in Animals and Birds'. [9]

Professor J.G. Wright, however, laid the foundations for modern anaesthesia and wrote what was for many years the recommended textbook on the subject. [10]

Diethyl ether made yet another return for use as an anaesthetic for horses in the 1950's when Sydney Jennings of the Glasgow Veterinary School developed an apparatus [11] he called ALMA i.e. Animals Large Maintenance of Anaesthesia. This was a large circle absorber and horses were connected to it to inhale ether and oxygen after being narcotised with chloral hydrate and intubated. Thus it was that rebreathing systems were to be the way forward to develop controlled inhalation for horses since the gas flow requirements for non-rebreathing systems were too great to be practical. However, ALMA was large and difficult to move around and so it became replaced with the Fisher-Jennings circle absorber – much smaller but with greater resistance to gas flow. [12]

Leslie Hall went to Cambridge and continued research into equine anaesthesia. BMQW moved to the Bristol Veterinary School in the late 1950's where there was an urgent need for a rebreathing system in order to administer controlled inhalation for the maintenance of anaesthesia and to do so using **halothane** which had by then become available at a cost of about 1 shilling per ml. Fisher and Jennings reported on the use of this agent in horses and cattle in 1958. [13]

Measurements and research

Measurements were required in order to persuade manufactures to make special equipment.

Re-breathing systems designed for humans posed intolerable airway resistance The use of a gas meter however began to indicate the respiratory volumes that occurred during breathing and a make-shift circle absorber was used with wider breathing tubes, reducing respiratory resistance. [14]

In addition, tracheal measurements were made in order that the range of Magill cuffed endotracheal tubes might be extended to sizes adequate for ponies and horses i.e. 20, 25, 30 and 35 mm id.

With the required measurements, frequent visits were made to A. Charles King, in London, later becoming British Oxygen Company (BOC which led to the development of an enlarged Boyle Mark I Circle absorber. This particular absorber model was selected because the soda lime canister could be removed and used as a to and fro system if required.However, the tubing used for this first circle absorber was from oxygen tents for humans and had the serious disadvantage of being expandable so that the system could not be used to inflate the lungs. Finding tubing of adequate diameter which was not distensible was a problem until a firm known as 'Flexible Ducting' was located in Glasgow.

The large circle absorber was then duly fitted with the non-distensible tubing and a range of enlarged Magill type, cuffed endotracheal tubes were made.

Sir Ivan Magill, having witnessed a demonstration of closed circuit halothane anaesthesia in a horse, made off with the tube when told that it cost £100.

Cyclopropane with oxygen was used with the large circle absorber but always with concern that there might be an explosion ! Chloroform was also used occasionally but with concern because of its dangers, especially in passing it

through soda lime. Thus, halothane became the inhalation agent of choice, affordable with care, using just 42ml for the first hour of anaesthesia.

Later in 1958, a large animal operating table was acquired at the Veterinary School, Bristol and, initially, a horse anaesthetised in the field would be put on a trolley and trundled to the operating theatre.

In due course however, it became possible to anaesthetise horses in the operating theatre. A horse anaesthetised with halothane (Fluothane – ICI) on the table raised to a suitable height for surgery to be carried out was revolutionary. The horse was fully relaxed and no hobbles or ropes were needed – see Figure 1.

The Society of Anaesthetists of the South Western Region (SASWR) showed much interest in the development of veterinary anaesthesia at Langford and visited in 1958. One anaesthetist who was there is at this meeting today, namely Dr Aileen Adams. After nearly twenty years, in 1976, the SASWR came again to Langford, this time with Sir Ivan Magill.

Studies continued in many centres to improve induction, sedation and analgesia for the horse.

Comparative studies were undertaken at Bristol between the horse, man and other animals in order to increase the understanding of the uptake and distribution of inhaled agents, notably halothane, and to develop a 'standard horse' for use in physiologically based mathematical modelling. [15] For guidance with these studies, a great debt of gratitude is owed to Professor Mapleson.

Intravenous induction of anaesthesia took place, after premedication with acepromazine, and using thiopentone followed by succinylcholine, steadying the animal to the ground on to mats as consciousness is lost – see Figure 2.

Induction with thiopentone, even after premedication, could be unpredictable and became replaced with an alpha-2 agonist agent, initially xylazine followed by romifidine and then detomidine which became the most popular one. With the horse deeply sedated, anaesthesia could be induced with ketamine. With this technique, both induction and recovery were greatly improved.

Direct blood pressure measurements came to be made during maintenance of anaesthesia and Glyceryl guaiacol ether (Guaifenesin) was often used as an adjunct to induction and or maintenance to enhance muscle relaxation.

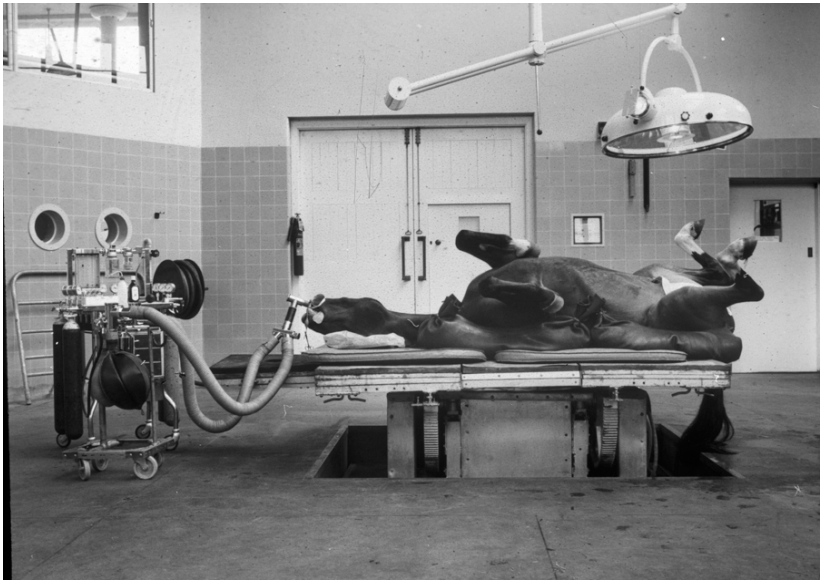

Fig. 1 Early use of halothane (Fluothane – ICI) for the maintenance of anaesthesia in a horse (1958)

Fig. 2 Pony being steadied down onto a mattress after IV induction of anaesthesia (1970s)

Ventilators

Another problem in the 1960's and 1970's was to develop a ventilator for intermittent positive pressure ventilation (IPPV).

Help was received from Dr's J Macrae and R Walley from Ham Green Hospital where many cases of polio had been treated requiring long term IPPV. [16]

At first a cuirass ventilator was used, making it intermittently compress a rebreathing bag in a 14 litre capacity aspirator bottle. End tidal respiratory samples were taken into a syringe as the horse breathes out and measurements were made via a modified Haldane apparatus. This was to assess expired carbon dioxide and give an idea as to the adequacy of the pulmonary ventilation. This system proved to be inadequate for horses weighing more than 400kg and so the next arrangement was to use a large Douglas bag in a (hot water) tank intermittently compressed by a Both pump, the displaced volume being sent to a large circle absorber and on to the horse. Respiratory flows and volumes were measured using a Fleisch pneumotachograph and recorded. [17]
For research studies, the Cambridge Respirator, developed by Leslie Hall at Cambridge was used but it did not fulfil all requirements (Figure 3).

Fig. 3 IPPV for an anaesthetised pony using the Cambridge Respirator

There is now a purpose built ventilator developed by Keith Simpson with his company, Vetronic Services which is known as the Tafonius.

Modern equine anaesthesia

At the present time, anaesthesia for the horse can still present problems but huge improvements have been made, revolutionising the care and pain relief available for this species and there are now excellent equine anaesthetists continuing to make improvements.

There is no doubt though that the advances that have been made would have taken far longer and just might not have happened were it not for the help and advice so readily given by medical anaesthetists. [18]

It is to be hoped that collaboration between medical and veterinary anaesthetists will continue with ongoing benefits to both professions

We have come a long way from the veterinary surgeon wearing a bowler hat and kneeling on straw.

References

1. Henkels P. The best method of anaesthesia for the horse both for use in Clinics and General Practice. *Deuts Tierarzto Wschr* 1938; **46**: 80-84
2. Francis J, Parry HB. Beta-naphthoxyethanol; a new anaesthetic for use in the horse. *Veterinary Record* 1949; **61**: 509
3. Kirkwood AK. Anavenol in large animals. *Veterinary Record* 1952; **64**: 338
4. Longley EO. Thiopentone (pentothal sodium) as a general anaesthetic in the horse. *Veterinary Record* 1950; **62**: 17-20
5. Hall L, Weaver BMQ. Some notes on balanced anaesthesia for the dog and cat. *Veterinary Record* 1954; **66**: 289-93
6. Hooper W. Horse Inhaler. *The Pharmaceutical Journal* 1847; **7**: 133
7. Marcenac, Lemetayer. *Bull Acad Vet France* 1930; **3**: 141
8. Wright JG. Anaesthesia and narcosis in the horse. *Veterinary Record* 1958; **70**: 329-36
9. Hobday FTG. *Anaesthesia and narcosis in animals and birds*. London: Balliere Tindall & Cox, 1915
10. Wright JG. *Veterinary Anaesthesia* (1st ed.). London: Balliere Tindall & Cox, 1941 [2nd ed. 1947, 4th ed. 1957]

11. Fisher EW, Jennings S. A closed circuit anaesthetic apparatus for adult cattle and for horses. *Veterinary Record* 1957; **69**: 769-71
12. Weaver BMQ. An apparatus for inhalational anaesthesia in large animals. *Veterinary Record* 1960; **72**: 1121-5
13. Fisher EW, Jennings S. The use of Fluothane in horses and cattle. *Veterinary Record* 1958; **70**: 567-73
14. Mapleson WW, Weaver BMQ. Respiratory resistance and compliance in the anaesthetised horse. *Respiratory Physiology* 1969; **6**: 257-70
15. Mapleson WW, Staddon GE, Weaver BMQ. Mathematical modelling of a standard horse. *Equine Vet Journal* (Leader)1984; **16**
16. Weaver BMQ, Walley RV. Ventilation and cardiovascular studies during mechanical control of ventilation in horses. *Equine Vet Journal* 1957; **7**
17. Weaver BMQ. Mechanical control of ventilation in horses. *Veterinary Record* 1967; **80**: 249-52
18. Weaver BMQ, Hall L. Origin of the Association of Veterinary Anaesthetists. *Veterinary Anaesthesia and Analgesia* (Editorial) 2005; **32**: 179-81

GUEST LECTURE – SUMMARY

TWO CRIMEAN HEROINES: MARY SEACOLE AND FLORENCE NIGHTINGALE

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The Crimean War was fantastic – tourists and wives of officers in the British Army went out to watch. William Russell reported in *The Times* the inadequacy of hospital facilities. The Secretary at War wrote to Florence Nightingale and in November 1854, she and 38 nurses disembarked at Scutari, a suburb of Constantinople. In her first letter back to England, Florence described the blood, filth and inconsiderate treatment. She had a band of unruly, often hard-drinking orderlies to control. With the support of Lord Palmerston in 1855, Florence and her nurses thoroughly reorganised the medical services.

Florence Nightingale turned down a Jamaican woman, Mary Seacole, who tried to join the team. Undeterred, Mary went to the front line and set-up a 'British hotel' in Balaclava. There she supplied handkerchiefs, lemonade, cake – and treated patients suffering from cholera and dysentery. She was a dispenser of herbal remedies and rode out to the front with these – becoming the most active of the few women who helped the British on the battlefield.

After the War, Florence Nightingale's reforms took off, and a school for nurses at St Thomas' Hospital, London was opened in 1862.

For more information consult Helen Rappaport's book "No Place for Ladies: the Untold Story of Women in the Crimean War".

FROM BOSTON TO BEAST: WALES AND THE HISTORY OF ANAESTHESIA

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Letters and Lessons from Boston

Thirteen years before it served as Crimean War transport, the steamer *Acadia,* a member of the prestigious Cunard fleet, played a more subtle but significant role – a role that served to advance surgery beyond recognition in 19th century Britain. In 1840 the *Acadia* began a fortnightly mail service between Liverpool and Halifax, Boston and Quebec. Amidst the passengers and cargo of this majestic paddle steamer on one such voyage in 1846 was news of ether anaesthesia from America.

This groundbreaking news came in the form of a personal correspondence from Dr. Jacob Bigelow to his London based friend, Dr. Boott. In tandem with this personal correspondence came a newspaper article from the *Boston Daily Advertiser*. This newspaper piece, dated Thursday 19th November 1846, was a re- printed article written by Professor Jacob Bigelow's son, Henry Bigelow. Entitled 'Insensibility During Surgical Operations Produced by Inhalation' the article was published in the *Boston Medical and Surgical Journal* one day prior to its appearance in this local newspaper. On December 16th 1846 the *Acadia* docked in Liverpool, which is thirty-five miles from the North Wales town of Wrexham; there the Beast Market would become the location of the first ether anaesthetic administered in Wales.

Henry Bigelow was a surgeon at the Massachusetts General Hospital who, along with his father Jacob Bigelow, witnessed the Boston based dentist, William Thomas Green Morton's historical administration of ether. This event of Friday October 16th 1846 was scrutinized by many of Boston's medical minds; however, the documentation for posterity of this event by Henry Bigelow far outweighed that of any other witnesses. This 'important discovery of the present age' was then the subject of the personal correspondence across the Atlantic to Dr. Boott in a letter dated 28th November 1846.

The news of ether had therefore reached the British Isles. Its route to *The Lancet* was via London and Dr. Boott; however, the story made it to local newspapers with impressive speed following the docking of *Acadia* on British shores.

Firstly, news appeared in the December 18th edition of the Liverpool Mercury, only two days after the ship arrived on the Mersey[1]:

> 'A method of mitigating pain in surgical operations by the inhalation of certain ethers has been discovered in America and it is said that successful experiments have been made'

In his comprehensive account of the introduction of ether to Great Britain [2] Richard H Ellis highlighted this Liverpool article but also an appearance of the story in the *London Medical Gazette* on the 26th December 1846. Ellis commented that besides forwarding the details to *The Lancet*, Dr. Boott may have also been the informant for this lesser known publication. Either way, information was being filtered and news of Morton's ether demonstration was reaching British clinicians. Dr. Boott, armed with this transatlantic correspondence, held council with his friend and colleague James Robinson. Robinson was a London based dentist who, on December 19th 1846, extracted a molar tooth using ether at his practice on Gower Street, London; Dr. Boott dutifully looked on. Professor Robert Liston was soon to hear of Robinson's success and two days later on December 21st, Fredrick Churchill underwent a swift amputation of his leg under the influence of ether administered by William Squire. This event at the University College Hospital in London by Liston has been historically granted with the title of the first surgery under ether in Britain. This distinction between the use of ether by both Robinson and Liston offers a Welsh comparison, using names less well known – Wiglesworth and Dickenson. This comparison will be further explored later.

Professor Jacob Bigelow's prediction following Morton's Boston-based first public demonstration of ether anaesthesia – "This is something which will go round the world" [1] – was holding true. Wales was certainly not left behind.

Dickenson vs Wiglesworth (outside contender- Hamiliton Roberts)

The accolade of the first anaesthetic given in Wales has three main contenders: Mr J Dickenson, Mr H Wiglesworth and Mr A Hamilton-Roberts. The English comparison outlined above is an important one; the actual operations in contention are the same- a tooth extraction and limb amputation. The tooth extraction by Robinson is not consistently celebrated as the first surgery under ether in England. This title is reserved, in the most, for the amputation by Mr Liston on December 21st 1846. Applying the same logic to early anaesthesia in Wales, we should certainly acknowledge a tooth extraction performed by Mr Henry Wiglesworth in Swansea in December 1846, but give the title of first anaesthetic in Wales to Mr John Dickenson of Wrexham who performed an amputation under ether in February 1847. As outlined below this anaesthetic

was questionable in its success, hence, the surgeon Mr Hamilton Roberts of Bangor provides another alternative to the accolade.

Mr Henry Wiglesworth

In *The History of Anaesthesia Proceedings* volume 6a of 1989 [3] JM Lewis advocates for Henry Wiglesworth as the surgeon who administered the first anaesthetic in Wales. A surgeon at the Swansea Infirmary, Mr Wiglesworth was, previous to this, a pupil of Mr Liston. The infirmary in Swansea, much like the Wrexham Infirmary, was founded as a dispensary in 1814. It became an infirmary in 1817 and was located on St. Helens Road in the south Wales coastal town of Swansea.

The local newspaper of Swansea at this time was *The Cambrian.* A letter in this newspaper dated January 13th 1847 [4] reported the use of ether by Mr Henry Wiglesworth. The letter, written by the surgeon himself, quoted his former teacher Mr. Liston. In the concluding remarks he referred to ether using Liston's words: 'a great thing for operating surgeons', it is the 'philosophers stone'. Referring to the extraction of a molar tooth from a young patient at his residence, Mr Wiglesworth continued to describe these events:

> 'The patient having been made to inhale the ether vapour through an apparatus especially adapted for the purpose invented by Mr. Robinson…'

Almost acting like a business partner, Mr Wiglesworth made the following footnote to his *Cambrian* letter:

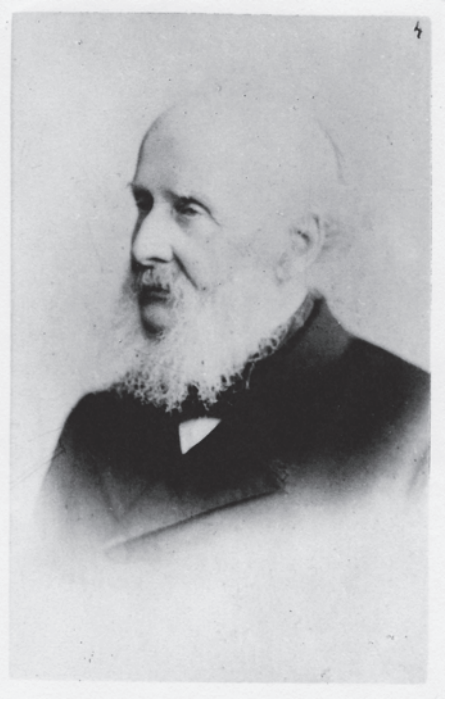
> 'This apparatus may be procured of Mr. Hooper, Operative Chemist 7, Pall-mall East; London- the price is four guineas.'

It is hard to image a similar footnote written in a present day local newspaper advertising the purchase of an anaesthetic machine – not a good idea for the general public to 'procure' such a thing.

Mr Wiglesworth was notably proud of his ether demonstration, and stated that the extraction of a tooth served as an adequate case to prove ether efficacy. However, he pushed the use of ether in South Wales and performed an amputation on a patient under its influence one month after his initial use of the substance. A report of this operation appeared in *The Cambrian* on 26th February 1847 [5], stating the event took place 'Friday last'. Considering the newspaper article was printed on a Friday itself, the operation therefore took place on February 19th 1847. Although the first to accomplish this in South Wales, Mr Wiglesworth misses out on being the fist in Wales to perform a major operation under ether by fourteen days. Mr J Dickenson had amputated a limb in Wrexham under ether two weeks prior.

James Robinson and Henry Wiglesworth had something in common. Both medical men of the late 19th century, they command attention with respect to the history of Anaesthesia; Robinson for England and Wiglesworth for Wales. Both carried out extraction of teeth with patients under ether, and both procedures are slightly overshadowed by the amputation of limbs by Mr Liston and Mr Dickenson respectively. Both have perhaps been overlooked by some as holding English and Welsh anaesthesia 'firsts'. The life and career Mr Liston is well documented, indeed his status as a famous surgeon of this time is probably the reason he overshadows Mr Robinson. Mr Dickenson of Wrexham, however, is less well known.

Mr John Dickenson



Mr. John Dickenson of Wrexham (1800- 1887)
Courtesy of Wrexham Borough Archives & Local Studies Centre.

Cheshire born Mr Dickenson was a highly regarded local general practitioner and surgeon holding his practice at Crescent House, Beast Market, Wrexham. It was within the confines of Beast Market that his first use of ether took place. A GP surgery still stands in the same location. Dispute exists as to the exact

location of this prominent event. Records show, however, that the infirmary in Wrexham did not gain funding for a surgical theatre until 1862, fifteen years following the documented anaesthetic by Mr Dickenson; supporting the notion the procedure took place at Crescent House.

Mr Dickenson was elected to Wrexham council in 1860 and held the position of mayor from 1861 to 1862. The vocations of both doctor and local councilman ran in the Dickenson family. Dickenson was succeeded in his medical practice by his nephew, Dr H V Palin, who was also mayor of Wrexham from 1889 to 1890. As mayor Mr Dickenson played a pivotal role in the improvement of sanitation in Wrexham, demonstrating a public health interest that extended beyond his medical career. The entry in G Leary's exhaustive text detailing previous Mayors of Wrexham [6] dedicated to Mr Dickenson, a section of which is show below, details the life of Mr Dickenson and also adds to the picture of 19th century Wrexham:

> 'After his election he made a speech in which he strongly advocated the provision of a proper system of drainage for the town and a supply of pure water. He stated there were not more than one hundred and fifty pumps in the town supplying a population of nearly eight thousand, and he added that of this number two thirds were out of repair.'

Thirteen years prior to his election to Mayor, and his efforts to improve the overall health of Wrexham, Mr John Dickenson administered one of the first ether anaesthetics in Wales. The events of this historical day in February 1847 are documented by the *Caernarfon and Denbigh Herald* dated 13th February, 1847 [7]. This newspaper piece is highlighted in both the 1978 *Anaesthesia* article 'Early uses of ether in North Wales' [8], and *The History of Anaesthesia Proceedings* Volume 13 of 1993 (paper by Dr L Gemmell) [9]. On inspection it is clear why this newspaper report warrants so much attention. It documents the first ether anaesthetic administered in Wales with extraordinary detail. The occurrence of vomiting, for example, is documented:

> '…inhaled ether vapor for some time – without much effect the stomach during its administration having several times ejected its contents.'

Following these vomiting episodes the article describes how the mouthpiece of the apparatus was merely:

> 're-adjusted and an additional supply of ether, its effects soon became perceptible to those around.'

The newspaper report also provides, albeit unwittingly, a documentation of anaesthetic awareness. The observation that the patient 'betrayed little or no symptoms of pain' is noted. Having not dismissed the prevalence of pain

completely, the author suggests that during the brief amputation the patient may have displayed some indication of pain. The patient was also interviewed following the operation and reported in blunt fashion that:

'he was aware of what was going on , but experienced no pain.'

Despite being one-hundred-and-sixty years old, this article documents two concerns that remain for today's anaesthetist: vomiting and awareness. The article concludes with the note that the 'result was highly satisfactory to the operator and those gentlemen present'. Thankfully the bench mark for awareness has changed; 160 years on we are certainly not satisfied with any form of awareness, painful or otherwise.

This distinction of awareness is, I believe, the key to whether this particular anaesthetic has historically been deemed a 'success'. Furthermore, this distinction has led to the notion that the first anaesthetic given in Wales was not in Wrexham by Mr Dickenson, but in Bangor by the surgeon Mr Hamilton Alder Roberts.

Mr Hamilton Alder Roberts

Mr Hamilton Alder Roberts is celebrated by some as the clinician responsible for the first anaesthetic administered in Wales. Mr Roberts was a 'Bonesetter', as they were aptly named, who worked in Penrhyn Quarry Hospital. Built in 1825 this hospital, as its name suggests, served mainly the population of quarry workers based in the Bangor area of North Wales. Ruins of this quarry hospital still remain on Mount Street in Bangor. Mr Hamilton Roberts was the first Bonesetter to grace its corridors full time.

From a family of surgeons based in Bangor, Mr Roberts travelled further afield to study. Following time spent in Dublin and Paris he returned to North Wales to succeed his father at Penrhyn Quarry Hospital, taking up the post in 1840. Although a highly regarded bonesetter of this time Mr Roberts' career was blighted by controversy and he eventually resigned after thirty-five years of service. Reading about Mr Roberts the impression is left of a surgeon who perhaps was in need of some anger management; much of the documented dispute involving Mr Roberts centred on altercations with other members of staff. An article in *The Lancet* dated 9th November 1839 details an accusation made by Mr Roberts to a member of Penrhyn Hospital Committee concerning the misuse of funds. E Davis comments- '[the article] suggests that Mr. Roberts possessed a rather vindictive nature' [10].

In his detailed book charting the health of north Wales' quarrymen in the 19th

century, E Davis proposes Mr Roberts as the first clinician in Wales to administer an anaesthetic. Davis notes 'Dr Hamilton Roberts played an important part in introducing the use of anaesthesia into North Wales'; a comment that is not in dispute. However, he later comments: 'on the 5th February 1847 ether was used in the Wrexham Infirmary, and five weeks later Mr Hamilton Roberts administered the first ether anaesthetic in North West Wales at the C&A Infirmary'. The 'use' of ether referred to is by Mr John Dickenson.

The procedure that gains Mr Roberts priority is the amputation of a leg under ether on 9th April 1847, around two months after Mr. Dickenson in Wrexham carried out a similar operation. A newspaper article from *North Wales Chronicle* on 17th April 1847 entitled 'Surgical Operation upon a Etherised Patient' [11] reads:

> 'An amputation of the leg was performed on Friday last by surgeon H A Roberts, at the Penrhyn hospital…the patient, a quarryman, previous to the operation inhaled the vapour of ether for a space of four minutes, when it was apparent that he was fully under its influence, the operation was quickly performed'.

And quick it certainly was. Mr Alder Hamilton Roberts was among the fastest surgeons in Britain at this time, along with Liston, who could amputate a limb in under sixty seconds. The article goes on to report an interview with the patient post-procedure:

> 'The operation was quickly performed, and being placed in bed he assured those present that he had no recollection of what had occurred, neither did he feel any pain.'

This is a different result from the interview with Mr Dickenson's patient, and I'm sure is the reason why this anaesthetic is deemed a success in comparison.

In an article titled 'A village medical mystery' (published as a 'filler' in the *BMJ* in 2006) Mr J Aelwyn Roberts also sits in camp Hamilton [12]. Mr. Roberts boldly states:

> 'The *Acadia* docked in Liverpool In its cargo were precious gift packs of this newly discovered anaesthetic bound for three hospitals- University Hospital, London, Edinburgh Infirmary and Penyrhyn Quarry Hospital, Bethesda north Wales.'

The author postulates that one of these 'precious gift packs' was destined personally to Dr Hamilton Alder Roberts of Penrhyn Quarry Hospital; the article goes on to conclude:

> 'So the first operations on etherised patients in Britain were carried out in London, Edinburgh and Bethesda, North Wales.'

This submission was strongly disputed by two respondents [13] [14], one of whom ommented that 'historical articles should be submitted to the same rigorous process of review which the BMJ applies to medical and scientific papers' [14].

Dickenson, Wiglesworth and Roberts collectively started to shape the specialty of anaesthesia in Wales. In Wrexham, Swansea and Bangor respectively, these Welsh pioneers served local communities striving to alleviate the terrible suffering of undergoing an operation in the late 19th century. The railway and quarry workers of North Wales and miners of South Wales provided countless trauma victims requiring the services of surgeons, these traumas also provided surgeons of this time with important lessons. An article in the North Wales Chronicle dated March 24th 1847 [15] outlines the sobering tale of a man left overnight with severe injuries to his lower limbs following an accident on the Chester to Holyhead railway. Surgery was delayed until the morning, the patient subsequently died on the operating table having been administered ether by Mr. Hamilton Roberts. The article relays the coroner's recommendation after this case, in that 'medical aid should be procured with as little delay as possible' – an early tale of death under anaesthesia, and one that provided lessons for surgeons in trauma.

The development of medicine and anaesthesia continues to be molded by the occupations, health and demographics of the current population. The history of initial developments in anaesthesia in Wales was also guided by the health needs of late 19th century Wales. Below is a glimpse into the history of Wrexham, a Wrexham that Mr Dickenson and his patients would have wandered through.

Wrexham the town

Flanked by the Welsh hills and the Cheshire countryside, Wrexham enjoys a handsome landscape. However, the industrial revolution was no kinder on this landscape than elsewhere in Britain. With industry evolving in Wrexham, along came the health pressures of an expanding population. The following statement from the Inspector for Health in 1849 paints a somewhat depressing picture of life in 19th century Wrexham [16]:

> 'The cesspools and the cottage pigsties are among the chief evils of Wrexham'

You can only imagine the nature of the other 'evils', and no doubt these evils were thanks to the booming industry that Wrexham accommodated at this time. The main industries that Wrexham catered for were coal mining, iron works and breweries. Many of these industries starting off as small workshops in central

Wrexham and grew to large imposing factories. One can imagine this place had pungent smells, abandoned waste, dirty streets and intolerable noise. At the centre of these 'evils' was the Beast Market, the namesake of this narrative. Beast Market was established in the late 17th Century and was the location of Wrexham's March Fair that became a focus for local business trading. Making its name more apt, a butchers market was built within Beast Market in 1848; this was joined by a butter market in 1879 and a vegetable market in 1910. It is within the boundaries of Wrexham's Beast Market that Mr John Dickenson held his general practice, a location that in February 1847 would host an important event for surgery in Wales.

The typical resident of Wrexham in the late 19th century would have grown used to the milieu of unpleasant sights, smells and sounds but also would have grown used to ill health. In a bid to serve the people of Wrexham, the Wrexham Dispensary was opened on 1st May 1833. Under the watchful eye of local doctor and businessman Dr. Thomas Taylor Griffith the dispensary was opened for the use of 'labourers, their wives and children, servants (earning less than £3 per year) and for persons unable to pay for medical advice and medicines' [17]. The Wrexham Infirmary opened in 1839; the building now serves as a college of art, part of Wrexham's Glyndwr University. In 1926, to commemorate those killed in World War One, Wrexham and East Denbighshire War Memorial Hospital opened. This building is also now used by the university. Today, the population of Wrexham and the surrounding boroughs are served by The Wrexham Maelor Hospital. Until 1986 local health services were inefficiently split between the Wrexham Maelor and the War Memorial Hospitals; expansion of the Maelor hospital began in late 1986, and the hospital continues to develop and extend.

From humble beginnings at the Beast Market, anaesthesia in Wrexham grew along with the hospitals. Mr Dickenson's legacy is that of a thriving anaesthetic department that has over twenty consultants and provides training for countless anaesthetists moving through the hospitals of an all Wales deanery. Mr Hamilton Roberts would be equally proud of the anaesthetic department formed at Ysbyty Gwynedd, a teaching hospital that stands tall in the hills of Bangor, north Wales. The busy department of anaesthesia split between Morriston and Singleton hospitals in Swansea provides a grand backdrop to the work pioneered by Mr Henry Wiglesworth. Forty-two miles east of Swansea is the Welsh capital of Cardiff.

Anaesthesia in Cardiff

One hundred years after the first use of anaesthesia in Wales and one year prior to Aneurin Bevan's inception of the National Health Service, the anaesthetic

department of Cardiff was formed. A description of the institution, development and resident clinicians of Cardiff's anaesthetic department could alone conduct its own narrative.

The year 1947 was important for Cardiff anaesthetics for one main reason; the acquisition of Professor William Mushin. Part time practitioners or junior staff gave most anaesthetics at this time. In 1947 this situation led to seven anaesthetic related deaths in a single week in a Cardiff operating theatre. The city coroner threatened to stop all surgery in the hospital if something was not done. That something was the appointment of Professor Mushin whose accomplishments prior to and during his time in Cardiff are well documented. L Rees, writing in an historical 'miscellany' published by the University Hospital of Wales League of Friends writes: 'He was one of a very small band of men who, in the early years of the National Health Service, transformed anaesthesia from an imprecise, practical art into a comprehensive scientific discipline' [18]. His obituary in *The Independent* includes ' W W Mushin's achievements were prodigious and are exemplified in the Department of Anaesthetics at the University Hospital of Wales in Cardiff, which he created out of nothing'[19]. M D Vickers ends his account of Mushin with the line: 'indirectly, he has saved the lives of many patients throughout the world by his persistence and unshakable belief in the correctness of his message' [20]. Most anaesthetists can only dream that their own career will command such passionate prose.

Professor Mushin subsequently ushered in many great anaesthetists to the University Hospital of Wales. He also carved out a prestigious role that has since been filled by a succession of impressive anaesthetic and academic talents. These talents were turned to pioneer many diverse elements of anaesthesia. William Mushin and John Lunn initiated a seminal audit in 1982 concerning mortality associated with anaesthesia; this later became the National Enquiry into Perieoperative Deaths. Professor Rosen's work with patient controlled analgesia enabled the development of the 'Cardiff Palliator', the first commercially available PCA machine in the world. Professor Mapleson joined Cardiff anaesthesia department in 1952 and is renowned for classifying Breathing Systems A to E. RS Vaughan writing of Professor Mapleson states: 'I, like many others, can testify to his immense contribution to the department and anaesthesia worldwide' [20].

In 1952 only twelve consultant anaesthetists worked in Wales; now ninety-two consultants work in Cardiff alone, shuttling between two university hospitals: the Heath and Llandough. Countless anaesthetic trainees have passed though the corridors of the Heath and have gone on to hold consultant positions all over the world. With many eclectic research projects running in parallel, the academic

anaesthetic department at the university hospital more than holds its own on the national and international stage.

One-hundred-and-sixty years ago three pioneers set out to alleviate suffering of 19th century surgical patients in Wales. The specialty of anesthetics continues to develop and evolve along with the needs of a twenty first century population. Wales remains a great contributor to these advances.

References

1. Australian and New Zealand College of Anaesthetists. History of Anaesthesia, the first Anaesthetics in Australia and New Zealand. Available from: http://www.anzca.edu.au/anzca1/anaesthesia/history-of-anaesthesia (accessed 12 February 2010)
2. Ellis RH. The introduction of ether anaesthesia to Great Britain. *Anaesthesia* 1976; **31**: 766-777
3. Lewis JM. Early History of Ether and Chloroform Anaesthesia from Welsh Newspapers. *The History of Anaesthesia Society Proceedings* 1989; **6a**: 31-34
4. *The Cambrian*. Painless operations. January 15, 1847
5. *The Cambrian.* Painless Operation at the Swansea Infirmary. February 26, 1847
6. Leary G. Mayors and Town Clerks of Wrexham. Typescript Book. Unpublished. Held at: Wrexham Archives and Local Studies Centre, Wrexham, UK
7. *The Caernarfon and Denbigh Herald*. Painless Surgical Operation. February 13, 1847
8. Hardy TK, Jones IW. Early experiences of ether in North Wales. *Anaesthesia* 1978; **31:** 264- 267
9. Gemmell LW. Early Anaesthesia in Wrexham. *The History of Anaesthesia Society Proceedings* 1993; **13**: 23-24
10. Davis E. *The North Wales Quarry Hospitals and the Health and Welfare of the Quarrymen*. Aberystwyth: Cambrain Printers, 2003; 113-122
11. *The North Wales Chronicle.* Surgical operation Upon an Etherised Patient. April 17, 1847
12. Roberts JA. A village medical mystery. *British Medical Journal* 2006; **333:** 1296
13. Wilkinson D. Earlier Welsh anaesthesia. *British Medical Journal* Rapid Responses for Roberts, 333 (7582) 1296 2006. Available from http://www.bmj.com/cgi/eletters/333/7582/1296. (accessed 31 March 2010)

14. Connor H. A Village medical mystery. *British Medical Journal* Rapid Responses for Roberts, 333 (7582) 1296 2006. Available from http://www.bmj.com/cgi/eletters/333/7582/1296 (accessed 31 March 2010)
15. *The North Wales Chronicle*. Serious accident. May 30, 1848
16. Gammond J. *Health, hygiene and hospitals*. Available from: http://www.bbc.co.uk/wales/northeast/sites/wrexham/pages/wrexham6.shtml (accessed 3 March 2010).
17. Williams A (ed.). *The Encyclopedia of Wrexham*. Wrexham: Bridge Books, 2001; 109-110
18. Baber C, Lancaster J (eds.). *Healthcare in Wales: An Historical Miscellany*. Newport: Newport Printing Company, 2000
19. Lunn J. Obituary: Professor W. W. Mushin. *The Independent*. January 26, 1993
20. Appadurai IR, Horton JH (eds.). *Essays on the First Fifty Years 1947- 1997*. Bodmin, Cornwall: MPG Books Ltd, 1997; 7-9, 55-58

THE DEVELOPMENT OF ANAESTHESIA IN SWITZERLAND

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Introduction

This article deals with the beginning of anaesthesia in Switzerland and with the role nursing has played in it. The idea to alleviate pain is old. Laudanum (tincture of opium) and ether were known well before the first officially documented anaesthesia was provided in Boston in 1846. Both were considered damaging to the human body by many at this time and were therefore avoided. The surgical method had to be very fast (Hänggi 2002).[1] In 1803/ 1804 Sertürner succeeded in isolating a crystalline substance from opium in the test tube, which he called morphium. Until then it was not possible to administer the drug in exact doses (Klockgether - Radke 2002).[2] The inventor of ether is thought to be Theophrastus Bombastus von Hohenheim, called Paracelsus. In a test Paracelsus put 1540 chickens to sleep and he concluded that the substance could be a great blessing for humans in order to alleviate suffering. He was born on 10th November 1493 near Einsiedeln (Switzerland) and died on 24th September 1541 in Salzburg (Austria). He was a physician, alchemist, astrologist, mystic, theologian and philosopher. [3] He produced sweet oil of vitriol by the interaction of alcohol and sulphuric acid (vitriol). The stuff was already widely used by hunters to catch birds and other animals by hand (Pagel 1966).[4] But unfortunately, the collective mode of thinking of the people at this time was obviously not ready for such an invention. Von Hohenheim's discovery came to nothing in his time. Fleck (1980) [5] takes the view that all discovery and generation of new facts is socially grounded. He dismisses the idea of the discoverer as a single hero. The collective thinking of an association of people and their style of thinking are the influencing factors when it comes to accepting a new discovery or a new fact. It looks as if the first pioneer in producing an anaesthetic substance was Swiss. Despite that, the Swiss played no role when it came to the advancement of anaesthesia (Hänggi 2002).[1] The Germans would of cause debate Paracelsus as inventor. According to Goerke (1988) [6] the invention is credited to the German doctor Valerius Cordus, who lived from 1515 to 1544.

Early days of anaesthesia in Switzerland

Hänggi (2002) [1] describes the very beginning only, mostly the year 1847. Data about the daily business of anaesthesia in Switzerland during the introduction of anaesthesia are, according to the author, very scant. He contrasts the Swiss

situation with data citing Pernick (1985),[7] who investigated patient's charts in search for anaesthesia in hospitals in the US. Pernick was able to deduce the percentage of surgical procedures done under anaesthesia in the late 1840s and 1850s. Pernick could also tell which people received anaesthesia. Lower classes and blacks were not so fortunate to be anaesthetised. In Switzerland no such data can be found for this time. There was no systematic documentation of patients and their history in the few Swiss hospitals and surgeries. Hänggi was also unable to find any documents that originated from patients. All the documents came from doctors, journalists who had their information from doctors, and local authorities who acted on information from doctors. It is also not known how dentists and midwives reacted to anaesthesia. Countries like the USA, Great Britain and France were leading when it came to its acceptance and advancement. Despite the fact that Hermann Askan Demme carried out the first anaesthesia in the German speaking area, the scientific discussions happened in Erlangen, Berlin and Vienna.

Hermann Askan Demme (1802-1867), from Saxony was Professor of Anatomy at Zurich University. From 1835 he was Professor for Surgery und Director of the Clinic of Surgery in Bern. Demme was the pioneer of General Anaesthesia in the German speaking countries and he provided the first anaesthesia in Bern on 23rd January 1847. Johann Jakob Jenni (1812-1890) was another pioneer. He was a GP and liberal politician of canton Glarus. After some consideration he anaesthetised numerous patients in his rural area of praxis. His anaesthesia apparatus was a pig's bladder (Pasch & Mörgeli 1997 [8]; Hänggi 2002 [1]). Hänggi has records of Jenni being rather casual when it comes to his anaesthetic outcomes. In one of Jenni's reports Hänggi found the statement "a patient was chloroformed to heaven, but such is life". Another pioneer was Conrad Meyer-Hoffmeister (1807-1881). He anaesthetised while the crème de la crème of Zurich's medical doctors was present. He was a surgeon at the cantonal hospital of Zürich, now the university hospital, president of the Zurich Association of Physicians and Freemason of "Modestia cum Libertate". Badilatti [9] in his speech (in February 1996) describes the task of the Freemasons of Modestia cum Libertate as educational. Education is concerned with the most important matters of mankind, such as true friendship, and the fulfilling of social and charitable duties. Another very important aspect of education is the development of one self, and fulfilling one's duties towards the family, country and mankind.

Hänggi (2002)[1] has records of Meyer-Hoffmeister having dictated to the Zurich Health Ministry that the doctors were the only group of professionals allowed to give anaesthesia. He decided over health policy. He saw it as his duty to point out the danger of anaesthesia. In his view it required a great deal of

competencies, although it is known that the doctors of that time had very little knowledge about the effects and side effects of ether and its possible contra - indications. Meyer – Hoffmeister must have seen the financial potential of anaesthesia for medicine because according to Hänggi's records wealthy patients required it for their dental treatments soon after its introduction into the country. The ministry took Meyer-Hoffmeister's argument on board literally and a new fact was born. Interestingly, Hänggi also found out that Demme did not share this view. While Meyer-Hoffmeister believed that only doctors were and could be responsible for the advancement of anaesthesia, Demme took the view that a great number of people, medical and other, must have tried anaesthesia otherwise it would have been impossible to gather the base of experience as it was apparently available at this time.

Hänggi (2002) [1] also describes how the news about anaesthesia in Switzerland was spreading. It was printed in daily newspapers. Even doctors published in newspapers because they could reach potential patients as well as their colleagues. Jenni cited the *Augsburger Allgemeine Zeitung* several times, while the *Revue medico-chirugicale de Paris* probably was Demme's source of knowledge. The fact is that the public got the news at the same time as the doctors. Hänggi also found proof that operations under anaesthesia were predominantly carried out in the liberal cantons of Switzerland (Zürich and Bern). In the 1840s Switzerland was an association of loosely connected, tiny republics (cantons). The conservative cantons had very few doctors. They were rural and some of their areas were very remote and often not accessible for month in winter due to large amounts of snow and bad roads. There was opposition towards inhalation anaesthesia and it mainly came from the Mesmerists who successfully operated using hypnosis. Using Fleck's (1980) theory the collective thinking was accepting ether more than Mesmerism.

Nursing and anaesthesia before the late 1950s

As already mentioned, Hänggi's work does not cover a large period of time. There is a big gap in historic documentation between the late 1840s and the late 1940s. There are some clues of nursing being closely associated to anaesthesia in Switzerland. Braunschweig (2009) [10] describes health care in the late 19th and early 20th century as a large field without clear professional boundaries. Nursing knowledge and nursing practice were passed on orally and through experience. Professional nursing developed slowly. Its professional base was the Christian religion and the complete care for the patient (psychological, moral and physical). At the end of the 19th century Switzerland saw a reform in nursing. Asylums became hospitals where patients were treated and operated. The hospitals transformed into institutions of learning and research. Nursing

developed into a paramedic profession and it was shaped by medicine. Doctors could delegate work to nurses of their trust. At the beginning of the 20th century all the decisive posts for nursing were occupied by doctors. Doctor and nurse were stereotyped into the ideal professional couple. This was and still is the basics for kitsch novels and TV series.

The attitude of that time was that women's work was not considered work. It was viewed as serving human beings. Serving has nothing to do with work and therefore does not entail payment (Bischoff-Wanner 2003)[11]. The religious mentality persisted even among the nurses who came from the first independent nursing schools. Their status was low and their working time at least 10 hours a day (Fritschi 1999)[12]. Borker, Wiemes & Horn-Stracke (1999) [13] conducted a qualitative study interviewing convent sisters. One category of results showed that the convent sisters constantly had to be there for the patients, nurses, doctors and the head of the order. They were held responsible for all care and they had to be available for the order and the hospital all day and night. The head of the order determined where they had to work. In one interview with Sister Liliane Juchli, who is famous through publications and teaching in nursing in the German speaking countries, Sister Liliane talked about her life as a nurse and the great difficulties to write a nursing textbook under those demanding conditions. Apparently it was very unusual for the order to do that since nursing knowledge has always been passed on orally. Sister Liliane is a member of the Franciscan Convent of the *Barmherzige Schwestern vom Heiligen Kreuz* Ingenbohl, Brunnen, Switzerland. In her dissertation Dätwyler (2007)[14] did a qualitative investigation into the professionalisation of nursing in Switzerland. In one interview a nurse said: "....but I had to do it, we had no anaesthetist in our hospital. I had never learned anything about anaesthetics; I began to learn about it from a workmate. She used to say to me: come on, this is how you give it. At the beginning she showed me but very soon I had to do it. The surgeon said, don't worry, I'll be liable. It went well but I was scared to death" (pg 216). I did my nursing studies from 1965 - 1968 in Zurich. During those years we had to do practice stages in operating theatres. I was fascinated with anaesthesia. In 1966 nurse anaesthetist Sister Hermine Glättli (she died in an accident some years later) told me: "I gave anaesthesia long before I had my formal training. It was the surgeon's responsibility and I learnt it from him and from other nurses in anaesthesia. I gave many anaesthesias using ether. It was rather safe once you knew how to apply it." There is at least some hard evidence of the fact that anaesthesia was given by others than doctors. In Goerke (1988) [6] anaesthesia was given by paramedical people, mostly nurses. The term "Narkoseschwester or narcosis sister" which means nurse anaesthetist was created. After some fatal anaesthetic incidents the surgeons paid more and more attention to the observation of the patient during surgery. They could not

operate, observe and drop ether at the same time. They delegated the observation of pulse, blood pressure, breathing, pupils and skin colour as well as the dropping of ether to nurses. Alarming signs were the beginning of cyanosis and the darker colour of the blood at the site of surgery. The widely cited story of anaesthesia given by doctors only does not pay justice to a situation that lasted until the end of the 2nd world war.

Nursing and Anaesthesia in the US

Unlike the Swiss convent sisters, their US colleagues did document their work. The earliest existing records documenting anaesthetic care of patients by nurses were those of Sister Mary Bernard, a Convent Sister who assumed her duties at St. Vincent's Hospital in Erie, Pa. in 1877. This information can be found on the website of the American Association of Nurse Anaesthetists.[15] The most famous nurse anaesthetist of the nineteenth century, Alice Magaw, worked at St. Mary's Hospital (1889), in Rochester, Minn. This hospital was established by the Sisters of St. Francis and operated by Dr. William Worrell Mayo. Alice Magaw was born November 9, 1860, in Cashocton, Ohio. She attended the Women's Hospital School of Nursing in Chicago from 1887 to1889. In 1899, Magaw became the first nurse anaesthetist to be published when the *Northwestern Lancet* printed her article "Observations in Anaesthesia." Five more articles would follow. Charles Mayo bestowed upon her the name "Mother of Anaesthesia" for her mastery of open drop ether. Magaw died on February 17, 1928, in Hudson, Wis. [15]

Professionalisation of Anaesthesia in Switzerland

This process started in the late 1940s only. Resistance from the surgeons against the founding of an anaesthesia discipline lasted until 1954. In 1952 three Swiss Anaesthetists founded the Swiss Association of Anaesthesia. The name was later changed into today's name "Schweizerische Gesellschaft für Anästhesie und Reanimation".[16] The first Swiss Anaesthetists were educated in Britain, Scandinavia and Boston. Since Anaesthesia is an own medical and nursing discipline development has picked up (Pasch & Hossli 2003).[17] Because there were so few anaesthetists, they started to properly educate those nurses who gave anaesthesia already. The first formal training in nurse anaesthesia was in the late 1950s. One of the oldest Swiss nurse anaesthesia schools (Bern) is celebrating its 50th anniversary this year (2010). The school was founded 1959 by one of those first anaesthetists who were educated abroad (Krankenpflege 2010).[18]

Summary

Hard evidence of who exactly did drop that ether between 1847 and the late 1950s is scarce. Most hospitals were run by convent sisters and doctors, mostly surgeons. The convent sisters saw themselves as servants to god and consequently servants to the hospital and its patients and staff. Later the independent nurses, being female, were obviously pushed into the classical serving roles as well and the surgeons delegated what ever they saw fit. The scope of work for nurses was everything in connection with the running of a hospital, from housekeeping to nursing, assisting the doctors and carrying out medically delegated work. Only very few sources point out that giving anaesthesia was one of those delegated jobs. The surgeons were responsible and therefore could claim anaesthesia their own achievement. There is a big gap of information from the late 1800s until the late 1950s about anaesthesia in Switzerland and who actually provided it. Investigating this period of time could be challenging.

References:

1. Hänggi M. *Die Anfänge der Anästhesie in der Schweiz (1847)*. Lizentiatsarbeit der Philosophischen Fakultät der Universität Zürich, 2002

2. Klockgether-Radke AP. Sertürner und die Entdeckung des Morphins. 200 Jahre Schmerztherapie mit Opioiden. *Anästhesiol Intensivmed Notfallmed Schmerzther* 2002; **37**: 244-9

3. www.wikipedia.com

4. Pagel, W. Vor und nach Paracelsus. Untersuchungen über Hohenheims Traditionsverbundenheit und Nachrichten über seine Anhänger. *Med. Hist.* 1966 (April); **10** (2): 210-12

5. Fleck, L. *Entstehung und Entwicklung einer wissenschaftlichen Tatsache. Einführung in die Lehre vom Denkstil und Denkkollektiv*. Frankfurt am Main: Suhrkamp, 1980

6. Goerke, H. *Medizin und Technik. 3000 Jahre ärztliche Hilfsmittel für Diagnostik und Therapie*. München: Callwey, 1988

7. Pernick MS. *A Calculus of Suffering: Pain, Professionalism, and Anaesthesia in Nineteenth Century America*. New York: Colombia University Press, 1985

8. Pasch T, Mörgeli C (eds). *150 Jahre Anästhesie. Narkose, Intensivmedizin, Schmerztherapie, Notfallmedizin*. Wiesbaden: Wissenschaftliche Verlagsabteilung Abbot GmbH, 1997

9. Badilatti, M. (1996) Freimaurerei zwischen Ideal, Alltag und Zukunft. Vortrag gehalten im Rahmen der Volkshochschule des Kantons Zürich am 20.2.96 als Teil der Ringvorlesung über "Die Freimaurer". www.modestia-cum-libertate.ch/freimaurerei.htm retrieved 01.10.2010

10. Braunschweig S. (2009) *Pflege als Liebesdienst und Erwerbsarbeit*. Zeitgemässe Betrachtung über die Entwicklung eines Frauenberufs. www.sozialgeschichte-bs.ch/html/img/pool/Braunschweig-Referat.pdf retrieved 16.12.2010 from Google Scholar

11. Bischoff-Wanner C. (2003) Pflege im historischen Vergleich. In: Rennen-Allhoff B, Schaeffer D (Eds.) *Handbuch Pflegewissenschaft*, Juventa (Google book)

12. Fritschi A. *Schwesterntum. Zur Sozialgeschichte der weiblichen Berufskrankenpflege in der Schweiz 1850 - 1930*. Zürich: Cronos, 1999

13. Borker S, Wiemes R, Horn-Stracke H. Ordensfrauen und Krankenpflege in der Mitte des 20. Jahrhunderts. Eine historische Forschung. *Pflege* 1999; **12:** 335-340

14. Dätwyler, B. *Professionalisation in Nursing; The Swiss Case*. Dissertation for the PhD Degree, University of Nottingham U.K. , 2007

15. www.aana.com

16. www.sgar-ssar.ch

17. Pasch T, Hossli G. Kurze Geschichte der Schweizerischen Gesellschaft für Anästhesie und Reanimation (SGAR). *Anästhesiol Intensivmed Notfallmed Schmerzther* 2003; **38**: 231-6

18. 50 Jahre Anästhesiepflege in Bern. *Krankenpflege* 2010; **12**: 8

THE BRITISH MEDICAL TEAM, SAIGON, VIETNAM 1966-1971

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Background

In 1965, the United States was looking for partners to form a coalition to prevent South Vietnam being overrun by the communist North. Communism was spreading south from "Red China", Laos had fallen, and the "domino theory" predicted that South Vietnam would be the next to fall. The French, who had been the colonial power since 1861, were defeated at the Battle of Dien Bien Phu in 1954. Vietnam had been divided into the communist North and the anticommunist South by the Geneva Accords. During the Korean War (1950-53) the US had been backed by United Nations troops, with which the UK troops took part. Our Prime Minister of the day, Harold Wilson was asked for military help by President Lyndon Johnson, but he turned down the request. However there was a proposal on the table, drawn up by Dr Tony Brown, who was working in Saigon, for a British Medical Team to be sent to Vietnam. A request had come from the Vietnamese Ministry of Health for a team to work at Bien Vien Nhi Dong, the Children's Hospital in Saigon. Dr Philip Evans, Consultant Paediatrician at Great Ormond Street Hospital (GOSH), and civilian consultant to the army, was asked to undertake a preliminary visit while in the Far East. He agreed to lead the team, and to help recruit for the first year. He turned to his colleagues at GOSH to find people, and I was sent for by Dr Robert Cope, or Uncle Bob as he was known to us, and thought I was to be told about my next rotation to Barnet or Brighton, but was asked if I would go to Saigon. Having worked at GOSH for a year, and enjoyed working with the children, the decision to go was not difficult.

Arrival in Saigon

The team of four doctors and six nurses arrived in Saigon in August 1966. The four doctors were: Philip Evans, our leader, John Partridge, who had been Resident Assistant Surgeon at GOS, from Barnstaple, Ronald Young our pathologist, and myself. A pathologist was included because there had been a specific request to develop some micro methods for blood tests for children. Five of the nurses, who were all very experienced, had worked as sisters at GOS. We were looked after by the British Embassy, who had found a house for each of the doctors, and a large house for the nurses to live together. The embassy had kindly brought out a long wheel based Land Rover to get the nurses to and from the hospital. It had been designed for the English winter, and

my very first task was to improve the ventilation by taking out the glass in the rear windows, and then fitting two doors to make it child proof!

Nhi Dong

At Nhi Dong we found, a modern concrete building, overcrowded, in a poor state of repair (Figure 1). The Vietnamese hospital doctors and nurses were very unsure of what to do with us, but after a few days we were allocated an office where we could put things, and began to find our way around. My next task was to get one of the loos working which could be reserved for our sisters. I recall a certain sense of achievement having found a new ball cock ! Some of the wards were very grim and in need of a lick of paint, so we set to and improved some of the wards considerably, and were asked to improve others ! We were then given a few clinical tasks, and had the problems of getting started in a strange environment. The doctors had all been trained by the French, the notes were in French, but the children and their parents spoke only Vietnamese. I recall going to French evening classes for two hours, five nights a week, to improve mine. We were allocated two operating days a week, and some surgical beds. We volunteered to do some emergency cover, to avoid the children having to be transferred to an adult hospital, but there was a curfew, so night time work was difficult. The operating theatres were designed for air-conditioning, which did not work. The theatre superintendent, a local male nurse, did not relish the longer working hours that we created, but other theatre nurses were very helpful and friendly. There were two locally trained nurse anaesthetists who were fairly competent but were bullied by the local surgeons. The equipment was pretty basic with two old Boyle's machines (Figure 2). The oxygen was piped, but very dependant on the man outside to change the large cylinder when it needed changing, and there were no alarms. There was no nitrous oxide. There was ether, trilene and I brought some halothane, laryngoscopes, endotracheal tubes etc. The Overseas Development Ministry told me to order and send out everything I would need for the next year, quite a task when I did not know what I would find when I got there. I took advice and went to see John Farman in Cambridge, who had worked in Nigeria and written the book on the EMO, and Tom Boulton who was writing about "Anaesthesia in Difficult Locations" at the time. I recall being advised to take out Brevedil (Suxamethonium bromide) which came in a powder form and did not need refrigeration.

Fig. 1 Bien Vien Nhi Dong (Children's Hospital)

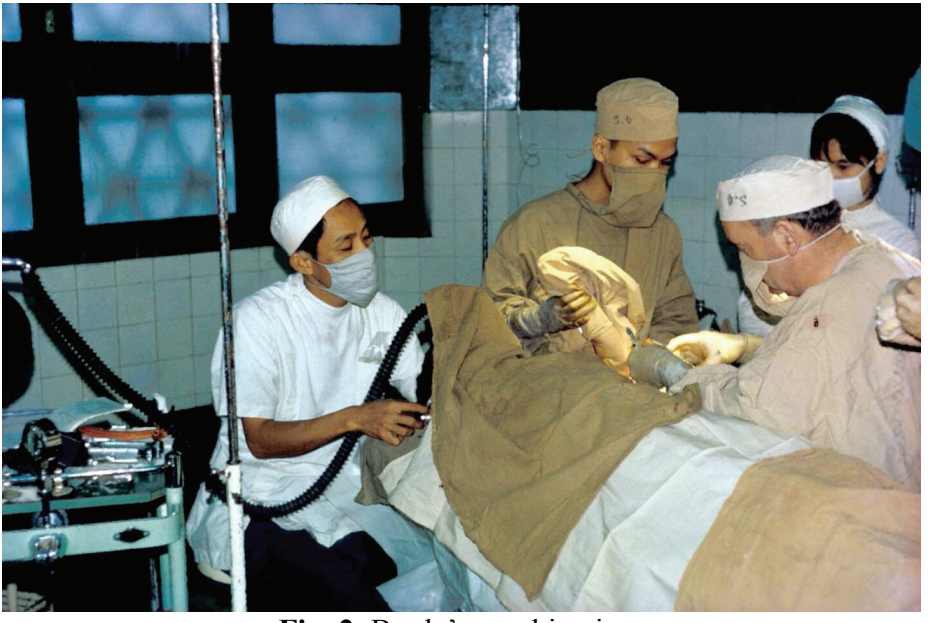

Fig. 2 Boyle's machine in use

Clinical work

We found the surgery was very varied, with trauma, abscesses, and congenital abnormalities, hare lip and cleft palate. John Partridge had been well trained in paediatric surgery and would tackle anything slowly and cautiously, and we saw some very sick children with typhoid perforations, and had to tackle some difficult lips and palates in older children. I also worked with the Vietnamese surgeons, Professor Tran Ngoc Nihn, known as 'Big Ninh', who was a French trained surgeon, and had recently been Minister of Education. He was a competent and ambitious surgeon, and announced soon after I had arrived that he had some interesting cases of children with fixed temporo-mandibular joints. Fortunately I had been trained by Dr James Smith in Plymouth, who made sure we were all skilled in blind nasal intubation.

We did see children injured by the war, but not as many as we had expected; we saw some burns, but very few were from napalm. Visiting journalists tended not to believe us when we told them this. Apart from the Embassy, we were the British presence in Saigon, and we had many visitors, from Vietnamese politicians, British MP's, journalists and other foreign health workers. I recall one American physician saying he had never seen a case of tetanus, and quietly opening the door, and saying "you have now seen six."

Much of the time, the two local nurse anaesthetists did not need supervision, and I found myself working on the wards as a registrar to Philip Evans. Betty Partridge, John's wife was a trained paediatrician, and we set up a 1 in 3 rota for the wards. Here we encountered the infectious diseases, diarrhoea and dehydration, malnutrition and tetanus. We had antibiotics, but IV fluids were in short supply, and we needed 1/5 N Saline (Dextrose saline) and ½ N Saline with Dextrose. This involved a trip to Hong Kong, and the fluids were delivered to Saigon, courtesy of the RAF. Obtaining blood from the local people was difficult, but we were able to get some blood from the US military hospital, which had come from the States.

The children were cared for at the bedside by their relatives, often the grandmother, who would spend hours or days by the cot, and it was they who did all the feeding, washing and changing. The nurses did the technical tasks, the medication and all the IV lines. It was not easy for our nurses to fit into this pattern, but they did and helped with the nurse training. They became good at the Vietnamese, which being a tonal language is difficult. We encountered French customs in the hospital, and passing the Medicine Chief, Professor Phan

Dihn Tuan on the stairs in the morning required a handshake, a "Bon Jour," and another handshake before one could get on one's way.

Teaching

We had the privilege of teaching medical students of the Saigon Medical School, who came to Nhi Dong for their paediatric time; they were very keen to learn, and clustered around our team leader, who was an excellent teacher. After a while I met with Vietnamese physician anaesthetists from other hospitals, who told me of the difficulties of teaching the local nurse anaesthetists, as their teachers had been called up into the army. I was invited to help with the teaching at Cho Ray, an adult hospital in Cholon, the Chinese part of the city. This was a considerable challenge, because of language difficulties. It consisted of teaching sessions during the lunch hour, which extended from 12 noon till 3 p.m. I managed to spend some time with them in the theatres (Figure 3), and at the end of the time was asked to help with the exams which were practical as well as written. At the end of one course, the British Ambassador was invited to present the prizes.

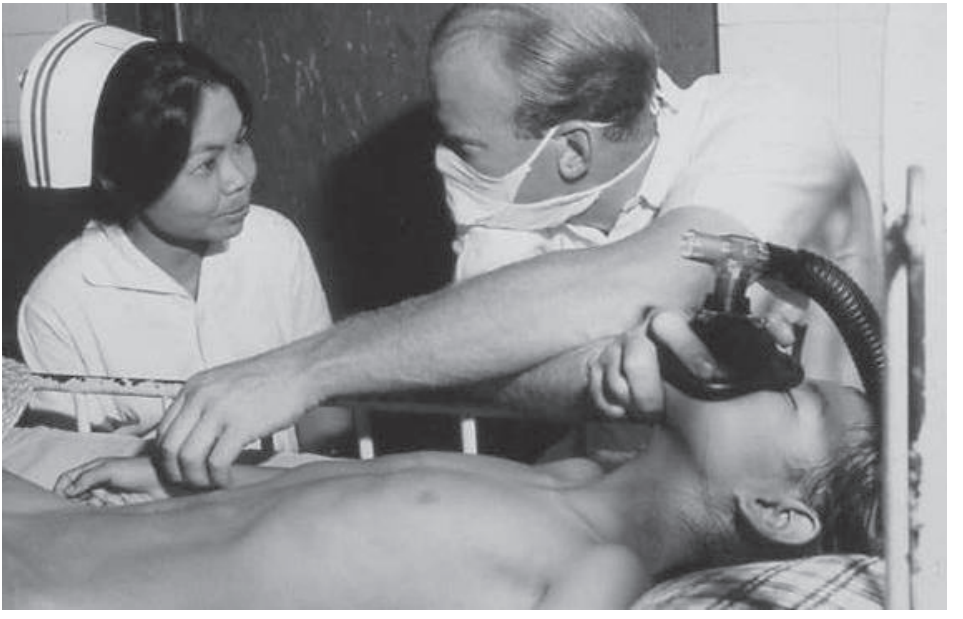

Fig. 3 Teaching in theatre

Travel to other hospitals

The British Government had supplied EMO draw-over apparatus, complete with Oxford Miniature vaporizer (OMV) and Oxford inflating bellows (OIB) in a wooden box, to all the 44 district hospitals in South Vietnam. Some of this equipment had yet to be delivered and gave me an excuse to take it to various hospitals, and demonstrate its use (Figure 4). Because of the security situation and the travel difficulties, this involved being away for a few days each time, but a wonderful opportunity to see the countryside, and to see what others were doing in Vietnam. In Qui Nhon, the UK Save the Children Fund had a team working in a rehabilitation centre, and a New Zealand civilian medical team was working in the district hospital. An Australian medical team was based at Bien Hoa, and I was able to swap jobs for a week, and see how the Australians were working; they were much closer to the action.

Fig. 4 EMO apparatus (with OMV and OIB) in use

Achievements at Nhi Dong

In the first year the British Medical Team had established itself at Nhi Dong, and had maintained good relations with our local hosts, the staff of Nhi Dong. We felt we had contributed to the welfare of the children, and helped with the teaching of young doctors, medical students and nurses. The team members mostly stayed for one year.

Life during the war

In Saigon itself, in spite of a bloody war, life went on, the children went to their schools on their bicycles, the market was always crowded, the young fell in love and got married, and the next generation arrived. But in the countryside a terrible war was being fought, there were 500,000 US and 100,000 Allied troops in the country, with the Americans losing around 300 people a week, and untold numbers of Vietnamese dying on both sides.

Second sojourn in Saigon

After 16 months, I returned to the UK for leave and went back to Saigon to work for USAID(Public Health) as the Free World and Voluntary Agencies Liaison Officer; the position previously held by Tony Brown. This involved supporting the various foreign medical teams. These came from various countries, the Swiss, the Iranians, the Australians having three teams, and the New Zealanders two. The Spanish sent a military medical team and the West Germans sent a hospital ship, manned by the Red Cross. At the time of the Tet offensive in February 1968, all the US offices closed for about a week so I returned to work at Nhi Dong with the British team who were busy, while the fighting was going on around the hospital (Figure 5). I had been replaced by Catherine Ryan (1967), and she was succeeded by David Gray (1969).

Further work of the British Medical Team

The team expanded after the Tet offensive, and completed the five year agreement signed with the Ministry of Health, but it contracted towards the end, as the political situation was deteriorating, ending in 1971. Saigon fell to the communist North in 1975, and was renamed Ho Chi Minh City.

DAILY EXPRESS

BACK BRITAIN BUY BRITISH

No. 21,046 SATURDAY FEBRUARY 3 1968 Weather: Showers, sunny spells; cold Price 4d.

Who are the profiteers?

THIS is a turbulent time in Fleet Street —and the excitement of competition s producing signs of strain.

The Daily Mirror this week launched a ersonal attack on the Circulation Manager f the Daily Sketch. His "offence," pparently, was in writing to newsagents ointing out that the Sketch was still priced d., whereas the Mirror has gone up to 5d.— n increase of 25 per cent.

Why should this letter ve such grave offence to e Daily Mirror? The nswer is, of course, quite mple. That technically cellent newspaper has en caught out in a asty piece of profiteering.

Like erring schoolboys ith their pockets bulg- g with stolen bullseyes— e indignant Mr. Cecil ing and Mr. Hugh ndipp seek to divert flection from themselves

POCKET CARTOON by OSBERT LANCASTER

Saigon: War comes to children's ward

TERROR BLITZ AT HOSPITAL

From STEPHEN HARPER Saigon, Friday

DOCTORS and nurses worked on calmly today when fierce battle swept a children's hospital in Saigon.

The British-run hospital was packed with refugee families and wounded babes.

Bullets zipped and cracked as South Vietnamese troops used the balconies as parapets to exchange fire with the Vietcong on two sides.

PRIDE

Within the staff of five

A South Vietnamese soldier in steel vest, heavy with grenades, stormed into the operating theatre. Dr. Inman pushed him outside.

The soldier said: "Me military police. You got Vietcong in there."

Dr. Inman went back to the 12-year-old boy on the operating table. Dr. Apley said: "He is very close to death. We must save him if we can."

The soldier frowned, and said: "Okay, you tell me when he's dead. We have to kill him anyway."

The British nurses blushed with indignation, tightened their lips, and then carried on.

—From Stephen Harper's despatch.

National lottery plan gets go-ahead

By MAURICE TROWBRIDGE and FRANK ROBSON

CAMPAIGNERS for a national lottery cleared another hurdle yesterday when the Commons approved a Labour back-

Arms ban probe into ships plan

Express Staff Reporter

A PLAN by Britain's biggest shipbuilding group to invest £420,000 in South Africa is being studied by the Foreign Office and the Minister of Defence.

Swan Hunter, the Tyne-based group, want to invest that sum in two repair yards in Cape Town, which could be used by the South African Navy.

Fig. 5 British newspaper report on hospital experience in Saigon, 3rd February 1968

ANAESTHETIC AND OTHER TREATMENTS OF SHELL SHOCK: PART 2 *

Dr A G McKenzie
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Following on from the presentation on treatments for shell shock in World War I, (HAS meeting in Llandrindod Wells, June 2010), this paper continues the story up to the present time.

In 1922 the War Office produced a report on shell shock which had recommendations for prevention of war neurosis. By the time of the Spanish Civil War (1936-39) barbiturates had become available, and phenobarbitone was used as a sedative. When World War II broke out in 1939, the War Office seemed to ignore the 1922 report's recommendations: pre-selection was rejected and recruiting boards were unable or unwilling to distinguish neurosis from malingering. The term 'combat fatigue' was introduced as breakdown rates became alarming, and then the value of pre-selection was recognised.

At the Maudsley Hospital in London (1940) William Sargant advocated barbiturate abreaction for quick relief from severe anxiety and hysteria. He used IV anaesthetics: Somnifaine, paraldehyde, sodium amytal. 'Pentothal narcosis' and 'narco-analysis' were adopted by British and American military psychiatrists. By 1942 in London, Sargant also employed continuous sleep treatment, modified insulin to increase weight, and convulsion treatment. However, by the end of WWII medical thinking gradually settled on the same acute approaches that had seemed effective in WWI. Nevertheless, post-WWII, abreaction sessions continued (under ether or thiopentone) with the psychiatrist acting as both "anaesthetist" and interrogator.

In the Korean War (1950-53) the US Army reintroduced 'forward psychiatry'. Subsequently (1963) the system was given the acronym 'PIE' for "**p**roximity to conflict, **i**mmediacy of treatment, and **e**xpectancy of recovery". This was continued in the Vietnam War.

In 1980 the term 'Post-traumatic Stress Disorder' was introduced – recognised by the WHO in 1993 as a separate diagnostic entity. Current guidelines for treatment include cognitive behavioural therapy (CBT) and some drugs, but NIL anaesthetics.

* Abstract only