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Douglas R. Bacon

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THE HISTORY OF ANAESTHESIA SOCIETY PROCEEDINGS

Volume 56

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BLESSED CHLOROFORM LECTURE

Acknowledgements

I would like to thank all of the authors for their timely and willing participation in the publication of this volume. Their presentations at the meeting were thoughtful and enlightening; their words captured within the pages of this tome reflect scholarship and the joys of historical research which leads to new insights and discoveries.

I would like to thank Drs. Peter Featherstone and Adrian Kuipers for having faith in me to do this job. Likewise, I owe a debt of gratitude to the Council of the History of Anaesthesia Society for allowing me this incredible honour. I would like to thank Dr. Ken MacLeod for his patience and assistance in making this volume a reality.

No volume is complete without a fantastic proofreader. Dr. John Pring not only filled that role with grace and aplomb, but he courteously answered my many questions as the first time editor.

HAS 2024 Scientific Programme

Wednesday 25th September

(Speakers denoted by asterisk *)

0830 - 0855 Registration

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1100 - 1240 Session 2: Chair: Dr. Peter Featherstone

1100 - 1125 The story of anaesthesia in ancient Greek mythology: More than a senseless odyssey
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1125 - 1150 Roots of sedation: The role of Mandrake in the history of anaesthesia
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1150 - 1215 The emergence of anaesthesia from the battlefield: How war shaped the history of anaesthetic practice
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1340 -1405 Arthur Ernest Sansom 1839-1907:A truant from anaesthesia
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David Wilkinson*

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1500 -1525 Carl Koller and Sigmund Freud: Friends who fell out
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1525 -1550 Machinations of the Nuffield Professorships of Anaesthetics Oxford and Sydney
Barry Baker*

1550 -1615 Blood transfusion, World War I (1914-1918), and innovation in medicine – a historical reappraisal (Part I)
Wulf Stratling*

1615 - 1640 TEA / COFFEE

1640 - 1740 ANNUAL GENERAL MEETING

1900. PRESIDENT'S RECEPTION

1930. CONFERENCE DINNER

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0900 - 0925 The importance of the Anaesthetists' Travel Club to American Anaesthesiology
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0925 - 0950 Blood transfusion, World War I (1914-1918),and innovation in medicine - a historical reappraisal (Part II)
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0950 - IO15 Epidural injections at the patients' home for acute lumbago/sciatica Fabrizio Casale*

1015- 1040 ISHA 2025
Dominique Simon*

1040- 1110. TEA/ COFFEE

11 15 -1215 Session 6: Chair: President. Dr Adrian Kuipers
(Accompanying Persons and members of
John Snow Society welcome)

BLESSED CHLOROFORM LECTURE

Anaesthetic practice in Scotland compared to England in the Victorian and Edwardian eras
Alistair McKenzie*

1215-1225 Close of Meeting
Adrian Kuipers*

HAS ANNUAL MEETING, 25th - 26th June 2025, Portsmouth, UK

The conference is being held in the prestigious National Museum of the Royal Navy, Portsmouth Historic Dockyard.
The Conference Dinner, on 25th June, will be held in the Royal Maritime Hotel.

Mayo Clinic Department of Anaesthesiology Centennial meeting - joint with Anaesthesia History Association: Thursday 24th - Sunday 27th April 2025 Rochester Mariott Hotel

International Symposium on the History of Anaesthesia: September 2025 Paris France

Website: https://isha2025.com/Welcome.html?lang=en

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David Zuck Memorial Prize 2024

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The Zuck Prize goes to:
Wulf M. Stratling for his paper entitled The Clinical introduction of the Roth-Dräger Anesthesia Apparatus to the United States (c. 1903-1907) and Early Interactions with James Tayloe Gwathmey and Richard von Foregger published in the Proceedings of the 10th International Symposium on the History of Anesthesia.

Don Bethune

Colin Burt

List of Delegates

Neil Adams

Douglas Bacon

Chris Ball

Barry Baker

Jane Baker

Moyna Barton

Liz Bradshaw

Elliot Brown

Fabrizio Casale

Henry Connor

James Dawson

Alan Dronsfield

Roger Eastley

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Saoirse Gibson

Paul Goulden

Jacques Hotton

Danielle Huckle

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Christopher Pickles

Janet Pickles

John Pring

Peter Reid

Maria Rollin

Deborah Roy

Bindiya Shah

Dominique Simon

Ian Smith

Luke Solomi

Wulf Stratling

Marten van Wijhe

Clare Watkinson

Tony Wildsmith

Trish Willis

David Wilkinson

Chris Woollam

Citation for Honorary Membership of the History of Anaesthesia Society: Dr Adrian Kuipers

I am delighted to give this citation for Dr Adrian Kuipers to become an Honorary Member of the History of Anaesthesia Society.

I first met Adrian at one of our meetings more than 20 years ago and, like many others who've met him, was impressed by his jovial personality and interesting background. With a name like Kuipers it comes as no surprise to learn that Adrian was born in .....Woking, (UK) , which was remarkably fortunate as his mother also happened to be there at the time! His parents normally lived in Holland, his mother being Dutch and his father having dual nationality - British and Dutch - but during the war they fled to the UK where his father worked for MI6 and later the SOE and returned to the Netherlands after the war. It was there that Adrian was educated, achieving the equivalent of the modern Baccalaureate.

At the age of 19 he set off to Birmingham to study medicine. He did his house jobs in the Isle of Man, and was then encouraged to do 6 months of anaesthetics as "it's always useful" and continued for a year. He was on-call the night of the fire at the Summerland leisure centre in Douglas which killed 50 people and seriously injured a further 80. Adrian was advised to apply for the Birmingham registrar rotation scheme and in due course was called upon to anaesthetise some of the victims of the 1974 Birmingham Pub Bombings.

In 1976 Adrian passed the Final Fellowship exam (those were the days when it was a proper, difficult exam, with most of the vivas still in Latin!) and was a senior registrar in Birmingham before working as a Specialist Anaesthetist in the Flying Doctor Base Hospital at Broken Hill in outback New South Wales, which he described as one of the hardest jobs he'd ever done, and before moving on to a year at Prince Henry's Hospital in Melbourne

In 1981 Adrian was appointed to the Royal Shrewsbury Hospital and the Robert Jones and Agnes Hunt Hospital in Oswestry, during which time he served as Chairman of the Senior Medical Staff Committee, was invited to join the Hickman Travelling Club (duly becoming Honorary Secretary and then President), and organised home and away meetings with Professor Knape in Utrecht.

He was Honorary Secretary and Treasurer of the Midland Society of Anaesthetists for many years and organised annual meetings at Shrewsbury and in Birmingham.

Playing golf to a handicap of 6 and representing Shropshire at tennis are just two of the many things Adrian has never done but at the age of 62 he took up flying and still has a pilot's license, flying in a two-seater kit plane which he built himself, albeit as he admits "with a lot of help". He is truly our very own "De fliegende Hollander" - the Flying Dutchman - and as far as I know Adrian is the only HAS member to have had an opera named after him. Richard Wagner must have been clairvoyant!

Adrian joined the History of Anaesthesia Society when he retired as he had some spare time then. He has not only presented papers - at Dundee on "The last death from a static anaesthetic explosion in Great Britain?" and on "Fireside Bellows for Resuscitation" at the meeting in Cirencester - but has also utilised his penchant, indeed flair, for organising meetings: Ludlow in 2003, Llandrindod Wells in 2010, and was co-organiser for the meetings at Shrewsbury in 2021 and Llandudno in 2023. He has served as a member of Council, as the Society's Membership Secretary and Treasurer, and of course is currently the Society's President.

Adrian can proudly say that he has "done his bit" for the Society, and on that note it is my great pleasure to recommend Adrian Kuipers for Honorary Membership of the Society.

Citation presented by Dr. John Pring

Citation for Honorary Membership of the History of Anaesthesia Society: Dr Ann Ferguson

Since Ann Ferguson joined the History of Anaesthesia Society in1993, she has been a regular, indeed almost a permanent fixture at our Annual Meetings.

She was elected to Council in 2006 and was appointed as Assistant Secretary from 2007 to 2008. Her responsibility was to take the minutes of the Council Meetings and the AGM. This was a more difficult task than you could imagine, for previous occupants had found that not even perfect punctation, spelling and grammar was satisfactory. You had to be able translate the nuances of voice, the silences and the raised eyebrows. into black and white print in a tactful and subtle way. The post was abandoned after Ann’s tenure because there was no one able to fill her expert shoes.

She became the Society’s Honorary Secretary from 2017 to 2022. She cast a new eye on the organization of the Society and the rhythm of which and when tasks needed to done throughout the year. This enabled her to marshal the agenda and attention of the various Presidents under whom she served. I might add, it also has made her successor’s job infinitely easier.

The hard work she has put to running the Society, and the institutional knowledge which she has acquired are more than enough to warrant Honorary Membership. But there is more, much more than that.

She has presented ten papers to the Society, many of which have been on the therapeutic or poisoning properties of curare. We are not the only beneficiaries of her knowledge, for she has lecture widely elsewhere - The Royal Society of Medicine, the Royal Society of Chemistry, the British Society for the History of Medicine, The Hunterian Society, the Association of Anaesthetists, and the Society of Apothecaries. I have forgotten to mention that she holds the Diploma in the History of Medicine of The Society of Apothecaries. Her reputation as an expert in medicinal poisoning has grown, but in doing so she has also enhanced the profile of our Society.

Another reason why she deserves Honorary Membership. But there is still more.

Her expertise spread beyond the bounds of doctors, pharmacologists and so on and attracted the attention of the Crime Writers Association. She was invited to the Judging Panel for their Golden Dagger award for the best crime novel of the year.

If I may digress; During the First World War Agatha Christie trained as a Pharmacy Assistant. Her supervising Pharmacist was a strange man who kept a ball of a brown substance in his jacket pocket. He delighted in telling his student frequently that it was curare; “enough to kill the whole of the town in thirty seconds”.

Ann’s personal qualities match those of Agatha Christie’s heroine: She sees everything, remembers everything, and, when necessary, can quietly and subtly redirect the bumbling Officers to the right direction. These are the ideal qualities of an active Honorary Member. Every Society needs a Miss Marple. Think of Ann as ours.

It is my pleasure and honour to present Ann to you as our new Honorary Member.

Kenneth MacLeod

Citation for Honorary Membership of the History of Anaesthesia Society: Dr Peter Featherstone

Peter James Featherstone was born in 1980. He qualified in medicine at the University of Wales and then commenced speciality training in the East of England, in anaesthesia and later Intensive Care. He undertook advanced training Fellowships in both specialties in Melbourne before being appointed consultant in ICM and anaesthesia to Cambridge University Hospitals NHS Foundation Trust in 2015. Here he has an interest in the development and expansion of intensive care services, research and teaching. He is well recognized as an excellent clinician.

Peter has a specific interest in the history of anaesthesia, critical care and pain medicine.

He has written and presented many papers for which he has been awarded many prizes and he is much sought after as an international speaker. He is particularly well known for his ability to collaborate in writing articles with others, while never missing a deadline. He has been a reviewer for the *Journal of Anesthesia History,* and *Anesthesia and Intensive Care.* He was an editor of the *Journal of Anesthesia History*, now unfortunately discontinued.

However, it is for his outstanding services to this society that I am proposing him for Honorary Membership. He has been a council member, has attended our meetings and presented many interesting papers as regularly as his clinical commitments would allow.

For over a decade he was our webmaster, a job he did very quietly but very efficiently, all requests were dealt with immediately. He is highly regarded both nationally and internationally for many reasons, but not least for his work on this website which is regularly consulted by his peers throughout the world. It has been regarded as much superior to many official websites for up-to-date information especially on events, both national and international.

I therefore would like to present Peter Featherstone for Honorary Membership of our society.

Ann Ferguson

Blood gas analysis- from laboratory to bedside

Dr Christine M Ball.

Anaesthesiologist, Alfred Hospital, Melbourne.

Adjunct Clinical Associate Professor, Monash University.

In 1670, Robert Hooke and Robert Boyle used a vacuum pump to extract air from blood, demonstrating for the first time that such a thing was possible. Almost two hundred years later, the development of the mercury pump in 1858 allowed the first accurate, reliable methods for extracting gases from blood.
Refinements in this technology over the next fifty years provided invaluable information to those seeking a greater understanding of respiratory physiology. Coincidentally, at the same time, physicians were beginning to embrace the use of therapeutic oxygen and seeking answers to many clinical questions.

In the early years of the twentieth century, blood gas analysis became more accessible as practical equipment was developed for use by clinicians. However, the tests remained time consuming and there were limited clinical interventions available if wildly disordered blood gases were obtained.

It was not until the polio epidemic of the 1950s that blood gas analysis began to be a really useful tool in the clinician's armamentarium. Many patients required prolonged ventilation during their illness and blood gas analysis provided invaluable information to the treating teams.

Since then, advances in technology have made blood gas analysis a vital resource in the treatment of patients in all areas of the hospital. Throughout the history of blood gas analysis, technology has provided information that has not only benefited individual patients but also informed the knowledge of pathophysiology. This paper will explore the historical development of blood gas technology, its role in improving the knowledge of pathological processes and its integration into clinical medicine.

Cradles and incubators for premature infants (abstract)

Dr Peter J Featherstone

Consultant in Intensive Care Medicine and Anaesthetics, Cambridge University Hospitals NHS Foundation Trust.

In 1857, the birth of an infant ‘around the sixth month of foetal life’ forced Jean-Louis-Paul Denucé, Assistant Professor of Clinical Surgery at the Bordeaux School of Medicine to address two key problems: how to feed the baby, and how to maintain its temperature. Eschewing existing methods of warming, Denucé had an ‘incubating cradle’ constructed from zinc. This possessed a double bottom and double walls, which could be filled with hot water. Drawing off 0.5L of water every 6 hours and replacing it with an equal volume of boiling water, Denucé succeeded in preserving the infant’s life for 17 days ‘without it been possible to observe…the slightest cooling in body temperature.’ Sadly however, his attempts to provide nourishment proved less successful, and ‘from the eighth day weight loss began and continued until the end.’ [1]

It later transpired that a similar double-walled incubator had been introduced at the Imperial Foundling Hospital in St Petersburg in 1835, under the direction of the physician Johann-Georg von Ruehl, and by the mid-1850s, more than 40 of these devices were in service in Moscow. [2] The following decade in Leipzig, Carl Credé began using a copper wärmwanne (warming tub) for infants with a birth weight <2500g. [3]

Two novel incubators emerged during the early 1880s. In Dresden, Franz Winckel proposed the ‘permanent bath’, in which babies born between 28-36 weeks of gestation were immersed ‘up to the chin’ in warm water. [4] Meanwhile in Paris, Stéphane Tarnier conceived the idea for his ‘couveuse’ following a visit to the poultry incubators at the Jardin Zoologique d’Acclimatation. [5] Constructed by Odile Martin, and put into regular use at the Maternité Port Royal in 1881, the Tarnier-Martin couveuse comprised an insulated wooden box separated into two compartments. The lower of these contained a 71L hot water tank fed from an external boiler, known as a ‘thermosiphon’. Air entering through small apertures in the base of the incubator was thus warmed, before rising by convection into the upper compartment, which was large enough to hold two infants. [6]

During the early 1890s in Nice, Alexandre Lion founded the Œuvre Maternelle des Couveuses d'Enfants (Maternal Charity of Infant Incubators). Utilising a thermostatically-controlled metal and glass incubator of his own design, Lion's philanthropic organisation provided free care for premature babies. More than 25 'institutes' were established in France, and other European cities. [7] The most famous of these was located on the Boulevard Poissonière in Paris, where, for 50 centimes, members of the public could marvel at the incubators, neonates, and nurses. [8] In 1896 a display of live infants in Lion incubators aroused 'lively interest' among attendees of the Great Industrial Exposition of Berlin, and several entrepreneurs subsequently set up their own 'incubator-baby side-shows'. [9]

While a handful of new incubators emerged during the early 1900s, [10,11] many doctors became increasingly concerned that their closed design prevented the delivery of 'sufficient fresh air to the infant', and abandoned their use entirely. [12] Indeed, by 1916 in the United States, the devices were deemed 'passé, except at county fairs and side-shows.' [13]

In response, Julius Hess developed the electrically heated water-jacketed infant incubator and bed, which allowed currents of room air to circulate freely around the baby. [14] Just over a decade later, Hess created an oxygen unit which replaced the cover and canopy supplied with the bed, and as evidence emerged that high concentrations of oxygen ameliorated the respiratory embarrassment, cyanosis and asphyxia associated with prematurity, more elaborate incubators, which facilitated the prolonged administration of high concentrations of the gas were developed. [15,16] By the early 1950s, the delivery of >50% oxygen for 28 days had become standard practice in the management of neonates under 1500g in America. [17]

Concomitantly however, there was a growing awareness that intensive oxygen therapy might be the cause of retrolental fibroplasia, a condition which had been first recognized in premature infants in 1942, and quickly became the leading cause of blindness in children. The link between the two was finally proven in a cooperative study undertaken in 18 US hospitals between 1953 and 1954. As a result, those caring for premature infants rapidly altered their practice, administering oxygen only at times of clinical need, and in concentrations <40%. The incidence of retrolental fibroplasia reduced dramatically. [15,17]

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August Krogh, Christian Bohr, and the oxygen secretion controversy

***Deborah A Roy, RN MBA* and *Tuhin K Roy, MD PhD*[1]**

[1]Department of Anesthesiology and Perioperative Medicine
Mayo Clinic College of Medicine and Science

Since the discovery of oxygen by Joseph Priestly (1733-1804) in 1774, its role in cellular respiration has been a subject of great interest. The idea that oxygen diffuses passively across the alveolar-capillary membrane to oxygenate blood in the pulmonary capillaries in mammals is well accepted today, but was not so obvious as late as the early 20th century. Measurements made at the time seemed to suggest that the oxygen tension in the arterial blood could exceed that in the alveoli, leading to the hypothesis of an active transport mechanism within the lung to explain these data.

One of the biggest proponents of the oxygen secretion theory was J.S. Haldane (1860-1936), a prominent British physiologist who organized an expedition to conduct a series of experiments at altitude and in low pressure chambers to prove the existence of oxygen secretion, and concluded that oxygen secretion played a role in conditions of physiological stress, such as in exercise or when breathing hypoxic mixtures. Christian Bohr (1855-1911), a Danish physiologist, also felt that oxygen secretion was an important transport mechanism and developed an experimental technique involving the equilibration of arterial blood with a gas sample to help resolve this issue.

A student of Bohr, August Krogh (1874-1949), suspected that erroneous measurements were to blame for this hypothesis and set about improving the experimental apparatus used to make oxygen tension determinations. He worked with his wife, Marie Krogh (1874-1943), a fellow physiologist who had made some of the first determinations of oxygen diffusing capacity in the lung under various conditions.

Krogh was cautious and diplomatic, but determined to definitively resolve this issue. In rapid succession, August Krogh published a series of seven papers (some with his wife Marie) in 1910 containing sufficient evidence to lay the oxygen secretion theory to rest. Nevertheless, proponents of the oxygen secretion theory persisted, and a chapter appeared in a textbook by J.S. Haldane and his collaborator J.G. Priestley (1879-1941) as late as 1935 espousing active transport of oxygen by the lung.

Krogh received the Nobel Prize in Physiology or Medicine in 1919 for his work on the role of capillaries in the systemic circulation.

The oxygen secretion controversy exemplifies the difficulties inherent in formulating and confirming hypotheses based on data from still-evolving scientific instrumentation as well as the perils of extrapolating mechanisms from comparative physiology. Ultimately, it was not only the improved measurements but also the scientific insight of those involved that finally established diffusion as the sole source of oxygen transport across the alveolar-capillary membrane.

The story of anaesthesia in ancient Greek mythology: More than a senseless odyssey

Luke A. Solomi
University Hospitals Plymouth NHS Trust

Anaesthesia is a profession rooted in antiquity. The word itself is of Greek origin, first used in a pharmacological context by Greek physician and herbalist Dioscorides who described the hypnotic effects of mandrake, a root containing anti-cholinergic alkaloids said to render a patient “overcome with dead sleep” to allow a surgeon to “cut or cauterise.” Inextricable from Greek mythology, the mandragoras plant belongs to a genus whose original Linnaean designation Atropa drew inspiration from the eldest of the thread-weaving Fates of ancient Greek mythology, Atropos, whose role was to cut the thread of life.
The founders of modern medicine, the ancient Greeks used art and literature to understand and communicate complex phenomena in the observed world. Through art, analogy and allegory, mythology provided the perception of familiarity and predictability. This phenomenon is not dissimilar from a graphical representation of the Frank-Starling curve found in textbooks – it transforms a concept from the abstract into the understood and explicable. Thus, seemingly abstract mythological concepts to some degree reflect observed phenomena at the time. This paper outlines and analyses legends relating to sleep, hypnosis, unconsciousness, and death, exploring the history of anaesthesia through mythos.
Sleep is a powerful concept featuring in Greek mythology. Hypnos, the Greek personification of sleep, was considered so almighty that no mortal nor deity was exempt from his influence. Anaesthetics offers a modern correlate with this ancient wisdom, as all living organisms demonstrate susceptibility to anaesthesia. The ancient Greeks held a deep superstition surrounding sleep and unconsciousness, evidenced by the genealogical continuum of night, sleep, dreams and death. Hypnos and his twin brother Thanatos (Death) are frequently depicted together, highlighting their close relation. Also implied by multiple tales in Greek mythology is the distinction between physiological and drug-induced sleep, the latter of which is frequently associated with wrath, amnesia, and oblivion. There are numerous other legends and myths with modern anaesthetic correlates, such as the tales of Endymion and of Jason and the Argonauts. These stories highlight the power and responsibility given to those with the ability to induce hypnosis.

Roots of Sedation: The Role of Mandrake in the History of Anaesthesia

Dr Jon Emberey

The common mandrake, or mandragora officinarum, is a stemless perennial herb of the Solanaceae (nightshade) family [1], a group which includes plants such as potatoes, tomatoes and aubergines. From antiquity, up until the 19th century, various preparations have been used within medical practice for a broad range of applications, notably to provide both analgesia and anaesthesia [1-4].

The word mandragora has its origin in Sanskrit: mandros meaning sleep and agora meaning substance [3]. It is also known as atropa mandragora, a name which takes inspiration from Atropos, the eldest of the fates in Greek mythology, who was said to cut the thread of life [3]. In Ancient Greece it was also known as Circeium, a name derived from the sorceress Circe, famed for her knowledge of herbs and venomous plants, who turned Odysseus and his men into swine [3].

It is a perennial herb, native to the Mediterranean basin, southern Europe, and the middle east [1,3], a distribution which overlays many of the most important cultural centers of the ancient world; Rome, Greece, Iraq and Mesopotamia. From this, it is easy to see why its use was commonplace throughout these societies.

The mandrake’s significance is evident in ancient carvings found in the tombs of Egypt [1] and on cuneiform tablets dating to 2000 BCE [2]. However, one of the first documented uses of mandrake as a soporific agent appears not in botanical or medical texts, but in military history. Hannibal, feigning retreat, left a feast with wine drugged with mandrake root. As his enemies slept, he returned to ambush them [1]. This tactic was similarly employed years later by Julius Caesar.

When considering the description and pharmacological use of mandrake it is important to consider the plant as two separate parts with distinct uses. Above ground, the mandrake has a short stem, wrinkled leaves, clustered bell shape flowers and a berry-like orange fruit [1]. Below ground, the subterranean root is forked, gnarled and resembling a pair of human legs [1]. It is this that led Pythagoras to call the mandragora “anthropomorphic” [4].

In Ancient Greece, Theophrastus (370-285 BCE), a student of Plato, worked to classify and evaluate single plant remedies [3]. He described the use of mandrake root to induce sleepiness [2,3], and the use of the leaves (steeped in vinegar) as a remedy for both erysipelas and gout. However, it was not until the herbalist and physician Dioscorides (40-90 CE) that mandrake was formally described and used to provide anaesthesia. Knowledge of mandrake was said to have been given to Dioscorides by the goddess of discovery Heuresis [1], as it was “divinely inspired” [3].

In his text, De Materia Medica, Dioscorides described the harvest and preparation of mandrake root [1-4] to be used when intending to “cut, or cauterise” as they “do not apprehend the pain, because they are overborn with dead sleep” [3]. When the root is fresh, its bark should be stripped, chopped and pressed to extract the juice. Water should then be evaporated so that the juice becomes condensed, and this extract stored in clay jars until needed for use: “some persons boil down the roots in wine to a third, strain it, and put it away.” [4] Dioscorides commented on the dose-dependent nature of this preparation stating: “administering one cyathus to insomniacs, those in much pain, and those undergoing surgery… whom they wish to anaesthetise.” [2]

In Rome, Pliny the Elder (23-79 CE) wrote in his Historia Naturalis that mandrake wine should be given to patients “before incisions and punctures to remove sensation” [1] in a quantity proportional to the “health” of the patient [2], with a single cyathus (cup) being a moderate dose for anaesthesia [2]. In both of these societies, mandrake was treated as a medicinal rather than a magical plant [4].

After the works of Pliny and Dioscorides, little mention of mandrake was made until the work of Macer Floridus in De Viribus Herbarum, which again describes the use of mandrake if “anyone is to have a member amputated… or sawed, let him drink an ounce and a half in wine… he will sleep… without either pain or sensation.” [4]

Following the conquest of Alexandria by the Saracens in 640 CE, many Greek and Roman texts were translated and spread throughout the East [1]. This knowledge provided the inspiration for Avicenna, or Ibn Sina, (980-1037 CE) to create the Spongia Somnifera. A new sea sponge

would be soaked in opium, henbane, hog beans, lettuce seed, juice of hemlock, poppy and mandrake and then left in the sun for the water to evaporate. When required, this could be rehydrated and placed over a patient's nostrils to induce sleep: “It is desirable to procure a deeply unconscious state, so as to be able for the pain to be borne.” [1]

From the 11th to the 15th century Europe emerged from the dark ages, with learning enhanced by the Arabs and their interpretations of Greek and Roman medicinal texts. When the first medical school in Europe was founded in Salerno in the 11th century, a version of Avicenna’s Spongia Somnifera was described in Nicholas of Salerno’s Bamberg Antidotarium for use “when you want to saw or cut a man”. [1]

So why did the use of mandrake in anaesthesia decline? It is very likely this was due to its strong association with the occult. Various superstitions surrounding its harvest had existed since ancient times. Most common amongst these was to tie the root to the tail of a dog, whereby upon pulling the mandrake from the ground and hearing its scream, the dog would drop dead [1,3]. Theophrastus described the process of tracing a circle around the mandrake three times with a sword and cutting the root only when facing west [3,4], whereas Pliny advised keeping windward to avoid the foul stench of the uprooted plant. Many of these superstitions were passed on to mandrake from other plants for example three circles would be traced around xiris, and hellebore should only be cut whilst facing east [4].

Mandrake was believed to bring luck [3], used in brewing love potions [2] and a principal ingredient in the infamous Witches’ brew [3]. It was even believed to grow at the foot of the gallows of a man unjustly hung for theft [4]. It is likely that many of these myths associated with mandrake were embellished by swindlers to enhance the value of the plant. Following the mid 16th century little mention was made of mandrake in medical texts, likely due to a political climate that forbade dabbling with the occult [1]. As such, the Spongia Somnifera became a sideshow attraction used by showmen and magicians, and did not return to medical scrutiny until the abstract of Dauriol in the Lancet of 1847. The Swiss physician Paracelsus (1493-1541) explored the pharmacological value of these occult beliefs and concluded: [3]

”Not all things the physician must know are taught in the academies. Now and then he must turn to old women, to tartars who are called gypsies, to itinerant magicians, to elderly country folk and many others who are frequently held in contempt.”

The ethers have been used for the past 1.5 centuries, however the use of mandrake has far exceeded this timeframe. In the modern era, many attempts to experiment with mandrake have been recorded. Dr John Snow acknowledged that mandrake may cause “unconsciousness after intoxication” [3] and Sir Benjamin Ward Richardson (1826 - 1897), famous for editing Dr John Snow’s On Chloroform and Other Anaesthetics, tried to recreate the recipes of Dioscorides for use on pigeons, rabbits and even himself [3]. Although he noted a lack of efficacy if prepared with strong alcohol, he appreciated the ability of mandrake preparations to produce narcosis, pupillary dilatation, sleep and paralysis if too potent a dose used.

Mandrake contains tropane alkaloids such as hyoscyamine, scopolamine, atropine and mandragorine [2]. These muscarinic antagonists give mandrake its sedative effects as well as the ability to produce vivid hallucinations and delirium [2]. With modern pharmacological and physiological interpretations, it is possible to understand why mandrake has been used across the ages and the mythical status it gained among ancient physicians. To end with a quote, in his 1946 book, Victory Over Pain, physician and medical journalist Victor Robinson wrote: [1]

“In the vast brotherhood of pain, there is neither East nor West: with opium and mandrake and hashish and henbane, the Oriental healer like his Occidental colleague, sought to bring to his operative patients the balm of merciful sleep.”

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The emergence of anaesthesia from the battlefield: How war shaped the history of anaesthetic practice

Dr Bindiya Shah
Core Anaesthetic Trainee

War inflicts unique stressors and previously unencountered problems on humans leading to rapid innovation in medicine. This essay aims to explore how the western wars of the nineteenth century enabled widespread acceptance of anaesthetic practice as well as looking at how the World Wars played a role in shaping the hallmarks of anaesthesia: anaesthetists, anaesthetic machines, and vital signs monitoring.
After its discovery, the need for anaesthesia to facilitate surgical intervention was clear but its use was hindered by scepticism. Mass casualty in the Mexican and Crimean wars of the nineteenth century necessitated large numbers of surgical interventions in a short space of time, thus expanding opportunities to change public perception of anaesthesia [1,2]. The expansion of anaesthetic practise continued into the American Civil War resulting in widespread acceptance of the specialty [3].
During the First World War, the impetus for developing anaesthetic machines arose from a problem of physiology regularly encountered on the battlefield – shock. Sir Geoffrey Marshall observed patterns in the physiology of shocked patients in response to different anaesthetic agents. Concluding that an inhaled mixture of oxygen and anaesthetic vapour was required, he went on to develop a specialised anaesthetic machine to aid delivery which would form the basis of modern machines used in the World Wars and beyond [4]. Marshall’s research also cemented the fact that safe anaesthetic delivery required a unique understanding of physiology, pharmacology and physical principles of specialist equipment. This established the role of the anaesthetist as a distinct specialist.
Governmental appreciation of anaesthesia during the World Wars led to substantial investment in the field, allowing the formation of medical equipment manufacturing companies, some of whom remain major developers in the anaesthetic field to this day [5].
The advent of industrialisation and the World Wars took soldiers from aerial warfare to deep sea submarines. Uncharted environments strained human physiology in new ways and early recognition of the resultant pathological changes through vital signs monitoring was now urgently needed. Military pilots exposed to fatal hypoxic environments lead to the development of the first ‘oximeter’ [6,7]. Infrared technology developed for anti-aircraft

defence thermal cameras formed the basis of infrared tympanic thermometers [8]. Submarine environmental hazards necessitated continuous gas analysis, particularly in the form of capnometers. The technology designed for this purpose formed the basis of end tidal capnometers. These were then used in the development of closed anaesthetic breathing circuits with soda lime absorption [9,10]. Yet more examples of vital anaesthetic equipment with wartime origins.
The unique and distinct obstacles of war have steered the path of progression in anaesthesia and without our own infliction of mortality and morbidity on the battlefield, some of the fundamental aspects to anaesthesia may not exist today.

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The legacy of twilight sleep in obstetric anaesthesia

Dr. Elliot Brown CT3

Twilight sleep or ‘Dammerschlaf’ was an obstetric anaesthetic technique first described in 1906 by Dr. Bernhard Krönig and Dr. Carl Gauss in Frieberg, Germany. Morphine and scopolamine (hyoscine) were given via injection in the early stages of labour [1]. Subsequent doses of scopolamine were titrated to the desired effect, characterised by a lack of response to voice and uncoordinated movements. Twilight sleep provided amnesia and not necessarily analgesia. Due to the delirium induced by the anticholinergic effect of scopolamine, women were often restrained in specially designed ‘labour cots’ to reduce audio-visual stimulation and prevent harm from violent movements [2]. Accounts of patients under the influence of these medications varies from ‘being very sleepy but otherwise quite normal’ to ‘screaming in pain during contractions, thrashing about’ [3,4]. Positive patient accounts relate having an injection in early labour then being presented with their baby with no recollection of events [5].

Demand for twilight sleep gained significant traction, particularly in the United States, after an article published in McClure’s magazine by two lay women in 1914 [6]. Initial reticence by the medical establishment stoked widespread anger amongst first wave feminists, many of whom were associated with the suffragist movement. The newly established Twilight Sleep Association advocated for widened access to this technique [7]. J Leavitt comments on the counterproductive nature of this movement, ultimately resulting in giving up control over the process of labour [8].

The decline of twilight sleep was multifactorial. Growing concerns over dangers to the baby and the mother produced mounting concern amongst obstetricians [9]. Proponents of the technique blamed adverse reports on poor preparations of scopolamine and inexperienced physicians. The death in childbirth of one of the leading twilight sleep campaigners also harmed the movement [1,10].

Twilight sleep left a lasting impression on childbirth and obstetric anaesthesia. In relation to this method, an English physician expressed “If there is no memory of pain, it is equivalent to having no pain, and a doctor certainly has the right to speak of a ‘painless childbirth’” [4]. Medical professionals dictating how patients perceive pain in obstetrics continues to be an issue to this day. Untreated pain under neuraxial anaesthesia for C-

section is the most common successful medicolegal claim in modern obstetric anaesthetic practice [11]. Despite twilight sleep going out of fashion in the early 20th century, hyoscine remained in clinical practice well into the 1960s to produce anterograde amnesia in labour [12]. Popular demand for twilight sleep, though short-lived, meant that a successful obstetric practice had to offer some form of pain relief at a time when pain was strongly connected to the rhetoric of equal rights. Historians agree a consensus that it helped to instigate a change from birth being a natural process that occurred at home to taking place in hospital with physician involvement [7].

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Arthur Ernest Sansom (1839-1907): A Truant from Anaesthesia.

Henry Connor
Retired Consultant Physician, Hereford and
Honorary Research Fellow in the History of Medicine, History of Medicine Unit, University of Birmingham, UK.
Correspondence to: hconnor@vineyardroad.plus.com

Introduction

Berkeley Moynihan coined the term 'medical truant' for someone who studied or practiced medicine but who then gave it up in favour of an alternative occupation.[1] A variant is a doctor who achieved a reputation in one specialty only to change to another after a few years. Such a man was A. Ernest Sansom, as he usually signed his name, who achieved recognition as an anaesthetist in mid-nineteenth century London but then became a disciple of the work of Louis Pasteur and an early specialist in what we now know as infectious diseases, before finally specializing in cardiology. [Figure 1]

Figure 1 Arthur Ernest Sansom (1839-1907)
Courtesy of Wellcome Institute

This paper will concentrate on selected aspects of his anaesthetic publications.

Early Life

He was born at Corsham in Wiltshire, the son of a retired gentleman farmer. After initial education at a local school of good repute, at the age of 14 he was sent to Queenwood College at Stockbridge in Hampshire. [2] This was an independent fee-paying school sponsored by the Society of Friends who were popularly known as the Quakers. Founded in 1847, it closed in 1896 and was unusual for its time in that chemistry and physics featured prominently in the curriculum. [3] One of Sansom's teachers would have been the German chemist Heinrich Debus (1824-1915) who later taught at Guy's Hospital Medical School. [4] This scientific education would have served Sansom well in his later anaesthetic research.

Medical School and Medical Career

As Queenwood did not teach Greek which, at that time was required for matriculation at the University of London, he left for private tuition in this subject. He matriculated in the First Division and entered King's College London at the age of 16. There he was awarded a scholarship and six prizes. Having completed all the usual student placements he was still too young to sit his final examinations so spent time in Paris at the Hôpital St. Louis where he was taught the then advanced French methods of physical examination, allegedly by Pierre Adolphe Piorry. [2] If he was taught by Piorry it was not at the St. Louis because Piorry never worked there and when Sansom was in Paris in 1859 he was professor of Medicine at La Charité. [5] On his return later in 1859 Sansom qualified LSA, MRCS, MB, BS (Lond) subsequently obtaining the MRCP and MD (Lond) in 1866 and being elected FRCP in 1878. He held positions at King's as house physician and assistant to the physician accoucheur. [2] A combination of his obituaries, publications and his entries in the Medical Directory show that he was also house surgeon to the Royal Westminster Ophthalmic Hospital until by 1871 he was an associate physician to the London Hospital for Diseases of the Chest and to the North-Eastern Hospital for Children. By 1876 he was an associate physician at the London Hospital then assistant physician by 1880, and physician by 1882. He retired 2-3 years before his death in 1907. [2, 6]

Anaesthetic Research and Practice

Sansom wrote that he was "associated frequently with the late Dr. Snow" but this must have been while he was still a student because Snow died on 16 June 1858, the summer before Sansom qualified. At some point Sansom inherited Snow's anaesthetic practice with the King's Hospital surgeon William Fergusson as well as acting as Fergusson's anaesthetist in private practice. [7]

An analysis of his publications shows that, with the exception of one in a French journal, all those on anaesthesia appeared between 1859 and 1868. His next major interest centred on sepsis, antisepsis and infectious diseases and, with one exception, these all appeared between 1866 and 1872. His papers on cardio-respiratory disease were all published between 1874 and 1898. I had initially assumed that once he had been appointed as an assistant physician at the London he would have stopped practising anaesthesia but then found that he was certainly contributing to the discussions at meetings on anaesthesia at least as late as1897, [8] perhaps suggesting that he was still giving anaesthetics in private practice after he was no longer researching the subject. He was certainly still contributing to the discussion on anaesthetic topics at meetings of the Royal Medical and Chirurgical Society as late as 1895. [9] However he never attended any of the meetings of the Society

of Anaesthetists (founded in 1893 and merged with the Royal Medical and Chirurgical Society in 1908) either as a member or as a guest, even though he lived in London. [10]

Anaesthesia and Mortality

His first paper on anaesthesia derived from a student prize which he was awarded in 1858. Published in 1859 it was a wide ranging study of mortality following amputation. [11] In this paper I consider only his findings on the influence of anaesthesia on mortality. He began by reviewing the findings of others. Simpson of Edinburgh, Holmes of St. George's in London and Fenwick of Newcastle had all concluded that mortality was lower in the anaesthetic era than before. However Arnott who examined records from University College, St. Thomas's and St. Bartholomew's Hospitals in London came to the opposite conclusion [11]. Sansom used data from the London Medical Society of Observation for 1837-1841 for the pre-anaesthetic era and the record of operations at London hospitals published at regular intervals in the Medical Times and Gazette for 1854 to July 1857 for the anaesthetic era. However his results in the text were replaced by a table in an addendum which gave results only in percentages without showing numbers of operations. (Table 1). The results appeared to show a markedly beneficial effect of anaesthesia.

Table 1.
Sansom's Amended Mortality (%) on Mortality following AMputation13

Pre-Anaesthetic Period	All	Thigh	Leg	Arm
1837-42	33	29	44	23
1840 34	43	25	40	
Anaesthetic Period	All	Thigh	Leg	Arm
January 1856 to July 1857	19	20	17	14
1854 and 1855	20	20	23	8

Challenged by Arnott to produce more detailed information [12] he published another table giving numbers as well as percentages but in which comparisons with his earlier results were impossible because they covered different time intervals. He gives the impression of a 20 year-old in too great a hurry. [13]

Unfortunately all of these studies, not just Sansom's, have inherent problems. The pre- and post- study groups were in no way comparable. The advent of anaesthesia meant that many more operations were now performed,

especially in women and children and more conservative, albeit longer, operations were sometimes done where either no operation or an amputation might have been done before anaesthesia. A similar debate occurred in the U.S.A. where Pernick noted that none of the studies were statistically significant. [14]

Anaesthesia for ophthalmic operations

In 1861, having been house surgeon at the Royal Westminster Ophthalmic Hospital, Sansom expressed his opinion that neither of the two operations at that time used to treat glaucoma required chloroform. [15] This is an interesting reflection on attitudes to pain at that time because von Graefe's operation required the removal of one quarter of the iris and Hancock's operation involved the division of the ciliary muscle, procedures for which current patients would certainly expect local anaesthesia.

Works on Chloroform

Also in 1861 Sansom published a paper on the modes of death from chloroform. He proposed a middle path by suggesting that the vast majority of deaths were cardiac in origin but that a few were respiratory. Of equal interest is his statement that the underlying cause was "imperfectly vitalized blood". [16]

He elaborated on both these points in a major paper in 1864. [17] He rejected the argument that chloroform acted on the brain because experiments on animals by Fauré and Gosselin had failed to show any anaesthetic effect when chloroform was poured onto the exposed brain or injected into the carotid arteries. Instead he argued that anaesthetics acted by causing mal-oxygenation of the blood, alleging without supporting evidence that Nunneley, Snow, Richardson and others supported this opinion. He admitted that he had no proof but believed that "anaesthetics acted on the cell wall of the corpuscle" to impede its oxygen carrying capacity.

When discussing deaths from chloroform he wrote that "Every fact and every analogy tells us that we have to deal with a dangerous drug, and that in our dealing with it, we cannot use too much caution."[17] He therefore took issue with two of the conclusions in the recently published Report of the Chloroform Committee of the Royal Medical and Chirurgical Society. [18]

The first of these was the recommendation that "An apparatus is not essential to safety if due care be taken in giving the chloroform." As a protégé of Snow, he thought a vaporizer essential and described his own. He also disagreed with the Committee's conclusion that the risk from chloroform was in proportion to the quantity absorbed into the system, pointing out that a large number of deaths occurred very soon after the onset of anaesthesia and sometimes even before the operation had begun.

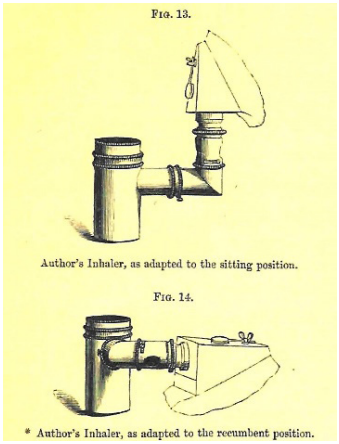
FIG. 13.

Author's Inhaler, as adapted to the sitting position.

FIG. 14.

* Author's Inhaler, as adapted to the recumbent position.

Figure 2 Sansom's vaporizer from reference 19 p. 127

Sansom's inhaler [Figure 2] has a facemask which appears identical to Snow's but he has dispensed with the water bath which elsewhere he describes as "heavy and cumbrous" and the tubing which is "often in the way". [19] Instead the vaporizer is connected to the facemask by a universal joint and is covered in gutta-percha to prevent it becoming too hot to hold as the chloroform evaporated. The whole point of Snow's water bath, to maintain a steady temperature and, thereby, a constant rate of evaporation, was therefore lost. Because he considered that Snow's apparatus delivered too high a concentration for initial inhalation his vaporizer contained two concentric cylinders, perforated in such a way as to permit very gradual increases in concentration when one was rotated around the other.

Sansom cited the findings of the personal experience of Francis Anstie of the Westminster Hospital of administering chloroform in 3058 cases. An inhaler was used in about 2200 but in the remainder only lint or a handkerchief. What Anstie described as "alarming symptoms" occurred in 21 cases, only 5 of which involved use of the inhaler and in at least some of these the inhaler was found to be faulty. [20] It is evident that Sansom considered it essential to use an apparatus to administer chloroform even though at this time, in 1864, he thought the fatality rate was approximately 1 in 20,000,[17] a figure which he increased to 1 in 16,000 a year later. [19] Even this rate was much lower than what later came to be the accepted rates of between 1 in 3000 and 1 in 6000. [21] The debate between safety and convenience was to continue over the decades and was only finally settled in favour of safety after a lengthy debate which began in the United Kingdom and North America in the 1940s. [22] Risk assessment is of course a comparative concept, and safety in anaesthesia must be viewed in a wider cultural concept than anaesthetic practice alone. For example, industrial and railway accidents were more frequent in the nineteenth century than today and yet were tolerated. Conversely, mortality resulting from anaesthesia today which even approximated to the average annual number of road deaths in Great Britain (n = 1825) would not be acceptable. [23] I have not been able to find accurate data for mortality directly attributable to anaesthesia. As a proxy, there were approximately 1,326,100 general or regional anaesthetics annually in the United Kingdom between 2009 and 2014 [24] and if we accept a Japanese study from 2003 of a mortality rate totally attributable to anaesthesia of 0.21 per 10,000 cases, [25] that would equate to approximately 28 deaths per annum. Deaths on the

railways were 47 in 1865, 87 in 1870 and 27 in 1875 but nowadays non-suicide deaths are rare. [26]

Sansom's textbook on Chloroform [19] was well received both at home and abroad. [27] In a compact 187 pages Sansom covered all aspects from basic science to practical uses in twenty chapters. Some of it had been covered in earlier papers, as described above, but there were now, inter alia, chapters on its discovery, the consequences of the discovery, resuscitation, anaesthetic mixtures, obstetrics, dentistry and other matters.

Sansom had first used the nasal administration of chloroform in 1861 on a patient of Mr Ferguson's with a maxillary tumour. He used a modification of the method described by Faure in L'Union Medicale in 1860 and recognised that Benjamin Ward Richardson had already used nasal administration in London. [28] For his own inhaler he now devised a special attachment for administration by the nostril. [19] [Figure 3]

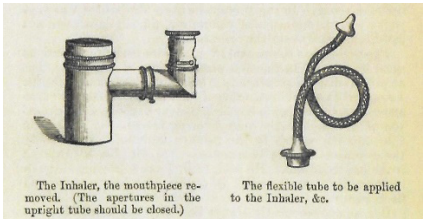

Figure 3 Sansom's Nasal Adaptor – from reference 19 p. 186

He also explained that inhalers were unsuitable for use in children under the age of seven and that, as children tolerated anaesthesia well, he usually poured some chloroform into a cylinder of lint from which the child was allowed to inhale. [19]

Carbon tetrachloride

He also made reference in this book [19] to animal experiments using carbon tetrachloride. Elsewhere he described the same agent as bichloride of carbon. [29] In a paper which Alistair McKenzie presented to this Society in 2023 he noted that authors investigating carbon tetrachloride at this time had trouble establishing its chemical formula and that this difficulty persisted until the introduction of the Periodic Table and the subsequent development of the concept of valence. [30]

In a paper in 1866 Sansom described the animal experiments with carbon tetrachloride in more detail and went on to describe how he had first used it in midwifery on May 15th 1865. [29] However by the time he published Simpson had already described its use in midwifery and surgery in a paper published on December 16th 1865. [31] Simpson thought that it resembled chloroform but took longer to produce the same degree of anaesthesia and longer to recover from it. During full anaesthesia he thought the depressing influence on the heart greater than that of chloroform and that it would be far more dangerous to employ as an anaesthetic agent.

Sansom noted that it was more pleasant to inhale than chloroform and was not subject to decomposition by air and light. As it was considerably less volatile than chloroform he suggested administering it by pouring it on a piece of lint or sponge wrung out in warm water. [29] It seems illogical to recommend such a method when he insisted on the use of a vaporizer for the administration of chloroform to which carbon tetrachloride is closely related chemically and with which there was still so little clinical experience. He used it only in two midwifery cases and just one surgical case. In the first midwifery case the pain was greatly eased though not totally abolished, the patient remaining conscious. In the second case the agent took a long time to act and the pain relief was imperfect. The surgical case was for clitoridectomy and was a failure so that chloroform was substituted. On this basis it is perhaps surprising that Sansom concluded that carbon tetrachloride would be "especially valuable, either alone or combined with chloroform, in midwifery practice." [29] However, like Simpson, he did not think it advisable to use it to induce deep narcosis and its use in surgery would therefore be restricted. Given these conclusions it is extraordinary that he published two further papers on the subject, neither of which contained any significant new information. In the first he admitted that carbon tetrachloride might not be the "summum bonum", i.e. the best, of anaesthetic agents [32] and in the second that it was not the best for "the pains of natural labour" but that it was useful for the relief of "headache and the slighter manifestations of pain." [33] In both these last two papers Sansom again mentioned that he was the first to introduce carbon tetrachloride, although he still did not mention that Simpson had pre-empted him in publishing on its clinical use; and it is difficult to avoid the conclusion that much of what he wrote on the subject was to emphasise his claim.

Anaesthetic Mixtures

A claim made in Tables IV and V in the last paper [33] was that the addition of absolute alcohol to chloroform delayed the vaporization by up to 50 per cent. However Sansom did not present evidence to show whether or not this percentage varied over time. This information is vital because Sansom claimed that the retarding influence of alcohol enabled him to dispense with a vaporizer. He should perhaps have known that nineteen years earlier Snow had already investigated the subject in greater detail. Snow first discussed mixtures of ether and chloroform. Because ether is about six times more volatile than chloroform, it follows that during the latter stages of evaporation the fluid consists almost entirely of chloroform in whatever proportions they have been combined initially. Patients inhaling such mixtures were therefore exposed to the pungent effects of ether before anaesthesia was induced. Turning to mixtures of chloroform and alcohol he described how the "so-called chloric ether" sometimes used at St. Bartholomew's Hospital contained 12-18 per cent of chloroform, the remainder being alcohol. This initially contained sufficient chloroform to induce insensibility but after one-third of the liquid had been inhaled the quantity of chloroform was insufficient to induce or sometimes even to maintain anaesthesia.

Snow also described the work of John Warren of Boston (USA) who used "strong chloric ether" containing one part chloroform to two parts of alcohol. However this too was "irregular" in its effect and did not always induce anaesthesia. Snow's experiments in which he exposed this mixture to currents of air in the laboratory suggested that the quantity of chloroform that the air would initially take up from this mixture would not "under the usual circumstances of inhalation exceed six per cent – a proportion which I believe, would not cause any sudden accident…" [34] In the light of experience the six per cent was later reduced to four per cent. [35] This was the concentration recommended by Sansom for use in midwifery where it was of course inhaled only intermittently and in sufficient quantity to provide analgesia rather than anaesthesia. [33] The lint would of course have to be refreshed frequently as the chloroform evaporated.

Anaesthetic Sequences

In discussion of papers presented by others at meetings Sansom twice recommended the practice of induction with chloroform using his inhaler followed by maintenance with ether, especially during lengthy operations or if there were the smallest sign of a failing pulse. [36] However chloroform should not be used if there was evidence of shock, heart disease, suspected alcoholism or dislocation of the larger joints. An "inhaler" for ether could be fashioned from a folded newspaper containing a cambric handkerchief folded into a cylinder closed at one end with the ether applied to the handkerchief. He regarded chloroform as potentially dangerous but ether as "a harmless sustainer of anaesthesia." [36, 37] He still continued using anaesthetic mixtures as well as sequences of individual drugs.

Envoi

As a young man Sansom was unduly brash as evidenced by a letter in which his criticism of a senior colleague was unnecessarily rude. [15] He also sued Dr Edwin Lankester, the Coroner for Central Middlesex for late payment of a fee when this was in fact the responsibility of the Coroner's Officer and a quiet word in the Coroner's ear might have been a more diplomatic and more effective way of dealing with the matter. [38,39] However he appears to have mellowed with the passing of the years because he was described in an obituary as one "whose countless acts of charity" to needy individuals and to institutions were made quietly and unostentatiously and that his funeral was well attended by those who wished to show their "sorrow for the loss of one so largely beloved and respected." [6]

Acknowledgments

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First ether anaesthetic in the Southern Hemisphere
William Russ Pugh MD. An enigma

Elizabeth Bradshaw
Consultant Anaesthetist, Retired

No paper submitted

“He’s blue, please come quickly” : Dr George Ellis (1908-1998)

Dr. David J, Wilkinson,
Llanddulas, Conwy, Wales.
lorikeet08@gmail.com

In 1949 the anaesthesia staff of St Bartholomew’s Hospital, welcomed the appointment of George Harold Ellis (1908-1998) to the Department. Ellis was born in Dunedin, New Zealand and retained that passport for his whole life. His father, Harold Oswald Ellis (1882-1972) who was born in Tasmania, was said to have been a purser with the P&O Shipping Line (but this cannot be confirmed at present) and married Florence Clunies-Ross (1882-1935) possibly on-board ship or possibly in the Cocos Islands where she was born. Their son was born when the ship sailed to Auckland, but the marriage was registered in Auckland in January 1907 and George Ellis was born in 1908, so the family lived in New Zealand for at least a year. Ellis always said that he had only lived there for about 5 days before his family sailed back to England,[1] and this might well be true. The family returned to Worthing, Sussex and in 1909, Zene Olive, a sister to George was born. In the census of 1911, his father was now living in Thames Ditton and was of independent means with two resident servants. George Ellis was educated at Bradfield College from the age of 14 until 1925. He does not appear to have excelled in any particular field at school but served as Lance -Corporal in the OTC. He came to Barts in October 1925 and qualified in 1938 a rather prolonged studentship which was allegedly used by Ostlere in his Doctor books as the model for the character Grimsdyke.

However, there were notable other seemingly perpetual students! One of these was Rudolph Arthur Foucar (1895-1943) who had been born in Moulmein, Burma (now Mawlamyine, Myanmar) who had started at Barts in 1915 and qualified in 1937. Three years of this time was spent in the army from January 1916 to March 1919 and he wore a regimental tie for the rest of his student life, and it is also reputed that on qualifying he burst into tears! Sadly, he died at sea in 1943 on board the Duchess of York while serving as a Major in the RAMC.

George Ellis moved straight into anaesthesia after qualifying, working at Barts and at Hill End and passed the DA in 1939. He joined the RAMC at the onset of the war becoming a Lieutenant Colonel and Adviser in Anaesthetics to India Command. At the end of the war, he returned to Barts where he became Senior Resident Anaesthetist, but he joined the staff some six months after this. While Senior Resident, surprisingly from the name, a non-resident post,

he became anaesthetist to several other hospitals including Harefield Hospital, Hounslow Hospital and the Gordon Hospital. In this same year he contributed a chapter on anaesthesia apparatus to Evans's book *Modern Practice in Anaesthesia*.[2] This chapter includes a detailed description, and superb diagrammatic illustrations of the Marrett apparatus, that he would use and teach on for the rest of his career at Barts.

In 1952 he published in the American journal his findings on the causative bacteria seen in postoperative chest infections, a joint paper with the Department of Bacteriology at Barts. 352 consecutive patients from one surgical team were seen pre and post operatively and swabs were taken of their mouth preoperatively and any sputum produced pre and post operatively. The results were inconclusive with a variety of streptococci, staphylococci and haemophilus collected, together with occasional coliforms.[3] Ellis passed the FFARCS in 1953and in the following year revised his chapter on apparatus for the second edition of Evans's textbook.[4] This included a coloured plate illustration of the new British Standard for medical gas cylinders.

In 1955 he published on the common cold and anaesthesia,[5] starting by stating that although it was now an accepted practice to cancel patients for elective surgery if they had colds, there did not appear to be a sound published evidence base for this. He could find no definite evidence and was sure that if a patient really needed an operation immediately, then a form of anaesthesia could always be provided, even in the presence of a 'cold'. He also believed that postponement of an operation should only be permitted if such a cancellation would occasion no suffering to anyone. He was also concerned that the creation of an unpleasant 'hacking cough' postoperatively, even with the use of appropriate antibiotics and physiotherapy, would be a potentially serious sequalae if the patient was having abdominal, eye or ENT surgery. In this same year he had his portrait painted by William Alexander Dargie (1912-2003). Ellis is seen sitting in his drawing room, probably in his home at Lansdowne House, W11, with a large bookcase in the background which contained his many treasured volumes. It is currently housed in the Barts Archives.

In May of 1956 he took on a further role becoming Warden of the Medical College,[6] he was the seventeenth to hold this position in a line of succession back to 1843 when James Paget was appointed to the newly formed Medical School. Ellis's role was to be responsible for the students' discipline and for the recently built (1952) College Hall and he resided in the Warden's House at the entrance to College Hall from Charterhouse Square. In addition, he acted as Censor for the *Barts Journal* reviewing page-proofs prior to their publication. In this role, Ellis became a regular provider of sherry to new

residents in College Hall and wine to other residents both before and after dinner. He had been made President of the student Wine Committee which managed the student bar, a role which he enjoyed and maintained until his retirement from Barts, being a regular attendee at the bar and supporter of Wine Committee events like the annual Smoker.

Later in 1956, Ellis published on postoperative wound infection.[7] He and his surgical colleagues had noticed relatively high incidences in wound sepsis over a prolonged period of time and had decided to investigate the possible causes. They made bacteriological assessments from their wards, theatre suite, and from all personnel. No carriers were found and the potential of air flow from the ward area into the theatre was highlighted as a potential cause of infection. They reversed the normal air flow in the theatre to create a positive flow out of the theatre and towards the wards, and this resulted in a fall in wound infection from nine to one percent during a two-year investigation. It is an unusual paper for an anaesthetist to be involved in but is the third related to sepsis that Ellis undertook. In 1963 he published on the use of halothane in closed circuit for emergency surgery.[8] In this paper he reviews his use of the Marrett apparatus over a period of three years and the provision of anaesthesia for over 3000 patients. He advocates the use of blood transfusion to combat haemorrhage induced shock but shuns the use of vasoconstrictors in patients already experiencing tachycardia and peripheral vasoconstriction. In 1964 he was awarded the FFARCSI by the Irish Faculty. In that same year, the Association of Anaesthetists of Great Britain and Ireland (AAGBI) offered to run the 4th World Congress of Anaesthesiology in London in 1968, on behalf of the World Federation of Societies of Anaesthesiologists (WFSA). The WFSA accepted the offer and the AAGBI formed a committee with George Ellis as Chairman. He was co-opted onto the AAGBI Council in 1965 where he served for the next three years becoming a Vice-President in 1969 for two years. Thomas Babbington Boulton (1925-2016) describes his appointment as Chairman of the organising committee as 'inspired' and highlights his calmness in times of stress, his kindness, loyalty and generous hospitality to his contemporaries and juniors alike. He writes ' *His unruffled approach to problems, his ability to make rapid decisions (sometimes not without an element of risk), his careful selection of co-workers, and his capacity to delegate to them and trust them, promoted harmony within the Members of the Organising Committee and therefore contributed greatly to the success of the meeting.*'[9] The AAGBI awarded Ellis the Pask Certificate of Honour in 1977 for his work with this meeting.

In 1966 the new bar was opened at College Hall,[10] and Ellis officially opened the premises as President of the Wine Committee and Warden; he was not a

believer in any speeches at official functions, and certainly never long speeches, so his laconic 'Gentleman, the bar is open' could rank as one of his longer orations. It was at this time that he stepped down as College Warden. He also became an Honorary Editor of the *Proceedings of the Royal Society of Medicine*.

In 1971 he chaired a committee created by a Conference of Editors held at the Royal Society of Medicine in 1968. The committee reviewed all current measurement units and their relationship to the Systeme International d'Unites (SI Units) which was now being adopted by most scientific journals. They produced a forty-page leaflet as a guide for biological and medical editors and authors which they state would need regular review.[11]

In 1973 Barts celebrated its 850th Anniversary with a huge event entitled the Bartholomew Fair. Ellis chaired the committee that made the event such a huge success. This was the year that he retired from Barts, and the journal published an appreciation written by an unknown colleague who signed off with the phrase 'Gaudeamus igitur' (So let us rejoice).[12] The author again notes Ellis's charm and willingness to teach. He was a great advocate of demonstrating his preferred technique on the first case on the list to either medical students or trainees and then leaving them to manage the next case while he relaxed with a motoring magazine in the adjacent coffee room. Any unusual physiological signs seen in the patient undergoing surgery would result in an urgent call for review by Ellis by the anxious trainee. Unhurried return to theatre by Ellis were usually associated with axioms like 'Dear boy, it is virtually impossible to kill someone with ether' or a cross examination of the messenger from theatre such as when told the patient had turned blue and could he return quickly he responded, 'How blue?' but then came immediately to the patient. The writer also referred to his great love of music which made him buy a box at the Royal Albert Hall, tickets for which were made constantly available to all members of staff. He was a great lover of fast cars and had a wide range of these. Very knowledgeable about wine and food he was an excellent cook and made ferocious curries. If there was a Departmental party, then he invariably sent along a roast turkey from Jackson's of Piccadilly. He was said to wear a different silk tie every day of the year and once when asked why he had never married he responded, "*Dear Boy I very nearly did once and then years later I saw the lady getting out of a taxi and I was jolly glad I hadn't*!" From the mid-1960s onwards he lived (and entertained) in the Royal Automobile Club in Pall Mall where he swam in the pool every morning. He was a larger-than-life character and almost every doctor qualifying at Barts while he was working there will have their own 'George Ellis story'.

Despite retiring Ellis had not finished with anaesthesia as yet and did his own locum for a few years before moving to Brunei to become Specialist Adviser in Anaesthesia to the Sultan of Brunei. He stayed there until 1992. He then came back briefly to London before returning to the place where he had been born in Auckland, New Zealand. He had returned there in the 1960s and bought a flat in Shortland Street. The author visited him there in 1996 when a satellite programme was held there prior to the World Congress in Sydney. A dinner party for Barts trained anaesthetists was convened and Ellis presided with great good humour and his usual fund of anecdotes. He had maintained his love of cigars and good whisky. He died in his sleep in May 1998. In his will he left a substantial sum of money to the AAGBI and they in turn have named a room in the premises at 21 Portland Place, W1, the George Ellis Room.

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Carl Koller and Sigmund Freud: friends who fell out

J A W Wildsmith,
Professor Emeritus, University of Dundee

Carl Koller and Sigmund Freud both made major contributions to medicine, having become close friends when they were students together in Vienna. In the early 1880s they were both working clinically in junior hospital posts and undertaking research in Stricker's laboratory, the key to this story being Freud's interest in the therapeutic potential of cocaine. He recruited Koller to help study the drug's systemic actions, this involvement leading Koller to recognise its anaesthetic potential, his intention to specialise in ophthalmology having already focussed his thoughts on finding a suitable 'local' anaesthetic. The early techniques of general anaesthesia were unsuitable for eye surgery, straining during postoperative vomiting often leading to expulsion of the contents of the globe, and Koller had already tried conjunctival application of several agents without success.

One day, while Freud was away from Vienna, Koller was introducing a colleague to cocaine and the remark, "My how that numbs the tongue", on 'tasting' the drug (a standard method of analysis then) making Koller recognise that he might have found his local anaesthetic. Animal and personal experimentation, followed by clinical trial, proved this to be so, and a paper read in Heidelberg (by a colleague, Koller could not afford the trip) announced the findings. By the time Freud had returned to Vienna the names of cocaine and Carl Koller were around the World, and Freud acknowledged that he had missed out on a major discovery. In spite of this success Koller's career did not flourish in Vienna, and he eventually emigrated to the US. Freud remained, publishing a major review of cocaine and continuing to explore its therapeutic use, including using it to treat a patient with morphine addiction, but only turning him into a cocaine addict, an embarrassing outcome for Freud. Thereafter he focussed on the matters for which he became famous, his then (and arguably still) controversial theories on psychoanalysis, and it is from that controversy that the difficulty between him and Koller arose.

A major criticism of Freud has always been that he and his methods were 'unscientific', but his supporters quoted his early career work, notably with cocaine, to counter such accusations. To augment this they have also made statements like "*Freud quietly revolutionized eye surgery by suggesting to the ophthalmologist Carl Koller that cocaine could be used as an anaesthetic*". Such claims were never made by Freud himself, but his slowness to refute them upset Koller enough for their friendship to break down. In spite of much refutation such

claims have been made ever since, the above quote being from a paper in *Brain*,[1] the major neurology journal, earlier this year. As a result the current author wrote a detailed refutation of the article which has since been published in the same journal, and fuller details of the story can be found there.[2]

During preparation of this presentation, and its actual delivery, the question of the spelling of Koller's first name came up: was it Carl or Karl? In all uses of his name, by both Koller himself and his family, the spelling Carl was used, examples including:

All his subsequent publications;

His 'sign in' to Mount Sinai Hospital, NY, USA where he was affiliated; and

On his tombstone in Valhalla Cemetery, NY, USA.

However, in the very first written publication of the local effects of cocaine his first name is spelled Karl,[3] this presumably being the source of its very occasional subsequent use in that format, although the English translation of the paper in 'The Lancet' used Carl.[4] Two explanations for that initial use of Karl came to mind: a quirk of the mid-nineteenth Austrian version of the German Language; or a simple error by those producing the journal.

In discussion, the suggestion was made that the subsequent use of Carl might reflect Anglicisation following the World-wide fame that his discovery led to,[5] but perhaps the crucial point is that he used Carl in the hand written form of the original paper, and before his fame resulted (Figure).

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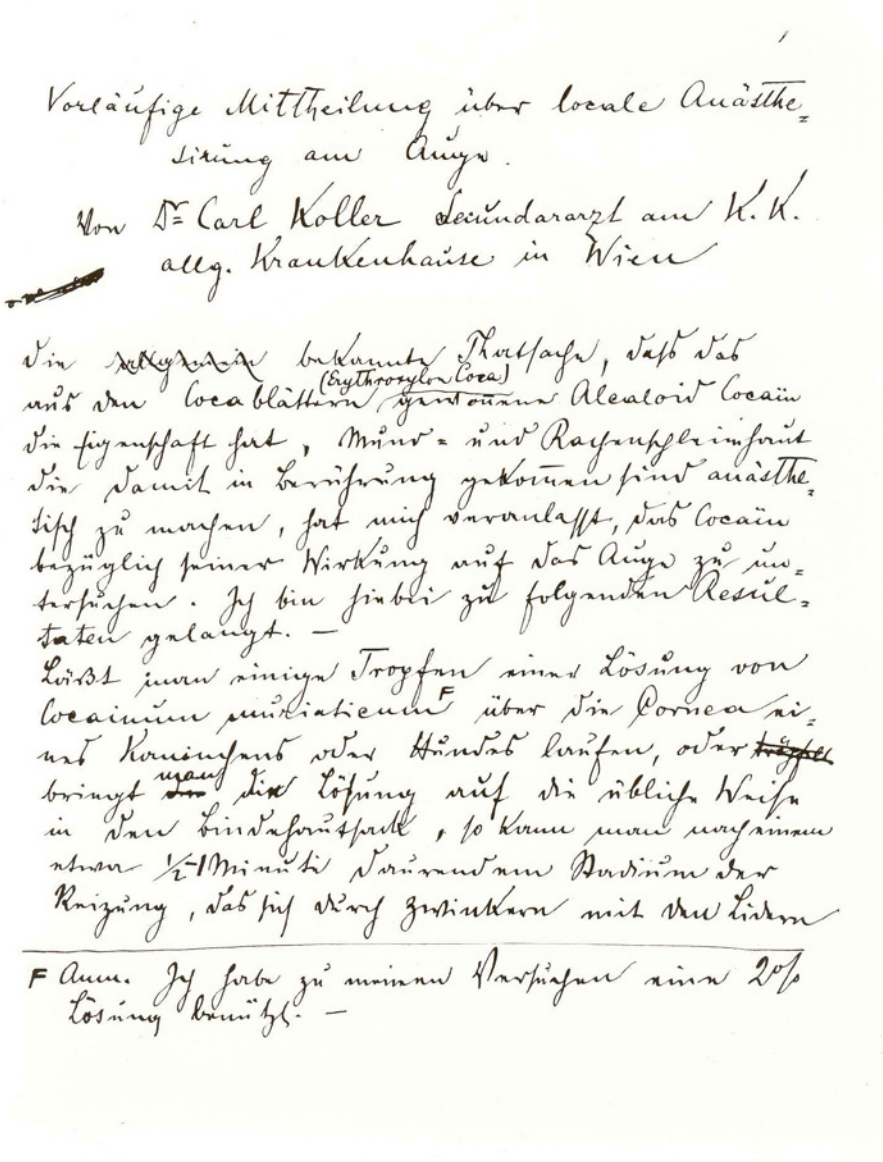
Figure



Vorläufige Mittheilung über locale Anästhesirung am Auge.

Von Dr. Carl Koller Secundararzt am k. k. allg. Krankenhause in Wien

Die bekannte Thatsache, dass das mit den Cocablättern (Erythroxylon Coca) gewonnene Alcaloid Cocaïn die sympathetische Tinte, Mund- und Rachenschleimhaut in Bezug in Berührung gekommen sind anästhetisch zu machen, hat mich veranlasst, das Cocaïn bezüglich seiner Wirkung auf das Auge zu untersuchen. Ich bin hierbei zu folgenden Resultaten gelangt. —

Löst man einige Tropfen einer Lösung von Cocainum muriaticum[F] über die Cornea eines Kaninchens oder Hundes laufen, oder bringt man die Lösung auf die nüchtern Weise in den Bindehautsack, so kann man nach einer ½-1 Minute Verstreichen die Erfahrung machen, dass sich sehr zahlreiche mit den Lidern

F Anm. Ich gebe zu meinen Versuchen eine 2% Lösung benützt. —

Legend

Monochrome copy of Koller's original, hand written paper given to the author by his daughter, Mrs Hortense Koller Becker. The first name is clearly spelled with a 'C'.

Machinations of the Nuffield Professorships
Oxford & Sydney

Barry Baker
MBBS (Qld), DPhil (Oxon). FANZCA, FRCA, FCICM, DHMSA
Emeritus Professor
University of Sydney

It is now 87 years since Dr Robert Macintosh (as he was then) took up his position as the first Nuffield Professor of Anaesthetics at Oxford University in February 1937, following initial reluctance by Oxford University to contemplate a Nuffield Professor of Anaesthetics. Sir Farquhar Buzzard, the Regius Professor of Medicine, and his colleagues all thought that anaesthesia was not a suitable University topic and certainly not to be graced with a Professorship! Lord Nuffield had other ideas following a comment by Macintosh, at their regular post-golfing dinner at the Huntercombe Golf Club, that "*I see they have forgotten anaesthetics again*" [1], which had followed Nuffield's remark that the University were looking for £stg1,250,000 to sponsor three Chairs in Medicine, Surgery and O & G. Later, when digging in against the University's opposition to a Chair of Anaesthetics, Nuffield retorted "*If I don't establish a chair now, who is going to do so in the future*" [2]. These machinations have been well discussed on a number of occasions [3,4] and this brief introduction will set the scene for further machinations mostly associated with the change over of Professors when incumbents retired.

However the initial machinations did lead to Nuffield increasing his benefaction to the inaugural four Nuffield Chairs at Oxford University to £stg2,000,000, and then shortly thereafter added a further £stg500,000 for Chairs of Orthopaedic Surgery and Ophthalmology, which no doubt all helped the University to swallow its pride and accept gracefully the Nuffield Chair of Anaesthetics. An invited overseas visitor to the Oxford BMA Meeting in July 1936 [5], where the concept of the Chairs had been floated by Buzzard to Nuffield, was Ralph Waters then Professor of Anesthesiology in the Department of Surgery, University of Wisconsin. There he obviously learnt of and followed developments

Table 1

Nuffield Professors of Anaesthetics
University of Oxford

1937-65 Sir Robert R Macintosh 28 years
1965-79 Alex Crampton Smith 14 years
1980-92 Sir Keith Sykes 12 years
1992-2002 Pierre Foëx 10 years
2002-07 Interregnum 1 – Clive Hahn 5 years

concerning the projected Chair of Anaesthetics, because he suggested to Oxford University that Noel Gillespie, in his Department in Wisconsin but originally from England and a graduate of Oxford University, was "*an Oxford man with the Oxford tradition sincerely at heart, ….. well grounded in science, should be considered for the job*" [6]. Later Macintosh, without knowing about Waters' suggestion, informed Waters (10 December 1936) that he had accepted the position, and mentioned that Gillespie was considered for the position but that he had responded "*Waters and Rovenstine are the only two who could do the job*" [6]. However Nuffield had all along wanted to install two of the original four Oxford Nuffield Professorships – Hugh Cairns in Surgery and Macintosh in Anaesthetics. And he got his way! The machinations in this instance were from Nuffield! Cairns was appointed 27th January 1937 and Macintosh 1st February 1937 (Table 1), and later Chassar Moir in O & G in May 1937 and Leslie Witts in Medicine in November 1937.

Macintosh knew that Cairns had been opposed to Anaesthetics as a Chair at Oxford and won him over very early by appointing Cairns's London neuroanaesthetist, Olive Jones, to a First Assistant post in the Department of Anaesthetics so she could continue to be his neuroanaesthetist. That and the antipodean association – Cairns from Adelaide Australia, and Macintosh from Timaru New Zealand, also greatly helped Cairns acceptance of Macintosh.

In the early 1960s Sydney anaesthetists became aware that John Lowenthal, the Professor of Surgery at Sydney University, had plans to appoint an academic anaesthetist at Associate Professor level within the academic Department of Surgery [7]. Sydney University had been the first University outside of Oxford in 1938 to recognise Nuffield with an Honorary Degree (Hon LLD Syd), and Lowenthal knew that Nuffield was very favourably inclined to the University because of that recognition. So he had managed to persuade the Nuffield Foundation to bequest £stg20,000 (£Aus25,000) for the appointment of an Associate Professor of Anaesthetics within the Department of Surgery. One of the then leading Sydney anaesthetists, Harry Daly, decided that Nuffield would not approve of any academic anaesthetic appointment within a Department of Surgery under the control of the Professor of Surgery, so he enlisted Sir Robert Macintosh to intervene with Lord Nuffield and the Nuffield Trust. This worked and the University were informed that it would not be appropriate to appoint an academic anaesthetist within the Department of Surgery. Lowenthal saw an opportunity to persuade the Nuffield Trust that this would cost much more suggesting £stg100,000 for "*If a chair is to be established at this stage it would require complete endowment*" [7,8]. The Trust called his bluff and offered £stg40,000 (£Aus50,000) for a full independent Chair, which the University of Sydney then accepted. Douglas Joseph was appointed in November 1963 taking up his appointment in January 1964. Joseph had been aware of the Sydney

manoeuvrings and had taken leave from his Staff Specialist position at Sydney Hospital in 1963 to work in Professor Cecil Gray's Department in Liverpool to learn research methods, but more meaningfully because he knew that Gray would be the External Assessor appointed to the Appointment Panel for the Sydney Nuffield Professorship.

Not long afterwards in 1965 Macintosh retired from his Oxford Chair, and there was a short-lived but determined attempt by the University to close down the Chair.[9] This was unsuccessful and at the subsequent selection process there were two standout candidates, both Consultant Anaesthetists within the Department in Oxford. Roger Bryce-Smith had been a First Assistant (1948-57) and then a Consultant, and Alex Crampton Smith also a Consultant from the early 1950s. Both had good research credentials though Bryce-Smith had trailed off a little since leaving his First Assistantship, and Crampton Smith was very active at this time researching the artificial ventilation treatment of poliomyelitis, tetanus and other intensive care patients. However much more influential was the fact that Professor Philip Allison, the second Nuffield Professor of Surgery, was on the Appointment Committee. Bryce-Smith had, as First Assistant, been Allison's anaesthetist and they had not "gelled". Allison "black-balled" Bryce-Smith and so Crampton Smith was appointed [10]. All was then well until Crampton Smith retired in 1979 when again there was an attempt by the University to disestablish the Nuffield Chair of Anaesthetics, but they succeeded only in removing a Clinical Lectureship! Disestablishment was relatively easily rebuffed and the Chair was readvertised.

On this occasion the External Assessor to the Appointment Committee was Keith Sykes, at that time a Professor at the University of London at the Royal Postgraduate School of Medicine, Hammersmith Hospital, London. At the Appointment Committee meeting Sykes was very forthright that there were no suitable candidates so there should be no appointment. The Chair of the Committee (Sir John Bell, Regius Professor of Medicine) asked Sykes why he had not applied. Sykes replied [11] that he had applied at the time of Macintosh's retirement and that the University had not bothered to acknowledge his application nor informed him that they had appointed another! Bell then asked him to apply, and he was appointed very soon thereafter without an interview! At this time there were major financial restraints associated with the transfer of the NHS facilities from the Radcliffe Infirmary site to that of the John Radcliffe Hospital in Headington, which affected the Department and contributed to the new Nuffield Professor's woes at the commencement of his reign [12].

At the time of Sykes retirement in 1991 there were as far as I am aware no machinations – the University did not try to disestablish the chair and there were no machinations concerning the appointment of Pierre Foëx. However during

Sykes' reign the Department had completed a major shift, from the Radcliffe Infirmary almost in the centre of town to the John Radcliffe Hospital in Headington, with a large increase in Consultant staff in all three areas of the Department's activities – anaesthesia, intensive care & pain management. Because of the financial issues involved in this move, alluded to previously [13], the academic part of the Department and the major research laboratories remained at the Radcliffe Infirmary for a number of years until more space was found for them at the John Radcliffe Hospital, while the majority of the clinical anaesthetists moved to the John Radcliffe Hospital. Almost inevitably this led to a distancing between the small academic group and the expanding clinical interests of the Department. This distancing continued under the reign of Foëx so that when Foëx retired from the Nuffield Chair there were almost two separate elements to the Department – academic and clinical.

Following Foēx's retirement the Chair was advertised without issue from the University and a very good candidate from the USA applied – Debra Schwinn who was James B. Duke Professor of Anesthesiology at Duke University, North Carolina. She was offered the Nuffield Chair, but the pace slowed as she wished to negotiate improved research support from the University. To fill this hiatus Professor Clive Hahn (a physicist), who had a personal Chair within the Department and had been a long-time member of the Department since 1968 when he had first joined as a scientist, was appointed Acting Head of the Department. This did not help the distancing between the academic and clinical aspects of the Department, despite Hahn's strong efforts to minimise the issues between both groups. Schwinn's demands were initially met, but she came back with further demands which also happened a third time. Then in 2006 she finally decided that what was offered was not satisfactory and she withdrew. Although initially it was not obvious, but with hindsight, her demands were part of a playoff as she was in discussion about a position at the University of Washington, Seattle, where she accepted the Chairmanship of the Department of Anesthesiology and Pain Medicine in 2007.

Meanwhile Oxford had seen what was happening and Sir John Bell who was again the Chair of the Appointments Committee by then had other ideas as the University were developing plans to amalgamate the Nuffield Chair of Anaesthetics, the Nuffield Chair of Ophthalmology and the Oxford Centre for Functional MRI of the Brain. But first it was decided to abolish the Nuffield Professor of Anaesthetics position and replace it with two positions – a Nuffield Professor of Clinical Anaesthesia, and a Nuffield Professor of Anaesthetic Sciences. In 2007 Henry McQuay, a Consultant Anaesthetist in Pain Medicine, was appointed to the Chair of Clinical Anaesthesia and Head of Department, and Irene Tracey, a scientist who was Head of the Centre for Functional MRI of the Brain, was appointed as Nuffield Professor of Anaesthetic Sciences. In 2010 the

University inaugurated the Department of Clinical Neurosciences and within it the Division of Anaesthetic Sciences, and Henry McQuay retired but was not replaced. His reign unfortunately led to further separation between the academic and clinical aspects of the Department, because of his interests in pain medicine with no involvement in anaesthesia. This separation of the academic and clinical aspects of the Department led to the clinical side appropriating the name Nuffield Department of Anaesthetics as it had been lost to the Nuffield Division of Anaesthetic Sciences within the Department of Clinical Neurosciences.

On McQuay's retirement Tracey became Head of the Division of Anaesthetic Sciences (and thus the old Nuffield Department of Anaesthetics) until she became in 2017 Head of the University Department of Clinical Neurosciences. This all led to further separation of the academic and clinical aspects of the old Department of Anaesthetics. At this time Professor Andrew Farmery, a Consultant Anaesthetist and Fellow of Wadham College who had a Personal Chair in the Department, became the academic Head of the Division of Anaesthetic Sciences within the Department of Clinical Neurosciences. There has never been any formal acknowledgement that the clinical side of the Department could use the name Nuffield Department of Anaesthetics, but now after 22 years the *de facto* element is fully operative! Intriguingly Irene Tracey retained her Nuffield Professor of Anaesthetic Sciences title when she became Master of Merton College in 2019, and only "dropped" the appellation when she became Vice-Chancellor of the University of Oxford in October 2023!

Table 2

Nuffield Professors of Anaesthetics University of Sydney

Douglas Joseph 1963-1989 26 years

Barry Baker 1992-2005 13 years

Peter Kam 2006-2018 12 years

Meanwhile in Sydney Douglas Joseph retired in 1989 (Table 2) and the Chair was readvertised after a slight delay of a year which was reported as being standard University procedure to recoup holiday and leave finances. The obvious candidate was Professor Michael Cousins, then at Flinders University in Adelaide, who was originally from Sydney and known to be keen to return to Sydney. He was interviewed and offered the position, but then engaged in negotiations to transfer the Nuffield Chair from Royal Prince Alfred Hospital (RPAH) to the Royal North Shore Hospital (RHSH), which had been the hospital where he had been an anaesthetic trainee. This suggestion was strongly supported by RNSH where the Chairman of the Hospital Board was the senior Professor of Surgery at the University of Sydney. The proposal was vehemently opposed by the Department of Anaesthetics at RPAH, and indeed the RPA Hospital Board and the Dean of Medicine at Sydney University (Professor

John Young), because the Nuffield Chair and all the other original Sydney University Clinical Chairs were situated at RPAH. Eventually Cousins chose to go to a Hospital-funded University Chair at RNSH declining the Nuffield Chair which the University deemed would stay at RPAH. I, at that time Professor of Anaesthesia and Intensive Care at the University of Otago in Dunedin, New Zealand, was asked to advise on what would make the Sydney Chair attractive to potential applicants. On coming to Sydney it was immediately made plain that they wished to know how could the Chair be made attractive to get me to apply. The Chair was almost immediately readvertised and I applied and was invited quickly for interview and immediately offered the position. There was then a delay of approximately 6 months whilst the Hospital agreed in writing to certain conditions I had negotiated with them concerning Hospital space and staff. This proved to have been very necessary as they eventually only followed through with their agreements because I was able to show the signed agreements to Senior Administrative Staff – both the Hospital CEO and the Medical Director had changed in the meantime! I took up the position in December 1992. During the interregnum Associate Professor Greg Knoblanche had acted as Head of Department.

On my retirement in 2005 there was a very brief attempt by the University to pass the University's commitment for the Professor's salary to the Hospital, but this was quickly scrapped and the position advertised. There were three serious candidates interviewed – Professor Kate Leslie from the University of Melbourne and the Royal Melbourne Hospital, Professor Jamie Sleigh from the University of Auckland and the Hamilton Hospital, NZ, and Professor Peter Kam from the UNSW at St George Hospital in Sydney. At interview Leslie clashed with the RPAH CEO (Dr Diana Horvath) who had a history of difficulty with anaesthetists in the past, particularly Professor Joseph, and Sleigh ruled himself out by demanding to be Professor of Anaesthetics and Intensive Care. Thus Kam, who had previously worked in the Department at RPAH as a Senior Lecturer prior to moving up the academic ladder to RNSH and then St George Hospital, was appointed.

On Kam's retirement in 2018 there was again an Interregnum overseen by Associate Professor John Loadsman because the Children's Hospital at Westmead made a very strong approach to transfer the Nuffield Chair from RPAH to them, as they purportedly had a strong candidate. In the event this candidate did not materialise and the bid failed. The Chair was again advertised and Rob Sanders, then at Wisconsin as an Assistant Professor of Anesthesiology but originally from Imperial College in London, was appointed in 2020.

To bring this history up-to-date, in May 2024 the University of Oxford finally advertised the position of Nuffield Professor of Anaesthetic Science closing in

August 2024 for appointment from 1 August 2025 [14]. "*Applications are particularly welcome from women and black and minority ethnic candidates*"! Currently there is no indication who the Applications Committee will be or even if there will be an anaesthetist on the Committee, though there probably will be at least one. Almost certainly the current Head of Department of the Nuffield Department of Clinical Neurosciences (Professor Kevin Talbot – a neurologist) will be a member of the Committee, and the Chair the current Regius Professor of Medicine.

As will be appreciated machinations aptly describes these intrigues that have befallen the Nuffield Chairs of Anaesthetics in both Oxford and Sydney. After what will be 15 years since McQuay retired, it is to be hoped that Oxford will return to an academic anaesthetist holding the Nuffield Chair of Anaesthetic Sciences with the current iteration proceeding to appoint a clinical academic anaesthetist to the position.

Disclosures

University of Oxford

Professor Sir Robert Macintosh – a library & history colleague

Professor Alex Crampton Smith – my DPhil Supervisor

Professor Sir Keith Sykes – one of my DPhil Examiners

Professor Pierre Foëx – a DPhil student one year behind

Professor Clive Hahn – a DPhil student at the same time

Professor Andrew Farmery – a research collaborator

University of Sydney

Professor Douglas Joseph – one of my FFA Examiners

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Blood transfusion, World War I (1914-1918), and innovation in medicine-- a historical reappraisal

Dr. Meinolfus "Wulf" M. Stratling, MD, PhD, PhD

Consultant Anaesthetist, Medical Historian and Ethicist, Clinical Lead for Medical Humanities, Anaesthetic Department, Llandough University Hospital / University Hospital of Wales, Cardiff-Penarth, Penlan Road, CF64 2XX, UK. Contact: wulfstratling@gmail.com
Honorary Associate Professor for Anaesthesia and for History, Theory and Ethics in Medicine, Lübeck University, Germany.

Introduction

It is often claimed that World War I (WW I; 1914-1918) became a *catalyst* for progress and innovation in medicine: One prominent example is about blood transfusions [1,2]. Another one is about reconstructive and prosthetic surgery for maimed soldiers [3-5]. Matching narratives about other sectors are numerous. Most have close connections with peri-operative care and anaesthesia: Inhaled oxygen therapy, shock prevention and resuscitation, respiratory physiology, respirators, ventilators, and other advanced apparatus, high-altitude- and aviation medicine, or nitrous oxide-oxygen anaesthesia. Related innovations are mostly attributed to British and US-American pioneers.

On the latter cluster of topics this author has commenced an extensive and systematic re-assessment [6]. Its consistent findings are that many widely publicised assumptions are mis-contextualized and factually incorrect. As an important *collateral result* another remarkable *pattern* was noted: I strongly suggests that narratives, which allege a *positive* influence of WW I on medical innovation are likewise *inconsistent* with the contemporary evidence base. This calls for the *entirety* of the related historiography to be *systematically* reappraised.

Material and methods: comparative historiography

Within the above, wide spectrum of complex practices, techniques, science, and technology, the segment of blood transfusions was investigated. Included were aspects, which transfusion shares with volume therapy.

A representative selection of English-language historiography was assessed [1,2,7-10]. Ten transfusion-related advancements were identified and investigated. All of these are widely ascribed to the war, and to mostly US-American and British pioneers. Then surveys from non-English speaking backgrounds were analysed. These often include much wider contexts and chronologies: Many cover the earliest known beginnings until the recent past. Extensive international and transdisciplinary interactions are explored and acknowledged [11-18]. Conflicting claims and narratives were then compared. Primarily on the base of contemporary, *original* sources they were then cross referenced, and (re)contextualized.

Contemporary extent of international practice

It is well established that at the start of the war only few transfusions were given. On the side of the Western Allies the first transfusion is said to have been performed in the French army by Emile Jeanbrau (1873-1950) (16 October 1914) [2]. On the British side initially only fluid therapy with saline solutions was practiced. Transfusions are said to have been *introduced* in 1915. Canadian pioneers, who were influenced by US-colleagues and literature, are said to have been particularly instrumental. Their *initial* practice was *direct* donor-to-recipient transfusion of untreated *full-blood* via 'surgical methods'. Lawrence Bruce Robertson (1885-1923) of the Canadian Army Medical Corps is credited with having been leading and particularly noteworthy [7,8,10,19,20].

In German speaking countries and wider central Europe numbers were likewise modest: The method was associated with significant difficulties and risks. Their causes were still poorly understood. Transfusion was mostly a *reserve of last resort*. However, notably in surgery the method had gradually gained growing recognition and acceptance [11-14]. Around WW I (c. late 1900s to mid-1920s) the *average* numbers of transfusions administered in large and (inter)nationally leading university hospitals like Hamburg, Heidelberg, or Vienna are estimated to have ranged annually between the 20s and 30s [14].

Over the subsequent period of the conflict (1915-1918) even Robertson reported in original publications only about 70 battlefield cases [21-23]. Elsewhere transfusion likewise remained *'throughout the war infrequent and technically imperfect'* [2]: An early post-War compilation (1922), commissioned by the British War Office, attributed to Robertson and collaborators around 220 cases in total [19]. Around the end of 1917 transfusions of conserved *citrated* blood were introduced. These were intended to make the practice more accessible and contributed to increase its use. The extent of this increase, however, is in doubt.

In stark contrast to many *later* narratives, the *contemporary* evidence suggests that even those numbers remained modest (details below).

Put differently: Instead of making the alleged leap forward, the *objective* numbers throughout the war are *not* dissimilar from those, which had by then been *already achieved* in foreign and civilian settings - and without the conflict's cataclysmic, and allegedly catalytic mass casualty scenarios.

A belated exercise in catching up… – and covering up?

This finding already calls the usual narrative into question. It suggests that many later accounts merely "reinvent" what was primarily a belated exercise in catching up.

This first impression is consistent with wider contexts:

In the history of surgery, peri-operative care, and transfusion it is well established that many contemporary benchmarks to internationally compare against then lay in central Europe [6,12,14,24]. There Germany and Austria were 'the enemy.' The traumatic fierceness of the conflict would have served as a strong stimulus on the opposing side to disavow earlier interactions. It is plausible and understandable that rather than having to acknowledge that the enemy may have been ahead of oneself, it would have seemed politically and ideologically more opportune to beautify, embellish, exaggerate, and glorify one's own achievements, and to present and re-attribute those as original innovations.

It is also consistent with the fact that nationalist bias constitutes a recognised pattern in related earlier historiography [6,12-14].

It is also well known that the preparedness of the Western allies for the medical needs of their forces was poor. Related logistics and levels of care on the opposing side of the German-Austrian axis were usually deemed better. US-American authors and pioneers were very vocal in highlighting and addressing this phenomenon, not least by calling for humanitarian aid and volunteers. These were primarily deployed to Britain and France, well before the USA entered the war on the side of the Entente [6,25,26]. The initially better preparedness on the German-led side is consistent with their higher level of pre-War standards in surgery. It is also consistent with the persistently poor standards of wider health care in Britain before the inception of the National Health Service (NHS, est. 1948). Yet again, people in central Europe often fared better. In Germany, for example, comparatively comprehensive health and social care insurance had been largely introduced since around the late 1860s. Therefore, a strategy of embellished 'success stories' would have had added political value. It could

distract from the inconvenient truth of possibly thousands of preventable deaths, owed chiefly to lack of competence, medical preparedness, and planning: Many of the current narratives certainly help to 'offset' these with exaggerated numbers of likewise many thousands of lives *allegedly* saved by transfusions, or other innovations. Factually, however, the numbers of soldiers who received the treatment at the time (let alone were saved by it) were a few hundred: Against the backdrop of the millions of casualties [27] the potentially life-saving contributions of transfusion were far below any statistical significance.

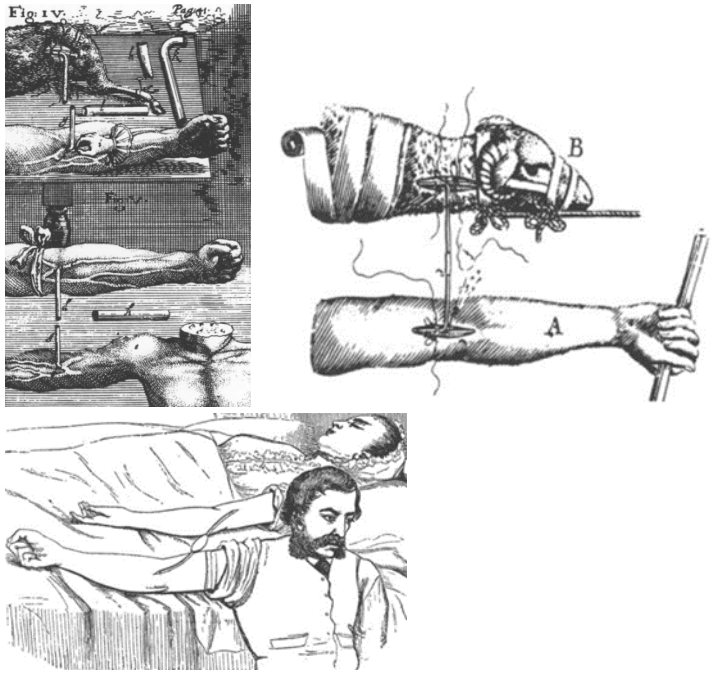
Improved surgical techniques of direct transfusion

French and British doctors mostly used *surgical* techniques of *direct* transfusion: Inter-vascular (usually arterio-venous) connections from donor to recipient. They were made of small-diameter rubber tubes, or glass pipes. Alternatively, direct vascular anastomoses were sutured.

Around the start of the war quicker, simplified *variations* were promoted: On the side of the Western allies the most prominent techniques were ascribed to the US-surgeon George Washington Crile (1864-1943) and the likewise US-based French researcher Alexis Carrell (1873-1944).

Both Carrel's anastomosis (c. 1902-1906) [28,29] and Crile's method (c. 1907-1909) [30,31] emerged well *before* the war. Carrell's technique initially had a non-clinical, experimental background. Hence, they must be seen in a different context of chronology and causality: Around the 1900s surgical techniques of blood transfusions had been described and trialled for nearly 250 years [Fig. 1 - 3]. The method even became eponymous for the second phase of a systematic chronology of transfusion-medicine, which is widely used and accepted in specialist research and writings: The period of *Chirurgia Transfusoria* (c. 1640s - 1780s) [11-14].

Fig. 1 -3 Early surgical methods of direct blood transfusion [12]
1. Johann Sigismund Elsholz (1623-1688), Clysmatica nova, Berlin and Cologne, Germany, 1667 (left)
2. Paolo Manfredi, De nova et inaudita medico-chirurgica operatione, sanguinem transfundente de individuo in individuum, prius in brutis et deinde in homine experta, Rome, Italy, 1668 (centre)
3. Gustave Joseph Witkowski (1844-1923), Histoire des Accouchements chez tous les Peuples, Appendice, L' Arsenal obstetrical, Paris. France, 1887 (right)



All techniques of surgical anastomoses had by the 1900s been long recognized as highly invasive, dependent on specialist skills, time consuming, and prone to complications (infections, blood-loss, thromboembolic events).

It is also widely accepted that at the time an unfortunate combination of clinical impracticalities and unfavourable risk-benefit ratios were the main factors which obstructed progress. With the root-causes of complications not fully understood, addressing clinical impracticalities were the main tool surgeons had to make transfusions more accessible [12, 14].

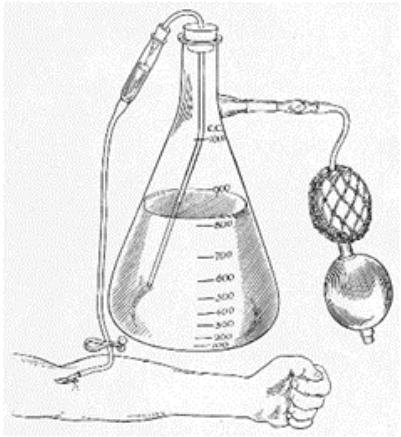
It is therefore not surprising that Crile's and Carrell's techniques were not the only suggestions to simplify the method [24,32]. The German surgeon Franz Oehlecker (1874-1957) is another example, who developed during the war an improved method of a surgically established (veno-venous) shunt. It was combined with a (syringe-based) pump-apparatus and catheters for intra-venous placing [Hamburg, Germany, c. 1915-1921] [14,33,34].

In German language-textbooks across Europe various methods of surgically established vascular access remained prominent well into the 1950s [14]. In clinical practice, however, they were since between the late 1900s and the mid-1920 gradually rendered obsolete by transcutaneous cannulation.

Transcutaneous cannulation, transfusion apparatus, and volume therapy with saline solutions

The Oehlecker apparatus is an example for a hybrid, or interim solution: It combines the outgoing technique of a *surgically* established access with the main components of more modern *transcutaneous* (predominantly intra-venous) *cannulation*, alongside apparatus specifically intended and designed for infusion, or transfusion. According to English-language accounts the latter likewise constitute advances of wartime medicine [7, 19,20] [Fig. 4].

Fig. 4 British blood transfusion apparatus, introduced during WW I by Geoffrey Keynes (1887-1982) [20]



Experiments with intravenous injections for therapeutic purposes, carried out on animals or humans, are recorded in Western historiography since at least the 1640s. Claims of priorities are contested: Notable examples are Hans Gürge

[sic] von Wahrendorff (biographical details unknown) [(Oberlausnitz, Germany, c. 1642]; Francis Potter (1594-1678) [Kilmington, Wiltshire, Britain; probably c. 1660-1665], Christopher Wren (1632-1723) [London, Britain, c. 1656] and Johann Sigismund Elsholz [Germany, c. 1667] [12]. The British obstetrician James Blundell (1790 - 1877) conducted animal experiments with transfusion since c. 1818 [35]. He is credited with having subsequently published the possibly earliest case report of a successful human-to-human transfusion (c. 1825-1828) [36]. For these purposes also Blundell already described components of both techniques [Fig. 5-6]. He acknowledged using devices obtained from named instrument makers [35,36]. Another broadly matching apparatus *ascribed* to him was built and marketed in Britain by Savigny and Company (est. c. 1720), a dynasty of instrument makers of French origin [37]. Between the 16th and the early 20th century most manufacturers of scientific instruments in Britain had foreign backgrounds and had imported their skills and products from continental Europe [38]. Piston syringes, for example, had by Blundell's time been recorded in medical history for centuries [e.g., Elsholz (c. 1660s); Galen of Pergamon (A.D. 129-200)]. Hence, also the advent of 'Blundell-style' apparatus [e.g., the depicted Savigny-device (estimated: since c. 1801)] [37], very probably predate Blundell's publications (c. 1818-1828) [35,36].

Fig. 5-6 Different techniques of blood transfusion used (c. 1818-1828) by the British pioneer James Blundell (1790-1877)
5: Surgical method with 'gravitator' for connection between donor and recipient (left). Manufacturer: *"Messrs Maw, Aldermanbury"* [36].
6: Syringe-based transfusion apparatus, attributed to Blundell (right) [Wellcome Collection, London]. Known manufacturers: *"Laundy, of St Thomas Street, Southwark"* [35] and *"(late) Savigny and Company, 67 St James Street, London*" [37].

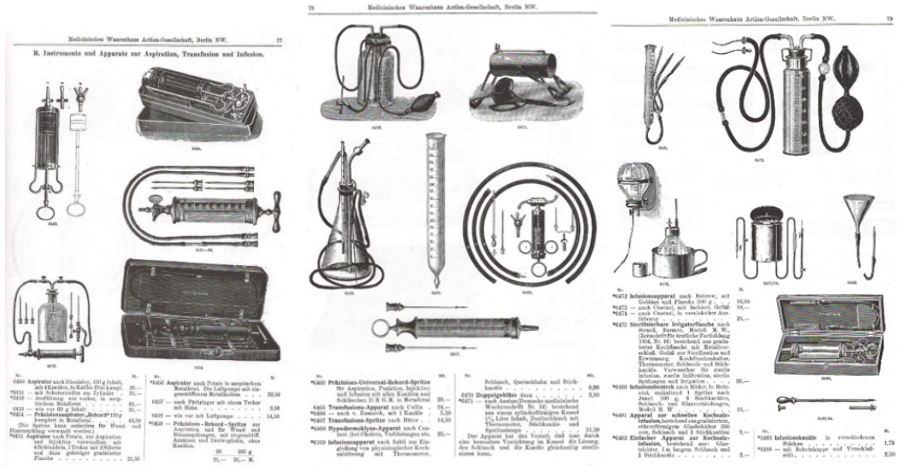
Intravenous (i.v.) infusion therapy, mostly with saline solutions, is recorded since the 19th Century [17,18]. Around 1832 the earliest known case of a successful, experimental treatment of a cholera patient with i.v. saline was reported [Thomas Aitchison Latta (1796 – 1833), Edinburgh, Britain] [39]. It failed to gain wider recognition [17,40]. Following more physiological and clinical experiments, in 1879 the superiority of saline solutions over water in hypovolaemic shock was demonstrated [Felix Jolyet (1841-1922), Paris, France] [41]. In the same year animal experiments also proved the possibility of successful shock-treatment and volume-resuscitation with saline solution [Hugo Kronecker (1839-1914) and Julius Sander (biographical details unknown), Berlin, Germany] [42-44]. By the early 1880s the gynaecologist Johann Jakob Bischoff (1841-1892) had published the first known *surgical* case report with a positive outcome in a human [Basel, Switzerland, November 1881] [45]. The surgeon Hermann Kümmell (1857-1937) published shortly afterwards two similar, but in the end less successful reports [Hamburg, Germany, May 1882] [46]. The experienced complications of intra-arterial (i.a.) application (thrombosis, necrosis, amputation) helped to establish the intra-venous route as the gold standard of intravascular fluid therapy [17]. The surgeon Walther Heinecke (1834-1901) dedicated the possibly first textbook to volume therapy and transfusion in clinical practice [Erlangen, Germany, 1885] [47].

Between c. 1885 and the early 1900s the surgeon Albert Siegmund Landerer (1854-1904) is credited with having been instrumental in establishing perioperative infusion therapy in wider German and continental European practice [17]. Notable improvements and standards promoted lay on the fields of physiologic animal experiments; trials in humans; strict asepsis; methods of application [via venous cannulation; or by subcutaneous injections] [48-51]; and another textbook [52] [Leipzig, Stuttgart, Berlin; Germany, c. 1885 – 1902]. In France postoperative infusion therapy was around the same time promoted for ‘clearing the blood’ (*lavage du sang*) [17]. By 1884 intravenous saline infusions were increasingly recognized and recommended treatment options in Germany for acute haemorrhagic or intestinal volume deficiency, intoxications, and infectious diseases [53,54]. By the early 1890s both intravenous and subcutaneous saline infusions were commonly administered for treating exsiccosis in cholera [55,56]. Around 1910 ‘standardized’ isotonic solutions for infusion therapy became commercially available. Widely used since then was the Tyrode-solution [17], introduced by the French and later US-based physiologist Maurice Vejux Tyrode (1878-1930)] [57]. Minor modifications still serve as the

basis for full electrolyte solutions around the world [e.g., *Sterofundin* (since c. 1930), B. Braun company, Germany]. Recognizing that most saline solutions available for *experimental* purposes were not physiologic, the British physiologist Sydney Ringer (1834-1910) empirically developed his eponymous solution on the base of animal experiments [17,58]. Following its first publication in a physiologic journal (1882) [58], it took half a century until Ringer’s solution was eventually introduced into clinical practice: Until at least the late 1920s totally heterogenous recipes are said to have been used [17]. A *standardised* modification, which was additionally combined with lactate, was clinically introduced around 1932 [Alexis Hartmann (1898-1964) and M.J.C. Senn (biographical details unknown): *Lactated Ringer’s*, or *Hartmann’s solution*].

All these trends led to the development of increasingly sophisticated apparatus for infusion - and its twin-sister, transfusion: By 1910 the catalogue of a leading medical supplier in Germany and central Europe listed more than a dozen *pre-WW I devices* [Fig. 7- 9] [59]. Similar examples are documented in US-literature [24].

Fig. 7-9 Pre-WW I equipment and apparatus for infusion and transfusion (c. 1900s-1910) [59]

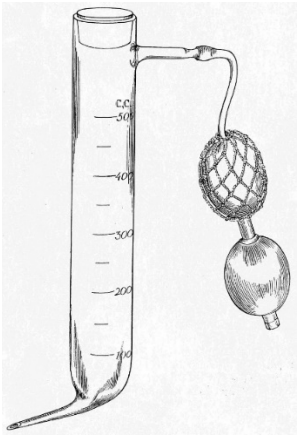


Prevention of blood clotting

In blood transfusion clotting causes complications. During WW I various methods were used to reduce related risks: The US-physicians Robert Kimpton (born 1881) and James Howard Brown (1884-1956) are credited with having introduced

paraffin-coated vials to slow invitro clotting [Fig. 10] [60]. Another method was to keep the blood stirred so that the fibrin wouldn't settle. Both methods are often portrayed as advances introduced during the war.

Fig. 10 Paraffin-coated Kimpton-Brown Tube [60]



Factually, the negative consequences of coagulation had been observed and researched since over 100 years earlier – the beginnings of the '*pre-serologic period*' of transfusion-related history (c. 1780s - 1880s) [12]. Complex and protracted controversies focused mostly on two questions: *animal* vs *human* blood, and unprocessed *full-blood* vs previously *defibrinated* blood. Notable pioneers involved included the British surgeon John Hunter (1728-1793), alongside the French physiologist François Magendie (1783-1855), and the German physician and biologist Theodor Ludwig Wilhelm von Bischoff (1807-1882); the French researchers Antoine-Augustin Parmentier (1737-1813), Nicholas Déyeux (1745-1837), Jean-Louis Prévost (1790-1850) and Jean Baptiste Dumas (1800-1884); the German-Italian duo Giulio Bizzozero (1846-1901) and Max Schultze (1825-1874); the German-Estonian pioneer of hemostaseology Alexander Schmidt (1831-1894); the Danish-German researcher Peter Ludvig Panum (1820-1885) [12], and many others [13,14, 61-63].

In 1875 the physiologist Leonhard Landois (1837-1902) described in an influential monography haemolysis and thromboembolic complications under transfusion [64]. In doing so he is credited with coining the terms haemolysis and haemagglutination [12].

In these contexts a method to slow in-vitro adhesion and agglutination for transfusion in oncologic research and therapy was already developed well before 1900 [*Vaseline-coating* of glass pipes: Ernst Freund (1863-1946), Vienna,

Austria, c. 1886-1888] [65,66]. Other methods used a *stir* and other components coated with the resin *Athrombit* (Munich, Germany, c. 1901), or specifically designed vessels made of amber [14, 67].

The above *paraffine* method for the same purpose, introduced around 1913 by Kimpton and Brown, and then again by Nelson Mortimer Percy (1875 – 1958), likewise pre-dates the war. It was immediately noted, promoted, and clinically introduced also in German and continental European practice [14]. Simple methods to stir blood are older still: A prominent clinical use was in auto-transfusion, or cell-salvage.

Auto-transfusion

The German surgeon Richard von Volkmann (1830-1889) is known to have already performed autologous blood re-transfusions (cell-salvage) in the 1860s: During exarticulations of the thigh at the hip joint blood loss was collected in a washbowl, defibrinated by continuous stirring, and then reinjected into the severed femoral vein [68].

A pre-emptive method for surgery on the extremities is still widely used: *Exsanguination* with tight bandages. Just like with the even older method of simple torniquets, the main aim here is to prevent blood loss. A claim of priority for both methods was later ascribed to Germany's most famous pioneer of military medicine: Friedrich von Esmarch (1823 – 1908). This illustrates that embellishment of battlefield practice to the detriment of pre-existing, civilian developments also occurred earlier and in other national contexts [69-75].

Shortly before and around WWI autotransfusion is likewise well documented: It was originally the reserve of a relatively narrow segment of gynaecological and surgical emergencies (ruptured tubular gravidities, or spleens). Notable publications are on record from gynaecologists like Johann Thies (born 1880) [Leipzig, Germany, 1914], or Alfred Wepfer (1882-1951) [14,76,77]. Already by 1915 Wepfer reported over 100 lifesaving autotransfusions. These were mostly field-surgery and augmented with saline solution. In surgical practice Ernst Rodelius (1883-1971) reported 75 autotransfusions, which were performed on WW I casualties between 1914 and 1919. His patients likewise benefitted from experience gained since years before (Hamburg, Germany, c. 1910s) [14,78,79]. In the early inter-war period Dietrich Kuhlenkampff (1880-1963) became the main promotor of auto-transfusion in German surgical practice. By the later 1920s and 1930s the method was relatively widely practiced [14,80,81].

Routine blood-group testing: a victim of practical difficulties and inter-professional demarcation disputes

Between c. 1900 and 1902 a Vienna-based team of researchers around Karl Landsteiner (1868-1943) famously identified the main antigenic qualities, or Isoagglutines, which define human blood groups [82-85]. These were subsequently classified as A, B, AB and 0. Their characteristics explained most interactions, when different bloods were brought together. The most important risk-factor and obstacle against safe blood transfusions in humans had been identified: Blood-group incompatibility [1,2,10-12,14,24].

The predictability of their interactions also provided a diagnostic tool to avoid transfusions between mismatched donors and recipients. The implementation of serologic testing in clinical practice, however, proved a sluggish process (c. 1909 – 1930s).

Most early advances focused on agglutination: While studying in Heidelberg, Germany (c. 1907-1909) the US-immunologist Arthur Fernandez Coca (1875 – 1959) [86] proved agglutination as the cause of the (by then long-known) phenomenon of sudden thromboembolic deaths during transfusions [12,14]. Other sources ascribe this questionable priority to Ludvig Hektoen (1863 – 1951) (c. 1906/1907) [24]. Albert Arthur Epstein (1880-1965) and Reuben Ottenberg (1882-1959) are internationally recognized for strongly recommending a *routine* agglutination test prior to every transfusion and suggesting a suitable in-vitro method (New York, USA, c. 1908 - 1915] [12,14 24,87-89]. Werner Schultz (born 1878) published an early case series of transfusions with defibrinated blood in anaemic patients. It likewise demonstrated an improvement of safety where routine pre-checks had been performed (Berlin, Germany, c. 1910) [14,90,91]. By 1914 also his German colleague Albert Plehn (1861-1935), an expert for tropical medicine, and Paul Morawitz (1879-1936), a pioneer of hemostaseology in Strasbourg arrived at the same conclusions [14,92]. This work also provides insights into other areas, which appear to be neglected in our WWI-centred historiography: One of these are indications for transfusion in tropical ailments, such as malaria, sickle cell disease, sleeping sickness, or yellow fever. Notably in Africa this had likewise led to noteworthy research, experiments, and trials [93]. Another example is the contemporary advent of immunologic treatment with convalescent sera [94].

Subsequently routine pre-checks were gradually, but increasingly recognised in continental Europe as recommended best practice. Technically, however, the method remained demanding, relatively cumbersome, and was often not adhered to: In German military and obstetric practice untested transfusions were deemed perfectly acceptable in cases of urgency [14]. On the side of the Western Allies routine blood-group pre-testing was likewise *not* adhered to [1,2,24]. Of the about 220 transfusions ascribed to Bruce Robertson and his circle, less than 2 % were crossmatched [19,20]. A prominent US - advocate of the method during the war became William Lorenzo Moss (1876-1957) [95,96]. His involvement also predated the conflict [97].

Additional factors are known to have further delayed the introduction of the new findings and practices by at least a decade (c. 1910 – 1920s) [12,14]: A pre-occupation with matters of practicality was pursued in tandem with an under-recognition of the recent sero-immunologic breakthrough – alongside its representatives. The latter heralded the emergence of the many important sub-specialties, which clinical practice nowadays takes for granted: Haematology, Serology, Immunology, Transfusion-Medicine, Haemostaseology etc.

A prominent example for this phenomenon has also been identified in Anglo-American historiography [12]: The above US-surgeon George Washington Crile. His monography ‘Hemorrhage and Transfusion’ (1909) [98] is widely considered as an internationally leading contribution by surgeons, and by his US-compatriots. Crile identified known haemolytic factors. The phenomena relating to agglutination and serology, however, he left to others [12]. His sequel ‘Anemia and Resuscitation’ (1914) [99] documents anatomic and physiologic experiments on the effects of anemia, selected aspects of surgical treatment, and resuscitation. Although it likewise contributed to him being later graced ‘father of transfusion’, on the method itself his study is noticeably scant. A decade after the war Crile was invited by the US-Army to summarize war-time experiences [100]. This further cemented his iconic status [6,101]. With all his notable contributions, however, Crile focused on transfusion-*related* practicalities: The above techniques for surgical shunts; transfusion apparatus and pumps; a physiologic theory of shock pathogenesis, prevention, and treatment (Anoci-Association) [102]; safer peri-operative and anaesthetic techniques for instable patients; suitable anesthesia apparatus for the same purpose (Ohio Monovalve, c. 1910); and training competent personnel [6,101]. To varying extent all his initiatives were adaptations: Like many leading US-surgeons of the time Crile had received his advanced training in Germany and Austria. He was fluent in German and returned to Europe regularly. He strove to promote international and trans-disciplinary discourse and to introduce speedily into US-practice the most recent advances from then internationally leading Austrian and German centres of excellence [101].

Hence, the potentially life-saving practice of routine blood-group testing did neither first emerge during the war, nor did it have its main breakthrough: Instead, it *stagnated,* owed mostly to an unfortunate mix of clinical impracticalities and counterproductive attitudes. The latter were mostly held by surgeons. These had internationally dominated the practice of blood-transfusion for over 200 years. Since the early 1900s to 1920s, however, they found themselves, their practices, and expertise eclipsed and taken over by newly emerging specialists. The fourth and final phase commonly distinguished in transfusion-history had begun: The *serologic period*, which continues to this day [12,14].

The cumbersome impracticalities of routine testing were only gradually overcome since around the mid-1920s [14]. The main advancement was the introduction of commercially available test-sera [Paul Moritsch (1896-1966), Vienna, Austria, c. 1925-1927)] [103]. The method was further augmented by the bedside biologic pre-test: It exploited the longstanding experience that adverse reactions mostly occur gradually and with a slight delay, even if only small test doses (usually 5-20 ml) were applied prior to the full commencement of the transfusion [Franz Oehlecker (1874-1957), Hamburg, Germany, c. 1921 – 1928] [104,105]. Another early bedside agglutin-test between *citrated* blood samples was introduced by the gynaecologist Ludwig Nürnberger (1884-1959) [Hamburg, Germany, c. 1920-1922] [106,107].

With regards to the professional demarcation disputes, the new sub-specialties became rapidly successful in the USA. There they established themselves by the 1920s to 1930s. The probably most influential example for this achievement is, yet again, a nowadays under-recognized trans-national joint venture: The transfer of the Viennese discover of the blood groups, Landsteiner (and members of his circle) to the emerging US-leader in the field - the Rockefeller Institute in New York City (c. 1922 / 1923): By then the USA, as a newly emerging, innovative powerhouse, had just begun to spread its wings (c. 1900s - 1920s). Over the next generation (c. 1920s-1950s) it eclipsed formerly leading central Europe [12].

In Germany and much of central Europe, by contrast, transfusion was mostly considered until well after WW II as *'a surgical method, which may only be carried out by surgically capable hands'* (Oehlecker) [14]. Surgeons initially defended their predominance more successfully. The longevity of this phenomenon for about another generation was mostly owed to older and more robustly established surgical structures. In practice their outcomes were not necessarily inferior [12,14]. Crile's example illustrates similar tendencies in the USA. Hence, the different routes and timelines to *professionalisation* between the USA and most of Europe over the following decades (c. 1920s-1950s) were

mostly matters of nuances and speed: The disciplines emerging around blood transfusion had in Europe a relatively more difficult and protracted process of *emancipation* from their surgical roots [14]. The discipline of anesthesia is another, well examined example: Here, too, the emancipation process from its mother-discipline surgery led around the same time and for the same reasons to different paths, which were *temporarily* predominant on either side of the Atlantic [108]. Eventually, however, these converged again, leading towards the same, sensible outcome of increasing professional sub-specialization.

Blood conservation with citrate

The 'citrate method' of blood conservation is another example, which is often ascribed to the Great War. It became one of the main techniques, by which blood banks operate to this day.

It had long been understood that anticoagulative measures did not only make transfusions safer. They could also be conserved. Examples of methods already mentioned were the coating of pipes and vials with Vaseline (c. 1886), or Paraffine (c. 1913), or defibrination (19th century). Unsurprisingly, also other anticoagulants were examined: The British physiologist John Berry Haycraft (1857-1922) - working in France at the time and previously trained in Leipzig, Germany [14] - described the anticoagulative properties of hirudin (leech extract) (Strasbourg, France, 1884) [109] . The method was not clinically introduced, as contamination with other ingredients led to adverse reactions [14]. A few years later the above chemist Ernst Freund described the anticoagulative properties of *(tri)sodium citrate* ($Na_3C_6H_5O_7$) (Vienna, Austria, 1891) [14, 110]. Another three years later the Northern Irish pathologist Almroth Wright (1861-1947) likewise experimented with the technique [9, 111]. Yet again, also the citrate method did not gain immediate recognition, but remained confined to laboratories. A re-description and experimental use of hirudin and sodium oxalate (Na2C2O4)-solution occurred another few years later [L. Landois and PhD-students E. Schultze and G. E. Molien, c. 1900] [12,112]. Around the same time early studies on the coagulation cascade had led to the discovery of Thrombokinase, alongside some of its interactions with Prothrombin, Fibrinogen and Calcium [Paul Morawitz (1879-1936), Leipzig, Germany, c. 1904] [113]. This raised awareness for the not yet remotely understood complexities of the coagulation system [12,114].

In this wider context the method of adding sodium citrate, primarily for the *conservation* of blood, was internationally *reintroduced* around the time the war broke out (1914 / 1915). This occurred in quick succession by the Belgian surgeon Albert Hustin (1882-1967) [115,116], the Argentinian physician Luis

D'Agote (1868-1954) [117], and the German-American surgeon Richard Lewisohn (1875-1961) [118-120].

The related claim of "priority" was - yet again - immediately contested [120,121]. The contributions of Hustin and Agote were published in relatively low-profile journals. They may have had less impact [120, 121]. Lewisohn, by contrast, had been born and educated in Germany [14, 121]. The USA, as his new homeland (since c. 1900), were at the time still a neutral power in the war. Hence, his findings and recommendations were simultaneously published in prominent US- and German journals [118,119]. Also on the German side it was noted that the 'new' method of blood conservation would, in Lewisohn's own words, *'serve with distinction, if rapidly introduced into current practice on the battlefields, where it would certainly prove much more effective than the usual saline infusions'* (translated) [14].

On the side of the Western allies the role of the citrate method was later exaggerated: Contemporary and historical accounts acknowledge that initially also its use was sporadic and haphazardly improvised. The numbers of patients treated were, yet again, almost negligible. L. B. Robertson is the best-known example on the British side: His work documents a gradual change of methods from surgical anastomoses and full blood transfusions to intravenous cannulation and apparatus, alongside his first four cases of citrated blood [21-23].

His British born US-namesake Oswald Hope Robertson (1886-1966) is credited with having first trialled and introduced the citrate method for the US-forces [Fig 11] [122]. This happened after the USA had entered the war and commenced to deploy troops (November 1917). Then staff had to be trained, clearing stations equipped, *'resuscitation teams'* formed, and *'shock centres'* established [19]. By the time all relevant structures were sufficiently operational (c. mid-1918) the conflict was almost over.

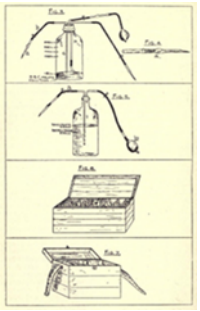


Fig 11 Oswald Robertson transfusion apparatus for the US-Army (c. 1918) [122]
These British drawings [20] illustrate the ad-hoc generation of citrated blood conserves, their short term cryo-conservation (ice-cooling), and application via trans-cutaneous cannulation.

The rapid expansion of the practice of citrated transfusions – an example for later myth- and legacy-building?

Nowadays it is claimed that *'by 1918 each base-hospital and casualty clearing station hospital was transfusing about 50 to 100 pints of blood to an average of 50 wounded each day on the Western Front'* [9,123]. Allegedly, *'countless lives'* were saved [9,124].

Contemporary sources to support these claims are - at best - scant: On the British side the above 1922-documentation of the War office contains (plausible) statistical claims on outcome improvements with transfusions. These are based on less than a handful of small-scale series. In these 34 to 55 transfusion-cases are included. These were mostly for major abdominal, or abdomino-thoracic trauma. All other examples for potential indications, cases reported, and supporting references appear to be sporadic, anecdotal casework, or theory-based assumptions [19].

The same applies for the probably most influential British textbook of the time: It was published in the same year (1922) by Geoffrey Keynes [20]. In marked contrast to the government's publication, Keynes referenced his considerable awareness of contemporary developments and literature - also on the continent. Keynes may also serve as an example, how exaggerations mostly manifest in much later accounts: They appear to be chiefly based on his autobiography (1981) [123]. His claims were then uncritically perpetuated.

Even on the side of the US-forces, who introduced the technique, the evidence is not more convincing: The original publication of Oswald Robertson focuses almost exclusively on practical and logistical issues. Only at its very end it briefly mentions 44 transfusions, administered to 38 patients. In all cases pre-testing is said to have been performed. The mortality was 34% [122]. A similar focus on practicalities, logistics, and related research is shared by the enormously extensive material, which was compiled and published over the following decade by the medical services of the US-forces (17 Volumes, 1921-1929) [125]. It likewise reveals little in terms of absolute numbers.

Therefore, the findings of this author confirm occasional, earlier observations: These concluded that *'there is no record of how many transfusions were performed during the war'* [126]. The method must in fact have remained '*infrequent'* and *'imperfect'* [2]. The early post-War statement that *'…in 1917 the value of transfusion as a routine measure in the treatment of haemorrhage had become fully established…'* [19] was either an aspirational desiderate, or an acknowledgement with the benefit of hindsight. All *objectifiable* evidence suggest that the promising citrate method simply arrived too late to make a difference.

Both Robertsons worked or interacted since *before* the war with the circle around Francis Peyton Rous (1879-1970) at the Rockefeller Institute, and with Lewisohn at the Mt Sinai Hospital [2,7]. Drawing on earlier, international literature, also Rous's circle had around that time been conducting research on blood conservation and its transfusion [127,128].

The situation in Europe was not much different: One example, where early trials with citrated blood transfusions were reported is from Zürich, Switzerland (Klinger-Stierlein, 1917). Also storage provisions were made. These were not yet for the readymade citrated blood. Instead, defined amounts of citrate were stored in vitro. With these conserves could be rapidly made and provided, if deemed necessary [14]. The same method is also recorded as the practice of the Western Allies [19,20].

Blood banks, related developments, and trans-Atlantic nuances

The Rockefeller centre is credited with having subsequently founded the world's first *blood bank:* A specialised depot, where larger amounts of *citrated* donor blood of all groups were conserved, stored in vitro, and made available for emergency use (New York, USA, c. 1919) [1,2,7-12].

Still, even on the field of *citrated* blood the above small-scale precursor-, interim-, or laboratory solutions had by then been trialled. Ludwig Nürnberger is another contemporary example from Germany, who researched citrated blood and its transfusion, related safety-checks, and the practicalities of sterile in vitro blood conservation [Hamburg, Germany, c. 1920-1925] [14,106,107].

Earlier beginnings of blood-banks can be traced back many decades before the war: On the field of cryo-conservation Panum described in 1863 that extracted donor-blood, which had been kept cooled and stirred, and which had then been re-warmed prior to administration, was *'still perfectly suitable for transfusion'*. He even suggested that such a *'method of conservation'* should be used for facilitating the ready availability of blood in surgery, citing the contemporary military conflicts as one potential field [12]. As a living blood bank supporters of lamb-blood transfusion recommended in the 1870s to have an animal with a surgically exposed carotid artery already prepared and ready for use before receiving combat casualties [129]. By 1883 Ernst von Bergmann (1836-1907) predicted a *' new, blood-donating era in medicine'* [130]. With transfusions mostly the reserve of relatively infrequent emergencies, and blood conservation in its infancy, larger hospitals resorted to appeal for ad-hoc emergency donations when the need arose. Common donors were family and friends of the patient, or members of hospital staff. As the latter group was often more readily available and amenable, local arrangements for volunteering professionals were made as required. Unsurprisingly, the same methods of ad-hoc emergency blood donation, as early blood banks in vivo, were used by all waring nations. They were nothing new, but by the time relatively well rehearsed surgical emergency procedures [14].

In local, national, and international practice both, ad-hoc emergency donation and conserved and stored citrated blood from designated depots persisted side by side well beyond World War II (1939-1945) [131]. Conceptional, logistical, and practical differences behind terms like *blood-bank*, *blood depot*, *blood donation service*, or *transfusion-institute* were blurred and inconsistent. In continental Europe such hybrid organisations were mostly formalized on institutional and regional levels since around the 1930s [12,14, 132]. Examples of earlier pioneers are Paul Clairmont (1875-1942) in Zürich, Switzerland (since c. 1917), Nürnberger in Hamburg (since c. 1920); Ernst Unger (1875-1938) in Berlin, or Paul Morawitz in Leipzig [14]. The earliest example in Britain was the London Blood Transfusion Service. It was founded in 1921 by Percy Lane Oliver (1878-1944). Keynes became its first medical advisor [7,8,10,133].

On national levels umbrella-organisations emerged mostly between the later 1920s and the 1950s. Commercial providers temporarily rose to prominence (and sometimes controversy), notably in the USA. They remained the exception: By 1929, for example, Landsteiner is known to have publicly campaigned against the commercialization of the service. He argued in favour of state-regulated and science-based organisations, which began to be established in European countries around the time [12].

Between the 1920s and 1950s in Germany and much of central Europe transfusion of freshly donated 'full blood' probably remained the more common routine. Notably in the USA the modern method of citrated depot blood gained quicker and wider acceptance. By the 1930s thousands of cases had been reported. Yet again, the most important factor perpetuating the older method in Germany and many neighbouring countries were long established structures, which were deemed to work well. Other factors were the eminence of influential citrate-critics like Oehlecker, professional conservatism, the emancipation and demarcation disputes, and the protracted economic, political, and social crises and conflicts, which ravaged the continent [12,14].

Birth of transfusion medicine

Considering the above, also the narrative that the war marked the *birth of transfusion medicine* [10] is questionable.

In the wider historiography of blood transfusion, for example, the fourth and so far final (serologic) period is usually defined to have begun about a generation *before* the war (c. 1880s) [11,12]. Key-events from around that time were the introduction of the above methods of early anticoagulation (c. 1884-1900); or the experimental identification of incompatible *Isolysines* and *Isoagglutinins* between individuals of the same (animal) species, alongside their role in triggering adverse reactions [Paul Ehrlich (1854-1915) and Julius Morgenroth (1871-1924), Germany, c. 1900] [134]. This led to the subsequent discovery of the blood groups in humans by the circle around Landsteiner (c. 1900-1902). Then came the sluggish processes of the establishment of serologic testing (c. 1909 – 1930s), including a lost decade (c. 1910-1920s), when almost everywhere surgical predominance and impracticalities delayed recognition for the newly emerging findings, methods, and sub-specialties. Seen in these contexts, the alleged *birth of transfusion medicine* during WWI sits chronologically right in the middle of a period of stagnation and obstruction.

Blood substitutes and plasma-expanders

Treating blood-loss with blood substitutes is a final example, which is chiefly associated with WW I. Yet again, the wider contexts paint a more nuanced picture:

Ernst von Bergmann had already observed after the German-French war of 1870/1871 that in acute traumatic shock replenishing fluid volume is more important than blood cells [12]. This initially contributed to the advent of intravenous fluid therapy, mostly with saline. In 1895 the British physiologist Ernest Henry Starling (1866-1927) recognized the importance of plasma protein and colloid-osmotic pressure for the fluid distribution between intra- and extravascular space [135]. Since around 1903 – 1905 experimental physiologists in Germany began to focus research on artificial blood substitutes [136,137]. Paul Morawitz successfully used in animal studies saline solutions augmented with *Gummia-arabicu*m for experimental shock treatment. These are complex plant colloids, extracted from a northern African acacia. Consisting of various sugars and minerals, the substance had already been described and used for animal experiments around 1863 by the Leipzig physiologist Carl Ludwig (1816-1895) [17]. Since around this time it was also widely used in pharmaceutical industry [138]. In 1915 the experimental physiologist James Joseph Hogan (1872-1942) published the results of several years of similarly promising studies with *gelatine*

solutions (San Francisco, USA) [139]. In the same year William Bayliss (1860-1924), who cooperated with Starling, published case reports of successful experimental treatment of traumatic hypovolaemic shock with Morawitz-style '*gum-saline'* solutions in WW I casualties [140]. Around the same time the German physiologist Otto Kestner (1873-1953) likewise worked with '*Gummi Arabicum'* [141].

On both sides of the conflict the clinical use of plasma expanders then remained sporadic and experimental (c. 1915-1919). Causes were mostly supply issues and concerns about various adverse reactions, side effects, and contaminations. In Germany, Kestner's research proceeded with animal trials since around 1916. Experimental emergency-treatment in human battlefield casualties was reported shortly afterwards [Rübsamen (1916), Krabbel (1918), Roedelius (1919)] [17]. Besides to colloids, also *hypertonic* saline solutions were trialled [142].

Based on successful treatment attempts with gum-saline solutions, the Western Allies published after WW I the latest evidence and recommendations for shock treatment with plasma expanders ('Allied Shock Committee') [17]. Kester and other German authors likewise published their findings from around 1919 onwards. Kestner and Fritz Külz (1887-1949) also quickly reinstated academic interaction with their overseas colleagues [17,141,143,144].

Conclusion and Outlook: Time to reclaim shared heritage!
- and to bust the myth of WW I as a force for good?!

The historical evidence presented does not lend itself to narratives that WW I had a positive influence on transfusion-related innovations. All relevant developments occurred *before* and *after* the conflict. The wartime itself was primarily a period of stagnation. This is consistent with the disruptive and destructive nature of human conflict.

Embellished narratives are predominant in English-language literature. Most of these did not manifest immediately after WW I, as one might expect, but around and after its equally devastating sequel with WW II (1939-1945). *Anglo-centrist bias* is much more pronounced in British, than in US-American accounts. This trend is consistent with the finding that most of the innovative interactions around the time were between continental European countries (not least the later 'enemies' Germany and Austria) and the USA (who had initially remained neutral). They were *not* – as usually portrayed – primarily between the USA and Britain. In European historiography the *alleged* advent of transfusion is therefore likewise perceived as *'less spectacular'* [14]. British activities were mostly preoccupied

with catching up. Longstanding and similar patterns for nationalist bias in related historiography are well known: Some of these have been traced back to the period of the fierce hegemonial clashes between the emerging powers of European imperialism and colonialism (17th to 19th centuries) [11-14]. Others have been demonstrated more recently [6].

All examples share international and trans-disciplinary *contexts*. Empirically, this is the *norm* in historical developments: They likewise tend to be *international, trans-cultural, multi-disciplinary, multi-lateral, and reciprocal.* In stark contrast, the narratives *re-investigated* here often promote an extraordinary extent of *nationalist bias:* They effectively *monopolize* historical achievements. They glorify, idealize, embellish, and exaggerate. Hence, they are unilateralist in perspective and occasionally supremacist in attitude. Many have since morphed into deeply embedded *folklore*. From a scientific perspective, however, this folklore mis-represents and mis-contextualizes objectifiable facts, chronologies, and causalities.

It is undisputable that WW I was one of worst catastrophes which ever befell humankind. Similarly painful recognition applies for the preceding period of Imperialism and Colonialism, or the subsequent disasters surrounding WW II. They all represent profoundly difficult heritage.

The above aspects represent two sides of the same medal. *Both* represent true, globally *shared World Heritage*: Like all history, they come with shine, pride, pomp, and glory - *and* with long, dark shadows, pain, shame, and tragedy.

One cluster of causes for factual inaccuracies are an understandable desire to distance oneself from a perceived enemy – preferably with simplistic, self-enhancing narratives - or *propaganda.* Another cluster are disputes arising from inter-professional relations. Methodological factors contributed: One obvious example are language barriers. Uncritical, or even unduly deferential attitudes towards certain sources and historical figures merit critique: From a perspective of *scientific* historiography it *must* be possible to respect the good intentions and deeds of the war generations, but to simultaneously point out that numerous of their 'innovations' constituted proven plagiarism, or profiteering.

In conclusion, the evidence and patterns emerging strongly suggest that numerous sectors of historiography on 20th century medicine and science must be reappraised. In the future they will have to be presented in more balanced and objective ways. For the *concept* of the *History of Military Medicine* the implications may be profound.

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The Importance of the Anaesthetists Travel Club to American Anesthesiology

Douglas R. Bacon, M.D., M.A.

Professor of Anesthesiology, Professor of the History of Medicine
Mayo Clinic Department of Anesthesiology and Perioperative Medicine

Working at the Mayo Clinic, John Lundy had the opportunity to interact with the world's leading surgeons not only in the Rochester, Minnesota operating rooms, but through the questions about anesthesia visiting physicians from around the world would ask. Especially, he was present for a meeting of the Society of Clinical Surgery which had been founded by William J. and Charles H. Mayo decades before Lundy's arrival. The Society aimed to demonstrate new surgical techniques in the hosts "home" hospital. No formal papers were presented, but rather the visitors gathered with the host to discuss what they had seen that day over dinner.

Dr. Lundy co-opted this idea to form the Anaesthetists Travel Club. Like the surgeons group, the invitation went out to the young up and coming physician specialists from across the United States and Canada. Seventeen physicians arrived on December 16, 1929, for the inaugural meeting. Arthur Guedel traveled from Los Angels, California, Robert Hammond from White Planes, New York, Brian Sword from New Haven, Connecticut, Lincoln Sise, the "old man" at 55 year old from Boston, Ansel Cain from New Orleans, Henry Ruth from Philadelphia and Ralph Waters from Madison, Wisconsin. Canada was well represented with John Blezard from Edmonton, Eason Brown, Charles Robson, and Harry Shields from Toronto, and Charles Stewart from Montreal.

The group toured many of the unique features of Mayo Clinic. They spent a day in the operating rooms of St. Marys hospital watching spinal anesthesia, Ethelene nitrous oxide anesthesia. Additionally, they witnessed transsacral and trans vertebral blocks as well as the use of sodium amytal.

The meeting was a success. John Lundy had created and continued to build a group of young leaders in anesthesiology. These men would eventually take over the certification process of the New York Society of Anesthetists transforming it into the American Society of Anesthetists (ASA). In turn, the ASA working with other groups would create the

American Board of Anesthesiology in 1938. Of the original nine directors, only H. Boyd Stewart of Tulsa, Oklahoma was not a Travel Club member, but he joined in 1940.

A simple invitation to associates to come and see new and innovative anesthesia techniques created a powerful cadre of physician specialists willing to define the specialty and who was qualified to practice as a specialist. The process survives to this day. It is a lasting testament to Lundy's forethought and creativity. The Travel Club, however, was perhaps a casualty of anesthesiology's success in World War Two. As the discipline expanded, a new more dynamic organization was needed. Working with Rolland Whitacre, John Lundy helped create the club's successor—the Academy of Anesthesiology. The Academy carries on the traditions of the Anaesthetists' Travel Club in scholarship, leadership and perhaps even more essential in camaraderie.

Epidural injections at the patients' home for acute lumbago/sciatica

Dr Fabrizio F Casale.

Dr James Cyriax, Consultant Orthopaedic Physician at St Thomas' Hospital, advocated caudal epidural injection using 50ml procaine 5% with 80mg methylprednisolone for the treatment of acute lumbago/sciatica.

At Colchester Hospital, Dr Alan Thorogood (founder member of the Intractable Pain Society of Great Britain) and later Dr Fabrizio Casale performed c.14,000 of these procedures during outpatient pain consultations, including 2,500 in the patient's own home.

Dr Casale kept records of 1,125 domiciliary consultations he performed during the period 1983-2003, at which he performed 520 caudal epidural injections for acute lumbago/sciatica. Perhaps we were fortunate not to encounter allergic reactions to procaine (previous reports might have been toxic reactions to the large quantities of procaine administered). However, its transient effect was ideal for use in the outpatient and domiciliary setting.

ISHA 2025 - PARIS

D.Simon, MD & J.Hotton, MD Market Harborough 26 September 2024

1° About ISHA

The International Symposium on the History of Anaesthesia (ISHA) is held every four years since 1982. It is an unique opportunity to talk on the History of Anaesthesia during three days. It is a time to exchange scientific items and meet friends.
A Scientific Committee develop the topics in the History from the First Aid to Intensive Care Medicine, the Physiologists of the XVIIIth century to the innovating ¨Process, military Medicine to civil Applications, ancient Practice to modern use. All the topics are useful for our practice.
From Rotterdam in 1982 to Kobe in 2022, a lot of cities hosted the congress: London in 1987, Atlanta in 1992, Hamburg in 1997, Saint Jacques de Compostelle in 2001, Cambridge in 2005, Heraklion in 2009, Sydney in 2014 and Boston in 2017, these meetings in English are in high-quality. The proceedings are published after every meeting.
Next one will be in Paris.

2° See Paris again

In a city full of History and stories there are a lot of special events:

1° Historic Paris

The French Revolution : 14th of July 1789 : taking of the Bastille The Second Revolution : « Liberty leading the people » in 1830 The Commune de Paris in 1871 : fire in City Hall
The Liberation of Paris : 80 years ago : 25th of August 1944
Romantic Paris: City of Light, An American in Paris-Georges Gershwin, songs of Josephine Baker, Paris is a feast-Ernest Hemingway, Satori in Paris-Jack Kerouac, Paris au mois d'août-Rene Fallet and song-I love Paris-Cole Porter by Helen Merill.

2° Heritage Paris

Notre Dame de Paris : built in 1100, on fire the 15th of April 2019, reopening the 7th and 8th of December 2024.
The Louvre : the most important Art Museum in the world opened in 1793. The Paris Opera : Garnier Palace opened the 5th of January 1875
The Eiffel Tower built for the centenary of the French Revolution in 1889 The Seine River : navigable and opened to bath in 2025

3° Scientific Paris

The Sorbonne : founded at the beginning of the XIIIth century, the College of Theology founded by Robert de Sorbon is agreed by the Royal Power in 1257. In the XVIIth century, Cardinal Richelieu, Headmaster of the College renewed the Sorbonne and built a baroque Chapel (1635-1642).

The College de France : Royal College created in 1530 by François the First . Dual purpose : make researches in a total freedom and pass on the knowledge. Made of departments, institutions and laboratories, the College is contributing to the scientific progress and research in France and in the world. A statue of Claude Bernard welcomes you in front of the gate.

The Pantheon : A church devoted to Saint Genevieve, Paris's patron Saint. Built by Soufflot the church must compete with Saint Paul in London and Saint Peter in Roma. Opened in 1790. Because of the French Revolution, the church turned in a national Necropolis with the death of Mirabeau in 1791. Church or secular Church, the Pantheon changed 6 times since the funeral of Victor Hugo in 1885, permanently secular Church :« Aux Grands Hommes la Patrie
Reconnaissante ». There are buried a lot of personalities, most known like Voltaire, Rousseau, Hugo and Marie Curie.

The Institut de France : place of the five academies : Academie Française, Academie des Inscriptions et Belles-Lettres, Academie des Sciences, Academie des Beaux-Arts and Academie des Sciences Morales et Politiques. The Institut is created in 1795 and the goals are : « to carry on, to support, to inform ».
Inside the building is the Dome, symbolic place of the Institut, old Chapel where the academicians get together. There are also two libraries : Mazarin library opened since 1643 and library of the Institut founded in 1795.

The Medicine Faculty and the Museum of Medicine History : Created in 1774 by Louis XVI, Health School in 1794 and Medicine Faculty in 1808.
The Museum, held inside, opened in the 50's, opened for the public in 1994, keeps the most antic Collections in Europe gathered by the Dean of the Faculty Lafaye in the XVIIIth century. Fille by various branches of the operative Art until the late nineteenth century.

3° ISHA 2025

The ISHA2025 goes on during three days from the **16 to the 18 September 2025** with conferences and submissions in English and visits : two days in the historical old Faculty of Medicine, place of Cordeliers, 15th School of Medicine Road and one day in the Convention Centre, Maillot Gate in Paris. This symposium is in cooperation with The Paris Cite University and the French Society of Anesthesiology (SFAR).
The focus is : « Exploring the Past to prepare the Future ». We shall be happy to welcome you in Paris and for your contribution to enhance by speaking or e-poster during the congress.
An Exhibition on the History of Anaesthesia will be held in the Medicine Museum. We shall show a lot of Materials and Books coming from the Library of the Faculty.
This central Area in Paris-Quartier Latin- is amazing to go on visiting renowned places like College de France, Pantheon, The Sorbonne, The Institut de France, Conti wharf. We are planning a lot of tours in these places. At last Paris without The Seine River is not Paris. In 2025 we could bath in some special places but if not we shall have a gala dinner on the Seine.

All useful information for the symposium will be on the site : www.isha2025.com You can also visit the site of the CHAR : www.char-fr.net

Welcome in Paris next year !

BLESSED CHLOROFORM LECTURE

Anaesthetic practice in Scotland compared to England in the Victorian and Edwardian eras

Alistair G McKenzie
Retired Consultant Anaesthetist, Edinburgh

Abstract

In the second half of the nineteenth century and up to the end of the Edwardian sovereignty, anaesthetic practice in Scotland differed markedly from that in England. Chloroform was invariably used in Scotland with apparent disregard for reports of deaths under its influence. By contrast in England, concern about chloroform deaths, which were subject to inquests there, led to ether often being chosen instead. This article examines the different interpretations and handling of chloroform deaths in the two countries – drawing on the medical journals of the period and archived documents. Quite symmetrical claims were made. Whereas in England the danger of chloroform was perceived to be an inherent property of the agent itself, in Scotland the blame was thrown on a timid method of administration. The interpretation in Scotland was supported by a network of doctors who promoted chloroform as effective, safe and easy to administer, manufacturers who had monopoly of its manufacture, and legal practitioners who were uninterested in investigating anaesthetic deaths. Although reporting of anaesthetic deaths was flawed in England, underreporting was far worse in Scotland. The fear of anaesthetic deaths in England allowed the seeds of specialisation in anaesthesia to germinate, whereas in Scotland the downplaying of anaesthetic risk obviated the notion of such specialisation.

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