

DENTAL HISTORIAN

NUMBER 67 (2)

July 2022

Contents

Lindsay Society Officers 2021/22.....	iii
Editorial.....	iv
Lily Fanny Pain FDS MRCS LRCP LMSSA (1899-1973) and her husband Leonard Austin Harwood MRCS LRCP LDS (1886-1952)	
Rachel Bairsto and Stanley Gelbier.....	55
Old teething remedies, a study into how a surgical procedure for the management of teething was marketed in the 18th century	
Zeenathnisa Mougammadou Aribou.....	59
History and evolution of inhalation sedation equipment specifically to UK development	
Janet Pickles.....	68
Dame Margaret Seward - an important influence in the development of UK orthodontics	
Chris Stephens and Sophie Riches.....	73
European Federation of Conservative Dentistry: the first twenty years	
Nairn Wilson, Stephen Dunne, Gottfried Schmalz, L. Şebnem Türkün	77
The history of the textbook "Oral Anatomy"	
Dr Barry Berkovitz and Professor BJ Moxham.....	86
The missing mahogany WWI Memorial. Mrs Lloyd George and the Royal Dental Hospital twenty-nine	
Richard O'Brien.....	94

Dental Historian

The Dental Historian (DH) is an international journal that publishes peer reviewed papers, biographies and descriptions of historical artefacts. The DH accepts manuscripts online. It is a condition of acceptance of a manuscript that it has not previously been published, or is not under consideration of publication in any other journal. If more information is required then please contact the Editor. Persons wishing to submit a paper for publication should send it to **Dr Margaret Wilson, Editor** at **m.wilson1000@btinternet.com**

Manuscripts should be sent as Word documents, single spaced, Times New Roman, font size 12 and left justified. Images should be sent as separate jpegs.

The publisher and editor cannot be held responsible for errors or any consequences arising from information in this journal. The views and opinions do not necessarily reflect those of the publisher and editor.

Authors are reminded that it is their responsibility to obtain permission for publication of images in the Dental Historian.

The *Dental Historian* is sent free to members of the Lindsay Society.



Lindsay Society Officers 2021/22

President	Roz McMullan	
Immediate Past-President	Roland Hopwood	roanhopwood@btinternet.com
Hon Secretary	Brian Williams	brianwilliams14@btinternet.com
Treasurer	Craig Rushford	
Committee members	Rachel Bairsto Stuart Geddes Craig Rushforth Andrew Sadler David McGowan	
Editor of Dental Historian	Margaret Wilson	m.wilson1000@btinternet.com
Associate Editor	Nairn HF Wilson	

Membership

Membership applications should be sent to the Honorary Secretary, Dr Brian Williams, 14 Howard Road, Great Bookham, Surrey, KT23 4PW.

Email: brianwilliams14@btinternet.com

Subscriptions

£30.00 Individual UK membership

£49.00 UK Joint membership-both at same address

£38.00 Individual overseas member, payable in sterling.

£58.00 Overseas joint members-both at same address, payable in sterling

Free to UK student members of the BDA

£30.00 Overseas dental student

Single issues can be bought by sending a cheque for £16.00+P&P made out to the "Lindsay Society for the History of Dentistry".

For on-line banking Account No. 10868167 Sort Code 20-51-43.

For international payments SWIFTBIC BUKBGB22, IBAN GB69BUKB 4310 8681 67

All requests should be sent to the Distribution Manager, Dr Stuart Geddes, Ysgubor Argoed, Tregagle/Monmouth, NP25 4RY. E Mail stuart_geddes@hotmail.com

Editorial

What will future dental historians make of the impact of the Covid Pandemic on dentistry? The pandemic is certainly not over, as many countries still face restrictions and shut downs. In the UK, life is slowly starting to return to what we used to consider normal. Although postgraduate lectures are still being provided on-line, there now seems to be a blend of hybrid arrangements where some dentists and members of the dental team are physically attending the meeting and others still joining remotely. In many countries there remains a requirement to provide evidence of having had two vaccinations and a booster before mingling with colleagues in an enclosed lecture hall. The return of face-to-face meetings is to be welcomed as nothing compensates for personal interactions, in terms of both learning and sharing professional experiences.

When in living memory have dental services been suspended due to a virus, or for any other reason? There have been many other viruses and prions that have had a profound impact on dentistry. For example, infections with hepatitis, HIV and CJD played a major role in the introduction of single use endodontic and related instruments and stricter requirements for disinfection and sterilization of equipment and cross contamination. Even before the Covid pandemic, I would maintain that the dental team was probably the best informed and protected in decontamination and cross infection control in healthcare. The legacy of Covid already includes enhanced use of PPE, which will probably remain at least in part. The elective use of electric speed increasing hand pieces rather than aerosol generating, water-cooled high-speed turbine handpieces in restorative dentistry may have made many clinicians appreciate the advantages of their use. Specifically, a reduction in the unnecessary loss of sound tooth tissue and damage to adjacent teeth during tooth preparation procedures. The trend to minimal intervention dentistry fuels this shift in handpiece use.

The training of undergraduate dental students has also been adversely affected. Their studies have been interrupted and there has been an increase in simulated procedures which, despite their increasing sophistication, still fall short of clinical experience with real patients. In some of our dental schools, the course has been increased by one year to compensate for the impact of reduced patient contacts.

This mixed picture of adverse effects and serendipitous developments is a typical effect of a global crisis. For example, many innovations in dentistry stemmed from technological advances during WWII while dental services to the general public were severely disrupted. Similar to a post war situation, post Covid there is a huge backlog of untreated dental disease. In the UK enormous amounts of additional money was allocated to healthcare during the pandemic, but little or none allocated to dentistry. This has had a particularly bad effect on NHS dentistry and has further exposed the inadequacies of the existing NHS contractual arrangements – specifically UDAs (units of dental activity).

Looking forward to the next Lindsay Society meeting in Belfast, it is hoped that as many members as possible will attend this meeting in person. A huge amount of work has gone into developing an interesting programme for this event, which has the potential to be as memorable as the Titanic, but for different reasons. (No Icebergs are forecast in the Belfast Lough, River Lagan or the Irish Sea). I am confident that a warm welcome awaits us on our first visit to Northern Ireland and on the special occasion of the Lindsay Society's Diamond Anniversary.

Lily Fanny Pain FDS MRCS LRCP LMSSA (1899-1973) and her husband Leonard Austin Harwood MRCS LRCP LDS (1886-1952)

Rachel Bairsto and Stanley Gelbier

Abstract: Much has been written about Lilian Murray (later Lindsay), the first woman in the United Kingdom to qualify as a dentist. This paper records the first female, Fanny Pain, to gain an LDS from the Royal College of Surgeons of England. Also, her husband, Leonard Harwood. Both of them had interesting professional lives.

Keywords: Lily Fanny Pain, Leonard Austin Harwood, National Dental Hospital, women in dentistry, children's dentistry, Licentiate in Dental Surgery (LDS)

Lily Fanny Pain

Fanny, she didn't normally use her first name, was born in April 1889. She was baptised at St Matthew Church in Newington, Southwark on 2nd June. Fanny's parents were Alfred and Mary Pain. Her father, a physician, encouraged her to study for a profession.

In 1907 Fanny was accepted as a student by the National Dental Hospital (NDH), the very place that had refused to accept Lilian Murray as a female student. Interestingly, she spent the first year at the London School of Medicine for Women at the Royal Free Hospital, established in 1874 as the first British medical college to train women. At the Royal Free, Fanny studied anatomy and physiology. Perhaps it was felt that it would be easier for her to be accepted by other female students whilst studying, especially during practical anatomy classes. By the early 1920s, the Royal Free advertised that it accepted dental students of its own, with their clinical studies being undertaken in conjunction with the Royal Dental Hospital.

Some other women students

Fanny was not the first female student at the National. According to Donaldson¹, the Dean was authorised by the medical committee to accept women students as early as 1893. A Miss Halliday was accepted for a short course in October 1893 but it doesn't say what happened to her. Only in 1902 did NDH indicate in advertisements that it accepted women. It goes on to state that the first two women for the full dental diploma course arrived in May 1906: Madeline Louise Bostock and Dorothy Rose Humby (who won the entrance scholarship). In December 1907 the recently established *National Dental Hospital Gazette* noted that at that time there were five women: Miss Bostock, Miss Humby, the

recently admitted Miss Pain and two short timers on a six-months course, one from Russia and the other from Holland. During the term a female medical graduate attended a short course in anaesthetics.

Fanny joined NDH as a pupil in the mechanical department. The Royal College of Surgeons of England registers show that having studied at Birkbeck College, perhaps at evening classes, Fanny passed its Preliminary Sciences exams in chemistry and physics in January 1910. As a student of the Royal Free and NDH she passed both parts of the first Professional Exam in May 1912 and Part II of the Second Professional exam in November 1912: the first woman to gain the LDS RCS Eng.

By the time Fanny had completed her pupillage and was ready to present herself for the dental diploma course and exams, the RCS was admitting women candidates for medicine and dentistry. Interestingly, if she had been slightly earlier, she would have had to join Madeline Louise Bostock and Dorothy Rose Humby who had to sit their exams in Scotland. But, by the time Fanny was ready, the English College had changed its regulations to allow women to take its medical and dental exams.

In 1907, the names of Bostock and Humby recurred as recipients of certificates; and Madeline won three medals. In his annual account on the hospital and school the Dean referred to the "*noble example of earnestness in their work and of the competition the women students furnished for the gentlemen*".² In 1908 Bostock qualified from the Faculty of Physicians and Surgeons of Glasgow and Humby from the Royal College of Surgeons of Edinburgh. Sadly, Rose Humby died in 1914, aged 28.

Fanny's LDS course

So, what course might Fanny have followed at the National? In 1874, it had been laid down by the RCS that lectures, dental clinical attendance at a hospital and mechanical dentistry requirements for the LDS could be spread over four years. However, two years could be spent in an apprenticeship with '*a competent dental practitioner*', with time devoted to studying the subjects on the curriculum. The mechanical dentistry requirements should also be completed during this time. Then two years would be spent on lectures and clinical work. The third year of mechanical study was finished between the winter and summer sessions.

One problem faced by dental students was to obtain the required education in general anatomy and physiology and general medicine and surgery. They were undertaken in a teaching hospital with medical students whose afternoon sessions were a bit problematic. The Royal Dental Hospital solved the problem by holding lectures and clinical sessions in the mornings and evenings. That was better for many lecturers and dental surgeons employed by the schools who were unpaid, as it reduced the time spent away from their practices. The situation at the National was probably identical.

By 1900, there were practical courses in dental metallurgy and dental histology. Final year students took a course in dental surgery practice (conservation, extractions and microscopic pathology). A phantom head course was also introduced. 1902 saw the introduction of courses in dental bacteriology and *materia medica* related to dentistry. To dental mechanics were added some modern components of prosthetics and orthodontics.

In the early 1900s a committee considered what work students must complete before their completion of course work schedules could be signed off. They had to have carried out to the satisfaction of the Medical Officers: 150 gold foils, 150 amalgams, 150 cement or gutta percha fillings, six crowns, the treatment of 30 pulpless teeth, four regulation cases, six sealing cases, four cases of pyorrhoea and have made and adjusted six dentures.

Fanny and children's dentistry

Fanny (Fig. 1) qualified LDS RCS Eng in 1912. She became a house surgeon and later demonstrator in dental surgery. Fanny was soon asked to take charge of a new children's clinic opened at the

National with the benevolence of a Mrs. Anstruther.³ Over time she became a dental surgeon to some London County Council childrens' clinics in Battersea and Lambeth.



Fig. 1 Lily Fanny Pain

Fanny's interest in children was perhaps not surprising. Staff of the National Dental Hospital and College were notable pioneers in children's dentistry, some helping to achieve the beginnings of school dental care as a public service. In 1898 Sidney Spokes MRCS LRCP LDS Edin helped to found the School Dentists Society (first president in 1900) for dentists treating Poor Law and public school children, helping to raise standards. It sought organised services for all children not just those *seeking* care, basing its recommendations on epidemiological and other scientific information: the first stirrings of a dental public health perspective. It became the Dental Group of the Society of Medical Officers of Health in 1921. Spokes was elected Dean in 1893 when, in addition to a number of hospital appointment at NDH and elsewhere, he was a dentist to a school in Hanwell and at Haileybury College. Spokes was re-elected 26 times.

Richard Denison Pedley FRCS LRCP LDS was enthused with the need for good children's

dentistry. Knowing most treatment was provided by general practitioners he sought their support so read a paper on '*Collective investigation of children's teeth*' to the BDA's Metropolitan Branch. In a survey carried out with Spokes, Pedley found only 15% of children in Hanwell had sound teeth; of 20,000 teeth examined over 2,000 needed filling, and 1,000 required extraction.

In 1909 the chairman at the School's Annual Dinner, Sir Thomas Barlow, mentioned the 1907 Education Act and warmly advocated the resultant provision of dental treatment. He said an important question concerned arrangements for the efficient care of children's teeth. The School and Hospital prepared for more children's dentistry to be provided and taught.

Not satisfied with dentistry alone, Fanny decided to study medicine, so returned to the Royal Free's Medical School. In 1916 she gained the Licence in Medicine and Surgery of the Society of Apothecaries, followed in 1917 by the Membership of the Royal College of Surgeons of England and the Licence of the Royal College of Physicians of London. One of the first women to be medically as well as dentally qualified.

In 1916, Fanny was appointed honorary dental surgeon to the Royal Free Hospital.

Marriage to Leonard Austin Harwood

On 31 December 1916 she married a fellow doctor-dentist, Leonard Austin Harwood MRCS LRCP LDS, at St Matthew Church where she had been Baptised. Leonard was born in Aix Les Bains on 31 August 1886. He qualified LDSRCS in 1908 after study at the Royal Dental Hospital followed by medicine at the Westminster Hospital in 1911.

Leonard became a house surgeon, tutor and demonstrator in dental surgery at RDH. He was later the medical superintendent and dental surgeon to the dental department at University College Hospital; and also, dental surgeon to the Cancer Hospital.

He was an early member of the Royal Army Medical Corps Volunteers (London Company) and continued when the Territorial Army was formed in 1908. Leonard "*rendered invaluable service*" in World War I with the 84th (2nd City of London) field ambulance.⁴ He held the rank of Army Captain. After the war he and Fanny set up practice

together at 97 Sloane Street in Chelsea, SW1. Although initially living in Chelsea, in 1934 they moved to Surrey.

They continued in the practice until Leonard joined the Royal Army Medical Corps at the outbreak of World War II. He eventually became a Colonel and Assistant Director of Medical Services (London Division). Leonard was mentioned in Dispatches and was later awarded the Territorial Decoration (TD).

Meanwhile Fanny kept the practice going and stood in for him as honorary dental surgeon to the Cancer Hospital. Founded as the Free Cancer Hospital in 1851 by Dr William Marsden, it was the world's first hospital dedicated to the study and treatment of cancer. In 1910 it became The Cancer Hospital (Free); in 1954 The Royal Marsden Hospital. When the NHS started in 1948 it became a postgraduate teaching hospital. With a need to expand to treat more patients and train more doctors, a second hospital was opened in Sutton, Surrey in 1963. By then the Harwoods lived in nearby Guildford.

After the War ended Leonard returned to the practice, which they continued together until retirement in 1949.

Leonard was a Fellow of the RSM and member of council of the Odontological section. He wrote two papers for the *Proceedings of the RSM*: A premaxillary odontome (1913) and A case of congenital absence of maxillary teeth (1914). He was also a member of the BDA and President of the Chelsea Clinical Society.

When the Faculty of Dental Surgery of the English College came into being in 1948, Fanny was amongst the first people to be awarded a Fellowship in Dental Surgery without examination.

The National Dental Hospital

The Metropolitan School of Dental Science was opened by the College of Dentists in October 1859 in competition with the London School of Dental Surgery at the (later Royal) Dental Hospital of London. It provided lectures and demonstrations to prepare students for the forthcoming LDS exams. However, with no clinical facilities arrangements were made for students to attend the Westminster Dispensary. It is not known if this arrangement was implemented but to overcome the problem the

College opened its own National Dental Hospital at 149 Great Portland Street in November 1861. Whilst Fanny was there, consideration was given to amalgamation with another dental hospital.⁵ Delegates were sent to the Middlesex and University College Hospitals to discuss the possibility. In July 1912 the Medical Committee agreed to amalgamate UCH, which was completed in 1914. In that year NDH joined the Dental School of University College Hospital. Fanny continued her relationship with her *alma mater* for many years, especially through its alumni activities in which she joined with great enthusiasm.

Fanny's interests

Like Leonard, Fanny was a Fellow of the Royal Society of Medicine and a member of its Section of Odontology. When she qualified as a dentist the RSM was only five years old, having been formed in 1907 by the amalgamation of eighteen medical and surgical societies, including the Odontological Society of Great Britain. Fanny was also a member of the British Dental Association.

Fanny died on 20 October 1973 at her home in Guildford, Surrey, aged 84 years. According to the writer of her obituary she was “*a distinguished colleague*” and “*a charming lady*”. Leonard had pre-deceased her in 1952.

References

¹ J A Donaldson, The National Dental Hospital 1879-1914. P 90.

² Ibid, p 93.

³ Obituary: Lily Fanny Harwood FDS MRCS LRCP LMSSA, Br Dent J 1973; 136: 40.

⁴ Dr Russell V Steele in Obituary: Mr Leonard Austin Harwood, Br Med J, 7 June 1952; 1: 1252.

⁵ National Dental Hospital, Minutes of Medical Committee, 29 February 1912.

Author Biography:

Stanley Gelbier Honorary Professor and Head, Unit for the History of Dentistry, Faculty of Dentistry, Oral and Craniofacial Sciences, King's College London.(sgelbier@aol.co.uk)

Rachel Bairsto Head of Museum Services, BDA Museum, 64 Wimpole Street, London W1G 8YS Rachel.bairsto@bda.org

Address for correspondence:

BDA Museum, 64 Wimpole Street. London W1G 8YS

Old teething remedies, a study into how a surgical procedure for the management of teething was marketed in the 18th century

Zeenathnisa Mougammadou Aribou

Abstract: Teething, a condition that is unavoidable in a person's life, was perceived as dangerous in the eighteenth century. Teething was considered to be a cause of childhood mortality and was included in the Bills of Mortality as a disease, which resulted in deaths. Over many centuries, physicians have recommended remedies and therapies to ease teething pain and manage what was perceived as one of the most dangerous times of a child's life. Over many centuries physicians recommended remedies that had been developed from ancient writings based on humoral medicine. However, this was challenged in the 18th century when Joseph Hurlock, a surgeon, wrote a *Treatise on Dentition*, which contested the effectiveness of these remedies and recommended a surgical intervention, gum lancing. This paper reveals the various strategies that were employed in Hurlock's *Treatise* to advertise his services and skills and convince the community to adopt this new surgical procedure.

Keywords: teething, gum lancing, child health

Introduction

Teething was referred to as "dentition difficilis" in Latin, alluding to the troublesome dentition period¹.

Though little was written in the ancient Greek history about the health of infants and children, a relatively important aspect of their medical texts refers to the dangers of teething, thus implying that teething was a significant concern¹. Ancient physicians described teething as a significant cause of childhood morbidity². Hippocrates wrote a short treatise on the dentition in which he regarded teething as a cause of severe illness, convulsions, and death. Over the centuries, many remedies were thought to alleviate the dangers of teething. They ranged from rubbing animal substances on infants' gums to the use of coral necklaces, which were believed to alleviate pain. Immense pain experienced during teething was considered to result in convulsions and inflammation which eventually led to death³. In the sixteenth century however, Ambroise Parey, a French army surgeon, proposed a new surgical technique to an age-old problem⁴. Parey advocated the opening of gums with a lancet after the examination of a dead child. He went on to describe, "*when we diligently sought for the cause of his death, we could impute it to nothing else but contumacious hardness of the gums*" and eventually concluded "*if it (lancing the gums) had been done when he lived, doubtless he would have been preserved*"⁵. The procedure however had not obtained a general acceptance since the time of Parey although some (physicians) "*regard it as highly injurious*"⁵.



Fig. 1 Infant with teething ring, Courtesy of the BDA museum

This intervention was not widely practiced in England until the eighteenth century, when it was promoted via the works of Joseph Hurlock. Joseph Hurlock published his treatise on the Dentition in 1742. Joseph Hurlock was convinced that lancing the gums would prevent deaths associated with

teething. In his text, Hurlock commented on the “*melancholy account*” of the dangers of teething, described it as an “*unavoidable passage of life*” and tackled objections which were raised to surgical lancing of the gums⁶. However, at a time when alternate remedies and therapies were available for the management of teething, it is interesting to explore the strategies used by Joseph Hurlock in promoting the cutting of gums in the eighteenth-century marketplace.

The medical marketplace

The medical marketplace of the eighteenth century is a term that was coined by Roy Porter in 1985. It described a space where “*physicians, surgeons and apothecaries... melted into each other along a spectrum that included thousands who dispensed medicine full or part time*”⁷. When referring to the medical marketplace, there is a perceived occupational hierarchy of “*physicians who advised, surgeons who operated and apothecaries who prepared drugs*” whilst others were “*simply ignored or denigrated as quacks*”¹⁰. Physicians, surgeons, and apothecaries therefore competed in this marketplace where their individual services were on display, advertised and sold to those “*sufferers who cared to shop*”⁸. The career system that existed in the eighteenth century was such that players in the marketplace notably physicians and surgeons endeavored to establish their skills in society and advertise their services by individual display⁸. Joseph Hurlock knew that to promote himself, he had to relay on the effectiveness of the surgical interventions in the management of teething. Hurlock used the perceived dangers of teething and the concerns regarding childhood mortality to his advantage and used this technique as his opportunity to progress and succeed in the market.

In his text, Joseph Hurlock wanted to convince both physicians and patients but he “*found prejudices in some of the guardians of children that were hard to (be) rooted up*”, and so in these situations he turned to physicians who “*want nothing more than a candid representation of things to determine (their) judgment*”⁶. Hurlock intended to change the mindset of both parents and physicians on this subject and planned to convince them of the effectiveness of his surgical techniques. This paper considers this strategy in two sections; the first part will take a closer look at Hurlock’s interaction with the physicians while the second

part will explore the ways in which Hurlock attempts to convince the parents of young children and persuade them to opt for a surgical intervention.

Hurlock’s strategies to convince physicians of the surgical technique

Medical knowledge in the eighteenth century was derived from “*an ancient humoral model of classical medicine*” supported by the contemporary concepts of philosophy⁸. Hurlock understood the importance of winning the support of physicians at a time when they were the predominant figures in the medical market. Throughout his book Hurlock tried to endear himself to physicians by explaining the important role played by humors and physic in managing a troublesome dentition. He contended that although the humors played a fundamental role in the process of teething, the interventions practiced were not effective in relieving teething danger. Instead, Hurlock advocated prescribing gum lancing together with physic, which he considered to be an effective solution in helping infants overcome the dangers of teething. Hurlock hoped to convince physicians of the effectiveness of gum lancing by firstly establishing the importance of humors in the troublesome dentitions and secondly by focusing on therapeutics. Hurlock dismissed the effectiveness of folk remedies and observed that while physic supported children during teething, it did not effectively manage a troublesome dentition. Finally, he attempted to convince physicians of the advantages of gum lancing. In doing this Hurlock ultimately wanted physicians to refer their teething patients to surgeons like himself.

Hurlock dedicated his book to Dr. James Douglas, an honorary fellow of the Royal College of Physicians London and a fellow of the Royal Society. James Douglas was a physician, an anatomist and close friend of William Hunter, a surgeon, who had a great interest in the subject. Hurlock wanted his treatise to become known to the medical community through Douglas who was well respected by the physicians⁶.

Hurlock was cautious not to dismiss the role played by humors in the period of teething. He aligned his view with physicians’ belief that humors played an important role in troublesome dentition. In general, he stated that, “*by nature*” teething in infants would generate pain due to the “*division and distinction of the sensible parts enclosing*” the

teeth”⁶. The “*most favorable dentition*” according to Hurlock, were the ones during which the pain went unnoticed. Apart from “*natural causes*”, he also mentioned secondary causes that led to a difficult teething period in children. These included the increase of heat and inflammation due to: the action of abounding humors, the retention of stools, eruptive inflammatory fevers particularly those that arose due to smallpox or measles, perspiration in infants or the eruptions on the skin in infants which was vaguely called “Red Gum”, a defect of the constitution of the body where small pimples appeared in the skin⁶.

Hurlock classified these secondary causes into distempers generated within the body and disturbances of the surrounding that influenced teething. He categorised them as “internal” and “external” causes.

Internal secondary causes were: “*repelling or hasty drying*” of body parts, “*sudden stop of the glandular secretion*” and “*driveling*” when there was a “*plentiful secretion discharge from the mouths of infants*” Hurlock described these causes as “*pernicious consequences*” which “*heighten the danger and distress of teething*”⁶.

External secondary causes were: aspects of the environment such as the “*influence of air*” which caused the early decay of some forward teeth, “the *use of hard bodies on the gums*” and the “*wounds of gums*”⁶. Hurlock believed that these afflictions, both internal and external, indicated humoral imbalances that predisposed infants to teething problems.

Hurlock’s interpretation of humoral effects on a troublesome dentition concurred with many physicians’ opinions and with the writings of Hippocrates, who mentioned that teething that occurs in the “*winter season has the advantage*”. According to Hurlock however, “*great and sudden changes of the temperature of the air were remarkable causes of distemper in the human bodies*” and attributed the increase of childhood mortality in the Bills of Mortality in the year 1740 to “*extreme hard winter*”⁶.

Hurlock also opposed the writings of Boerhaave who attributed teething problems to the “*tension, puncture and laceration of gums due to the appearance of a sharp pointed tooth*”⁶. Boerhaave did not state the process in which the teeth had to “*break its way through the gums*”, but in the English



Fig. 2 Examples of hard teething aides. Courtesy of the BDA Museum

translation of Boerhaave’s Aphorisms by J. Delacoste, “*laying the teeth bare with the help of a Lancet*” was one of the effective options in alleviating teething danger⁴. J. Delacoste, an English physician, also mentioned that “*surgeons will not be displeased to see a great physician (Boerhaave) own, that internal diseases depend on the right understanding of the external ones of their province*” and that “*no physicians can be a complete one unless he built upon the Foundation of Surgery*”⁴. Boerhaave, was a physician, but gave importance to surgery and to an extent, surgical interventions. It is therefore unclear why Hurlock omitted this piece of information in his text.

Ancient remedies

Hurlock did not dispute the association of humoral imbalance and teething problems but he did not subscribe to remedies and interventions proposed by physicians. The ancient remedies had no scientific basis. For example, in the sixth century AD, Aetios of Amida recommended that brain of the hare be given as “*by its nature it assists*”⁵. These remedies had evolved over time and were widely practiced in the eighteenth century. Joseph Hurlock was skeptical about ancient remedies and described them as “*inventions of necessity and danger*”⁶. Hurlock mentioned an array of these remedies from “*anointing or rubbing the gums with cream, fresh butter, honey, yolk of an egg and sugar to offering infants the brain of the hare, goat, calf, lamb or a sucking pig*”⁶. The fresh blood of the cock’s comb was recommended by Hartmann, a physician, to be “*anointed on the gums... once or twice at most with the fingers... to be effective in the production of teeth without difficulty and free from accidents*”⁶.

Although some of these cures were prescribed there was no universal acceptance amongst physicians of their effectiveness. Hurlock used these examples to portray the scientific baselessness of these remedies and to emphasize that these remedies were therefore not effective.

Apart from the applications of remedies, teething was also thought to be assisted by the use of devices made of hard substances such as teeth of wolves and necklaces made of "*roots of henbane, penny and wild gourd*"⁶.

According to Hurlock, such tools assisted in the "*penetration of the teeth*" and released a substance "*effluvium*" which was a very subtle substance that "*promotes the perforation of gums*"⁶. Hurlock was cynical as to whether effluvia was able to pierce the alveoli and thus dispelled its effectiveness and described it as an "*instance of craft*", supported by the ancient writings, rather than science⁶. Another intervention that was practiced was to coerce infants into biting wax candles to allow them to "*relax their gums and allay their itching*"⁶. Again, Hurlock dispelled this remedy by explaining the fact that such use of hard bodies on the gums will only harden them thus predisposing infants to a troublesome teething period. It is evident that Hurlock did not approve of these practices as he described them as "*beliefs*" that were being based upon "*bare credit*" and that they "*favor more superstition than reason*"⁶.

Medical and surgical management

Having discounted a variety of remedies in ancient writings, Hurlock emphasized that in the future there was a dire need for medical and surgical management to make progress as the "*art of physic has improved much due to the close observation of nature*"⁹. Though some argued that the use of ancient methods was diminishing among the medical and surgical profession, Hurlock pointed out that in the management of teething, "*they [use of ancient methods] still carri(ed) the approbation of some modern authors of good note*"⁶. Whilst Hurlock was against folk and ancient remedies, he was not entirely dismissive of using physic to manage teething. He considered the art of physic would aid in restoring humoral balance in a difficult dentition, but he nonetheless believed that gum lancing was a vital intervention in achieving this balance. Therefore, he stressed that manipulation of humors would be rendered useless if the child's

gums were not opened.

This proposition was in violation of the occupational hierarchy that was embedded in society, as it was usually physicians who advised and instructed other professionals on management of diseases. Hurlock was disrupting the hierarchical structure by advising physicians on a surgical technique he believed was the ultimate cure to overcoming the dangers of teething. The art of physic was ingrained within physicians and thus it was a laborious task for Hurlock to convince physicians to adopt a surgical intervention. This is evident as William Cadogan; a physician working at the Foundling Hospital released an *Essay upon the nursing and management of children from birth to age three years of age* in 1748. Cadogan advocated the introduction of "*more natural and reasonable method of nursing and management of children*" based on his mantra that "*all faculties of the mind are well known to depend upon the organs of the body*"⁹. He based most of his therapeutic interventions on remedies, which were thought to restore the balances of humors in the body. Cadogan's essay was published six years after Hurlock's treatise which shows that some physicians, still relied and believed in remedies based on humors instead of opting for a surgical intervention. This illustrates the 'uphill battle' Hurlock faced in persuading physicians to change deeply rooted beliefs in ancient remedies.

Cadogan, stated that teething troubles were the effect of "*too great a fullness of the corrupt humors of the body*"⁹. But the difference between the methods proposed by Cadogan and Hurlock lie in the fact that while Hurlock proposed a surgical intervention to balance the humoral constituents, Cadogan recommended the use of remedies to "*preserve the humors of the body*"⁹. Cadogan pointed out that if the "*blood and juices be perfectly sweet*" and not too "*great of a redundancy*" there would be no "*bad consequences*" of teething whatsoever⁹. For example, Cadogan suggested a "*little Manna*" or some "*gentle purge*" to help these remedies carry out their effects without "*lodging in the body*". It is interesting to note that although Cadogan was not forthright in his opposition to Hurlock, from his account, it can be inferred that at least some physicians still believed in such remedies and their effectiveness in restoring the humoral imbalance of the body.

Hurlock presented case examples, which

described the use of both gum lancing supported by physic to manage teething. In one such example in which the infant was still “*ill and restless at night*” after his gums were opened⁶. Hurlock advised the parent to “*reduce to a thin covering*” and “*be laid in a bed instead of a cradle*”⁶.

Hurlock also addressed the question of whether it was permissible to use remedies such as ointments to allay itching and inflammation in teething infants. He forbade the use of ointments and cooling application because ointments obstructed the outlet of humor whilst cooling applications “*repel[led] humor back to the blood*”⁶. He thought, dabbing the parts of irritation with breast milk or cow’s milk were the safest remedies as they helped relax the tension and inflammation. He also stressed that this was not a “*quick relief of grievances*” and thus emphasized that these remedies should only be used as an adjunct to gum lancing⁶. He described the example of a little girl in whom he “*diverted the humors*” by opening her gums. He went on to explain that he used “*cloths wrung out of fomentation of the Flor. Sambuc decocted in milk*” over the eruptions in her mouth to allay the “*great itch and heat of humor*”⁶. Though, Hurlock did not deny the benefits of remedies that restore humoral balance and mentioned that he himself benefited from taking Linctus for a troublesome cough, he urged “*prudent*” use of them and emphasized the importance of recommending these remedies alongside gum lancing.

Hurlock, however, recognized that convincing physicians of the efficacy of his proposal would be arduous as lancing of gums had “*met with such discouragement*” from “*scruples of many in practice*”, possibly referring to physicians who practice the art of physic⁶. He nevertheless made a positive argument in proposition of gum lancing by including the account of Ambroise Pare (Parey), the French surgeon who introduced gum lancing in the sixteenth century. According to Hurlock, Parey attributed teething to symptoms such as “itching, inflammation, convulsion and “flux of belly” and went on to state that the cause of the pain “*is the solution of the continuity of the gums by the coming forth of the teeth*”⁶ Hurlock also emphasized that Parey “*persuade [d] the surgeons to open up the gums*” and that it would “open a way for” teeth to penetrate through gums without griefs⁶.

According to Hurlock, Parey had already had cases of “prosperous success” with his own

children, in the presence of several “doctors or physic” and Guillemeau, the king's surgeon, thus demonstrating the safety and efficacy of this procedure⁶. Hurlock, upon drawing on Parey’s account, stressed that “*it will be of little significance*” to enquire who developed gum lancing and instead it was of much more importance to look at the “*progress the method has made since*”⁶. This perhaps portrays Hurlock as one who cared for his patients’ welfare more than status, money, or recognition yet it is questionable as to whether he promoted this procedure merely due to its success rather than recognition and revenue not only for himself but also for the entire surgical profession.

Eruption of the eye teeth

Hurlock also agreed with ancients and contemporaries that the most dangerous period during the erupting dentition was the penetration of the *canini*, or the eyeteeth. The difficult penetration of *canini* through the gums was possibly emphasized to highlight the effectiveness of gum lancing, as it would alleviate symptoms, aid the *canini* to penetrate the gums and hence eventually prevent death in teething infants. While Sennertus referred to “*cutting of the “eye teeth”*” as the “*occasion of most sorrow to the infant*”, Hippocrates stated “*parents could not truly rejoice in their children before they cut their eye teeth*”⁶. Likewise, Sylvius pointed out that the *canini* bring in a “*hard temper of the gums*” and a “*slow advance of the teething*” which leads to a difficult penetration⁶. Boerhaave, in his book, also implied that the eye teeth which had an “*obtuse point pierce the gums with difficulty*”⁴. Hurlock used this common consensus to illustrate that gum lancing would alleviate the dangers of teething by allowing easy passage of the *canini*.

The case for gum lancing

Hurlock described a case where the child had its gums opened nine times to prevent convulsions and death. Hurlock reasoned that gum lancing couldn’t be deemed “*unnecessary and unreasonable when a constitution is so unhappy as thus want its (gum-lancing) help*”⁶. In another account Hurlock described the relief felt by a man “*at the age of manhood*” after he opened his gums

Hurlock advocated gum lancing not only as a mean of “*giving liberty to the advancing teeth*” but also as a “*proper method of letting out blood*”⁶. On

this point, he commented that the use of leeches, which was another bloodletting method, often “*promoted early dentition*”⁶. He reasoned that although inflammatory symptoms deserved the use of leeches”, gum lancing was effective for the “*speediness of relieving a painful gum*” and for “*quick and effectual liberty given to the obstructed blood in gums*”⁶.

He emphasised that if gum lancing was not performed, the child would be threatened with death at which times “*no other methods can, without this [gum-lancing] assistance effectually save the child*”⁶. Hurlock believed that the “*distressing pain the gums*” was due to the growing teeth forcing their passage through the gums and the obstruction of the blood as the vessels would be compressed by the growing tooth causing inflammation. He therefore recommended an incision to be made in the gums, which would aid the tooth’s passage out of the alveolus.

In addressing his text to physicians, Hurlock was breaking the societal norms that existed in the eighteenth century. Physicians were professionals who were considered superior to surgeons in the occupational hierarchy, so they might resist any attempt for them to adopt his surgical technique. Hurlock advocated that gum lancing, which aided the cutting of teeth, was a method similar to bloodletting. He essentially argued that gum lancing, like bloodletting, was vital in the manipulation of the humors. He managed to draw up a convincing argument emphasising that the art of physic aided the restoration of humoral balance during teething, but without gum lancing, the benefits of such humoral remedies were nonexistent.

Joseph Hurlock’s strategy to convince parents of the effectiveness of surgical intervention

Hurlock also used his text to influence parents and guardians. His treatise was sold in St Paul’s churchyard and St Magnus church, thus allowing the entire community, regardless of status or profession access to the book. In the 18th century patients had the freedom to choose the medical practitioners they preferred. The parents of patients had the ultimate power to commission their preferred form of treatment¹⁰. Hurlock understood the need for parents of young children to read his treatise, which put him in competition with physicians who monopolized the medical

marketplace,

Joseph Hurlock therefore used his text to convince parents of the merits of his surgical procedure as they ultimately chose the type of intervention for their young teething children. Hurlock aimed to enlighten parents about the positive aspects of lancing by distancing himself from the nurses and the common perceptions of surgeons held at that time.

The role of nurses challenged

Hurlock understood that a surgical procedure had met with objections from parents who chose to avoid treatment which involved lancing their children’s gums⁶. According to Hurlock, “*some (parents) have been induced to think these young patients best left to the workings of nature and the care of a good nurse*” and in doing so have “*neglected other assistance*”⁶. He asserted that the “*restless moan*” of these infants was the “*voice of nature in distress*”⁶. Though he does not dispute the role played by nurses, he stressed the need for parents to bring their teething infants to surgeons for their gums to be opened, as there are “*circumstances that rise to a height above the skill of nurse to manage*”, emphasising the distinct difference in knowledge and skill set between nurses and surgeons⁶.

It seems that Hurlock dismissed the skills of nurses, also instructing them on how to be a good nurse. For instance, Hurlock placed huge importance on breast-feeding during the teething period stating that it “*lull the griefs and compose the disordered spirits to rest*” and perceived breast feeding as “*nature’s assistance*” to the alleviate the grief⁶. However, he instructed nurses on how to properly nurse children, as he stated that several authors have recommended at times “*should abstain from all things, that may heat or inflame their milk*” and goes on to emphasize the importance of “*temperature and orderly conduct*” of nurses as it will be most likely to produce “*good effects*”⁶.

Likewise, Hurlock placed huge importance on diet and its effects on humors during teething. He believed that increased quantities of food being more than “*sufficient for the nourishment of the body*”, resulted in the obstruction of vessels⁶. Nurses, therefore, were described as “*imprudent*” in their management of children’s diet and he blamed them for overfeeding children, often feeding children whatever the “*stomach seemed to bear*”⁶.

He stressed that, unlike a nurse's opinion, "*nothing obstructs true nourishment then over-glutting the stomach*" and thus professed that the distempers of humors caused by over-feeding often resulted in a difficult dentition.

He also questioned the decision of leaving the nurses responsible of such an important task of managing children and remained distrustful about "*silly nurses*" who he describes as "*unskillful*" and if left to manage infants will "*make but a tragical scene*" at best⁶. He described a case whereby the nurse accused the mother of killing her son" when she heard that the child had its gums opened⁶. Hurlock's opinion of nurses was not unique. Parey was also dismissive of nurses as he explained that the "burning or heat" of the child's mouth can be wrongly perceived by the "*nurse who manages it with breast milk*"⁶. This, according to Parey, would increase the swelling of the gums and cheeks worsening the state of inflammation and hence the prognosis⁶.

The promotion of surgeons

It is interesting to note that during this time in the medical marketplace, there was a power shift within female dominated occupations. Hurlock was also able to distance himself from the common notion that surgeons were brutal and heartless people. Though Hurlock maintained his superiority throughout this text and uses his medical and surgical knowledge as his assets to assert his influence and power over the reader. He also showed his softer side, appealing to parents to alleviate the anguish of their little babes. Hurlock included scientific terms such as incisors and molars and referred to the works of prominent physicians in his text. In this respect the text seems to be written to better suit the existing knowledge of medics and surgeons. On the other hand, it is probable that Hurlock used such terms to assert his medical and surgical authority on his readers regardless of class and status.

Nevertheless, he stressed that it was of utmost importance for parents to visit surgeons who "*have the skill to distinguish between growing and defective teeth*" and the skill to cut the infant's gums⁶. He encouraged parents to visit surgeons and skilled individuals who could identify "*defective teeth*"⁶. Hurlock described a case whereby the nurse, who wanted child's gum to be lanced, brought her child to a midwife who was "*said to*

have skill in performances of this kind"⁶. The midwife, however, discharged the child without opening his gums and advised the nurse to give some remedies instead. The child, however, grew much worse and was brought to Hurlock who opened the gums. Another example of a nurse/midwife treating teething difficulties was described in 1668. Françoise Mauriceau, a French male midwife recommended that the "*procedure be done with a lancet rather than a knife, although a thin groat (small coin) is as good or better than either*"⁵. Although other professions in the medical marketplace thought themselves skilled in this procedure, Hurlock maintained that lancing the gums of teething children was a surgical procedure that should be dealt with by surgeons alone.

Warnings to parents

Joseph Hurlock also characterized himself as a saviour of "*little babes*" with the interest of infants in his heart at all times. Though Hurlock deplored the "*crafty importers behind the curtains*" who used the dangers of teething to their trade advantage, he was careful not to put the blame on parents for resorting to such remedies as he "*spoke with the least intentions to prejudice the parents*" but to "*caution against the fooling of the lives of children away*"⁶. He warned parents of "*such imposters*" who were only concerned with matters that "*touched only the pockets of the buyers*" and who did not concern themselves with the "*helpless infants*"⁶. It is undeniable that Hurlock viewed ancient remedies as "*whimsical*" and thus appealed to parents to forgo these "*trifling*" practices for the sake of their children⁶. Hurlock pointed out that the use of remedies such as "*use of fatty substances, medication oils and slimy mucilage*" could give rise to problems such as nausea and might not be able to "*give speedy relief that oftentimes warrant*". Other remedies like fomentation and cataplasms, often caused "*inconvenience to the action of sucking*"⁶. He described infants as helpless and in need of help, more importantly, he subtly pointed out the need for skilled surgeons.

Hurlock maintained the persona of a superior authoritative surgeon, recounting his own personal experiences and cases and reminding readers that he was also a parent. He described the case of his own daughter who was convulsing but relieved of the symptoms as soon as he opened her gums, thus urging parents to see reason and appreciate the benefits of this procedure⁶. Hurlock also gave the

power of choice to parents, though it is known that his intention was to ultimately persuade parents to open their children's gum, by stating "*if it shall hereafter be fairly proved by any, that the method of the ancients is truly preferable, I give my vote as one entirely in the interest of little babes*"⁶. He, however, tackled objections raised against this procedure by placing importance on children's lives and hence convinced parents that the benefits of gum lancing outweighed the disadvantages. For instance, since opening gums in infants was practically unheard of in the 18th century, many were opposed to this "*novel procedure*"⁶. To this, Hurlock offered case examples depicting his attempts of saving children who were in the brink of death by opening their gums portraying himself as the ultimate hero of children. He described an example of a child who "*received so much benefit by the incision then made*" that her mother was convinced that she would have not lost two "*fine*" siblings if their gums had been opened⁶.

Another parental concern was that lancing the gums would cause irregularity in the teeth. Hurlock opposed this view by asking parents "*whether they had rather permit a child to die than attempt the saving its life in this way*", Hurlock was honest about this procedure and agreed that gum lancing occasionally resulted in irregularities in the erupting teeth but nevertheless emphasized the overall benefit this procedure had in the management of teething. For example, he included an anecdote from a child's mother who thanked Hurlock for opening his gums and went on to say, "*I shall never more have an ill opinion of lancing the gums*"⁶.

Hurlock portrayed himself as a skillful surgeon who had the best interest of infants in mind and distanced himself from ancient practices and from physicians and nurses who believed that teething danger was the working of nature. He emphasised that by opening the gums the infant would be able to go through teething without any anguish. However, it is questionable as to whether this procedure was necessary in teething infants to save them from the danger of teething or whether the medicalisation of teething was a marketing drive on the part of surgeons like Hurlock, who wanted to promote their trade and skill.

Conclusion

This study limits itself to the work of Hurlock and his strategy in the management of teething in

the medical marketplace during the eighteenth century.

In a medical marketplace, where each professional individual had to advertise his services, Hurlock used his treatise as a tool to market his surgical technique, gum lancing. Moreover, he also used the treatise to advertise the skills of his profession and to convince both physicians and parents of teething children the effectiveness of the procedure. Hurlock had to challenge the success of existing interventions whilst tackling arguments made against opening the gums. Hurlock argued that although physicians were correct in believing that the art of physic could explain the distempers during teething, it did not procure the ultimate solution to overcome troublesome dentition. He promoted the opening of gums as a surgical intervention that would remove the obstruction to the erupting tooth and thus restore the humoral constituents thereby relieving the dangers of teething in infant. Hurlock also addressed parents of young children, convincing them of the efficacy of gum lancing. At a time when females were being replaced in their profession, Hurlock deemed nurses as imprudent and unreliable. He dismissed the skills of nurses and advised them to seek a surgeon's professional help during their child's dentition. He also portrayed himself as a surgeon and father who had their child's best interest at heart, moving away from the common perception that surgeons are heartless and brutal. Finally Hurlock promoted his technique by trying to convince physicians and parents that gum lancing was an effective measure to prevent teething related childhood deaths.

References

1. Dally, Ann. "The Lancet and the Gum-Lancet: 400 Years of Teething Babies." *Lancet* 328(1996): 1710-1711.
2. Rendle-Short, J. "The History of Teething in Infancy." *Proceedings of the Royal Society of Medicine* 48(1955): 132-38.
3. McIntyre, G T, and G M McIntyre. "Teething Troubles?" *Br Dent J* 192(2002): 251-55.
4. Delacoste, J, trans, *The Special Edition of Boerhaave's Aphorisms: Concerning the Knowledge and Cure of Diseases*. London, 1715.

5. Ashley, M P. "Personal View: It's Only Teething... A Report of the Myths and Modern Approaches to Teething." *Br Dent J* 191 (2001): 4–8
6. Hurlock, Joseph. *A Practical Treatise upon Dentition*. London: C. Rivington and S. Austen, 1742.
7. Porter, Roy. "The Patient's View: Doing Medical History from Below." *Theory and Society* 14(1985): 175–98.
8. Jewson, N. D. "Medical Knowledge and the Patronage System in 18th Century England." *Sociology* 8(1974): 369–85.
9. Cadogan, William. *An Essay upon Nursing and the Management of Children from Their Birth to Three Years of Age*. London: J. Roberts, 1748.
10. Jenner, Mark S. R and Patrick Wallis. *Medicine and the Market in England and Its Colonies, c.1450-c.1850*. New York: Palgrave Macmillan, 2007.

Acknowledgments:

I would like to express my gratitude to my supervisors Dr. Neil Tarrant and Dr. Emily Mayhew who supported me throughout the process of writing this manuscript.

Author biography:

Dr. Zeenathnisa Mougammadou Aribou BSc, MBBS, MPH is a medical doctor currently practicing in Singapore. She graduated from Imperial College London where she undertook a History of Medicine module as part of her intercalation. She is currently training to be a preventive medicine specialist. She completed her Masters of Public Health in 2021 in National University of Singapore. She enjoys reading in her free time.

Address for correspondence:

zeena.aribou@gmail.com

History and evolution of inhalation sedation equipment specifically to UK development

Janet Pickles

Abstract: The introduction and development of inhalation sedation equipment is discussed in the UK and USA. This paper is based on the paper in the Historical Medical Equipment Society Bulletin 2021

Keywords: dental sedation, nitrous oxide gas

The history of the use of nitrous oxide gas and the associated anaesthetic equipment for sedation is fascinating. Many leading names have played a significant part in the journey. This paper will attempt to explore some of the facts associated with nitrous oxide since its discovery. In our modern context, we have much to be grateful for the work of illustrious personages such as Sir Joseph Priestley and Humphrey Davy.

Relatively little has been documented regarding the evolution of the modern-day purpose designed flowmeters for titrating precise doses of oxygen and nitrous oxide for analgesia. Langa is one author who does touch on the subject, including some of the early American units in both Edition 1 (1968) and Edition 2 (1976) of his book 'Relative Analgesia in Dental Practice' contains nothing of the U.K. involvement.

It therefore seemed worthwhile to describe something of this history, lest it be lost through time elapse, whilst at the same time, paying some form of homage to those men who contributed greatly to the provision of analgesic and anaesthetic equipment from the mid twentieth century onwards. Of course, without the discovery of oxygen and nitrous oxide, machines would not have been needed - interestingly, both gases have a record of origin here in England.

History of use: There have been many contributors to the development of analgesic and anaesthetic gases. In 1798, Humphrey Davy appears to have been the first to inhale pure nitrous oxide gas, and James Watt built a portable gas chamber to facilitate Davy's experiments with nitrous oxide. Davy found it a very pleasurable experience with thrilling sensations in the chest and extremities. Despite the popularity of the gas amongst Davy's friends and acquaintances and his copious notes about the ability of the gas to entirely take away the sensation of pain, Davy seems never

to have considered the use of nitrous oxide as an anaesthetic, missing a huge opportunity. Anaesthetics would not be regularly used in medicine or dentistry until decades after Davy's death.

A further interesting historical event is the use of nitrous oxide analgesia for cavity preparation, dating to 1889 in Liverpool¹. By this time, gas machines had improved somewhat, with oxygen being delivered alongside nitrous oxide. Moving forward to the twentieth century dentistry was the primary health discipline to use nitrous oxide. However, due to various factors, unreliable equipment and lack of established technique and training, nitrous oxide use was almost non-existent with only two main periods of interest: 1913-1918 and 1932-1938.

The 1940's saw a renewed interest in the use of nitrous oxide sedation and Harry Langa in the U.S. began postgraduate dental education in 1949, training more than 6000 dentists in nitrous oxide sedation. His first textbook was published in 1968, with a second edition following in 1976. This has become something of a classic reference book and is still quoted today².

Dental schools in America began teaching the concepts of inhalation sedation from the late 1950's. In 1962, guidelines for teaching pain and anxiety control in dentistry were established by the American Society of Anaesthesiology.

Dedicated relative analgesia equipment development

It is widely believed that the first purpose-built machine for delivering inhalation sedation was made by James Watt for Sir Humphrey Davy in 1799. Following on from that, many different types were developed.

History and equipment development timeline in the U.K.

At this point we should focus on the town of Keighley in West Yorkshire. Events took place there, starting in the first half of the twentieth century, which resulted in it eventually being regarded as the 'Anaesthetic Capital of the World'.

On the 5th of August 1947 three men: Bill Edmondson, Wilf Jones and a silent partner, Lord George Wellesley founded a new Company called Cyprane, with an initial capital of £2,000. A further Company called Anaesthetic Equipment Ltd was also established.

Wilf Jones had joined Coxeter's as a designer in 1938 – the year that Coxeter and Sons celebrated the Centenary of making surgical and anaesthetic equipment for nitrous oxide. They were also the original manufacturers of the Boyles and Walton gas/oxygen machine.

Cyprane and Anaesthetic Equipment Ltd were first based in a garage in Jew Lane, Oxenhope, (near Keighley) West Yorkshire. Work started immediately on development of a range of equipment including the Tecota, AE Gas Machine (Fig. 1) and the temperature compensated vaporizer; known as the Tec range - initially for Halothane (Fluothane).

Their first project was the development of the Cyprane Trilene Inhaler. This was the first item to go into production from the late 1940's and was used for self-administration in obstetric analgesia, and in other fields such as dentistry.

1950, Brought the need to move to larger premises in Oak Street, Haworth.

1954, In August that year, Cyprane received approval for the production of the Tecota Trilene Anaesthetic inhaler, used during childbirth (Fig. 2). The liquid Trilene was poured into the vaporising chamber and this converted it to a vapour for the patient to breathe. Wilf Jones eventually wrote, in a document entitled 'Cyprane Ltd' dated 7th March 1989, that "the work conducted on temperature compensation for this unit was of great assistance in the later development of the Fluotec vaporizer". The U.K. retail price for this machine at that time was £8.80.

Late 1950's, In the latter part of this decade, The

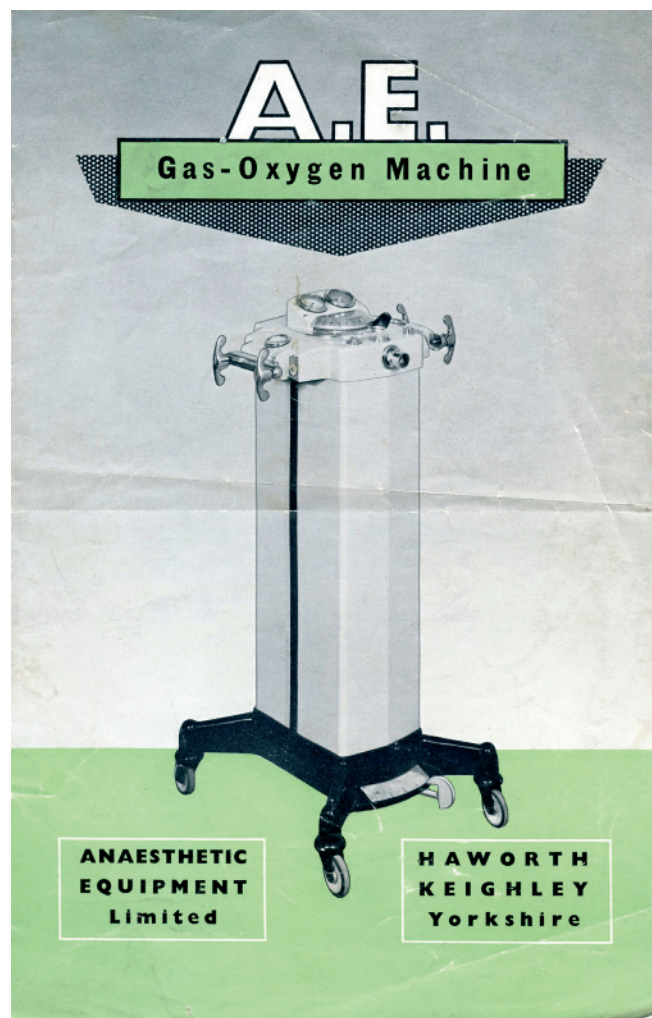


Fig. 1 The AE Gas -Oxygen Machine

Anaesthetic Equipment Company developed the AE Gas Machine. This machine was designed to deliver more accurate supply percentages of oxygen and nitrous oxide and incorporated a three-stage pressure reduction. It was an intermittent flow machine, working on a very different principle from the other units available at that time i.e., Walton V or McKesson and proved very popular. The original price was £145.00. It could be used for general anaesthetics, with the addition of an anaesthetic vaporizer, and remained in constant use until 2001 when general anaesthesia was barred from dental surgery settings³. It had proved very reliable and was sadly missed by its faithful owners.

1962, In the UK, the Haworth premises were becoming too cramped, so a larger building was purchased: Joe King's Mill, West Lane, Keighley, amounting to approximately 18000 sq. feet, at a cost of £9,000. The Haworth Works were retained for some time, but gradually all work transferred to the Keighley site and the Haworth Works were sold. Use of Anaesthetic Equipment Ltd was also discontinued, with only the name Cyprane



Fig. 2 The Trilene inhaler

remaining in use.

Overseas contribution

Into the overall picture, in 1956 entered some overseas involvement. A Canadian, Fraser Sweatman, started a corporation – Fraser Sweatman Inc - under the State of New York Laws, with headquarters in Buffalo, N.Y.S. Prior to this, Fraser had already had contact with Cyprane, and their development of the temperature compensated vaporizer programme and he became the American agent for anaesthetic equipment sales.

Fraser Sweatman worked on developing the (Quantiflex) Gas Machine, which incorporated the first twin-series (high/low) flowmeter system with protection against oxygen failure (failsafe) and the now standard position of oxygen downstream of all other gases.

A real turning point in safe practice came with the development by his engineers – including his then Sales and Design Engineer, Gary Porter, of the MDM (Monitored Dial Mixer) flowmeter. This machine was specifically designed to prevent the delivery of a hypoxic mixture. This hypoxic guard was rapidly adopted by other manufacturers of gas machines. This is the same design which is still manufactured and in wide use today, with very minimal changes or alternations (Fig. 3).

Gary Porter, based in Buffalo NYS was instrumental in the Quantiflex development. Gary Porter later went on to found his own business,



Figure 3 The Quantiflex Dental Monitored Dial Mixer

Porter Instruments Inc. in Hatfield, Pennsylvania – this company now manufactures the MDM having purchased the Matrx Nitrous Oxide Division in 2008).

1961 In April a house with very large garage was purchased in Bird Avenue Buffalo, N.Y.S., To accommodate Cyprane Inc for servicing of anaesthetic vaporizers.

29th June 1961 A U.S. Federal trademark registration was filed for the name 'Quantiflex'.

16th January 1962 The following entry appeared in the US Patent Office Official Gazette:

SN 123,396. Fraser Sweatman Inc, Buffalo. N.Y. Filed June 29th, 1961.

QUANTIFLEX. For Anesthetic Administering Machines. First use in Dec 7th, 1960

Langa in his book *Relative Analgesia in Dental Practice; Inhalation Sedation with Nitrous Oxide* published in 1968, refers to 'development of equipment for administering oxygen and nitrous oxide'. He stated that in the United States there were seven types of continuous flow machines:

NCG Dental Analgesia unit, McKesson Analor, Ormco, Foregger analgesia machine, Heidbrink analgesia machine Model T, the Dentalgesic and the Quantiflex R A (this is the early Mark I type manufactured by Fraser Sweatman Inc). This latter unit was first manufactured in the U.K. towards the late 1960's, under license from Fraser Sweatman, by Cyprane, West Lane, Keighley.

By the time that the second edition of Langa's book was published in 1976, the list had grown, adding the following units: Sedatron analgesia machine and the Quantiflex R A and MDM flowmeters. The last two types were also manufactured at Cyprane in the period from the late 1960's to -1970's, under license by Fraser Sweatman. In the U.K., the Quantiflex R A (or Fraser RA) was always referred to as the Mark II.

The introduction of Halothane/Fluothane

Around this period exciting developments were being made with anaesthetics. In 1956, ICI started clinical trials of Halothane - or Fluothane as it became known. The difficulties of administering Fluothane, using the available equipment, quickly became apparent, as small dosages were required. This breakthrough drug can quite rightly be claimed as a product of industry in the Liverpool and Manchester area, with clinical trials being conducted at the Manchester Royal Infirmary.

More than a modified Boyles bottle was needed, and a request was made for a vaporizer with a consistent output over the range 0.5 to 0.3% at continuous flows between 3 and 8 L/min.

The Fluotec Mark 1 gave an accurate output but below flows of 3 L/min the output fell off. This was the first temperature-controlled vaporizer apart from the Tecota and is the forerunner of all modern anaesthetic vaporizers in use today. The Mark II (In 1966 a Fluotec Mk II retailed at £40.00) and Mk III ((1968) followed, with anaesthetic drug variants; Enfluratec, Isotec etc. Many Tec III type vaporizers are still widely in use today in the veterinary sector.

24th November 1964 Cyprane incorporated to a limited company. On the 30th of November 1964, Bill Edmondson retired at the age of 65 and the Company was purchased by Fraser Sweatman. It merged with Canam Surgical Services Ltd of Canada and Fraser Harlake Inc of the US to form one large company. Wilf Jones was appointed as first Managing Director in England.

1964, A UK manufacturing license was granted and production of the Quantiflex Mark 1 R A Flowmeter commenced by Cyprane. Later, the Quantiflex MDM and Quantiflex Mark II (also known as the Fraser RA) started. The Quantiflex range was manufactured in both the USA and UK simultaneously – the main difference being the medical gases colour coding i.e., oxygen: USA – Green / UK – white.

1965, On the 6th of July the US Patent Office issued a patent for a Volatile Anaesthetic Vaporizing Apparatus – the Drawover Vaporizer. The inventors were named as William Edmondson and Wilfred Jones. This vaporizer was commonly used in conjunction with an MDM Flowmeter until 31st December 2001 when administering a general anaesthetic in a dental surgery setting was discontinued – only to be used in a hospital setting from that time forwards⁴

Late 1960's, Fraser Sweatman purchased the Harris Lake Company and changed the name to Fraser Harlake. Originally based in Canada, eventually all USA flowmeter manufacturing moved to Orchard Park, Buffalo, N.Y.S. where it remained until 2008 when Midmark sold the Matrx Nitrous Oxide Division to Porter Instruments (Parker Hannifin).

In 1972 a Quantiflex R A Head – available finished either in black with wood grain centre panel or silver tone – cost £160.00. A mobile 4 cylinder stand cost £75.00 and a wall plate with 12" swing Arm cost £20.00. These prices were obtained from a quotation offered to a prospective user dated the 31st of August 1972.

1972, BOC purchase the group of companies. Wilf Jones continues as Managing Director. Fraser Harlake/Cyprane become part of BOC Medishield.

1974, Bill Edmondson died aged 71.

1975, Cyprane Keighley was manufacturing an estimated 75% of the world's calibrated, temperature compensated vaporizers.

Current usage of inhalation sedation in dentistry

From the early days of nitrous oxide/oxygen sedation and all through the development and introduction of safety mechanisms to the equipment, the use of inhalation sedation has

proved to be an invaluable method of allowing extremely nervous patients to accept dental treatment. The technique can be safely used in adults and children and with suitably trained staff and equipment, inhalation sedation can be used in primary and secondary dental care settings.

References

1. Lippe HT, Nitrous Oxide Analgesia in Cavity Preparation, Temple Dental Review 14.7, 1944
2. Langa H, Relative Analgesia in Dental Practice 1968
3. The amendment to the NHS (General Dental Services) Regulations 1992, issue 2001
4. A conscious decision, A review of the use of general anaesthesia and conscious sedation in primary dental care. Department of Health July 2000

Author Biography: With a background in surgical nursing, Janet Pickles, in conjunction with her Husband Christopher, formed R A Medical Services in the early 1990's. Christopher had many years' experience in the area of anaesthetic vaporizers and inhalation sedation flowmeters, being part of the team who developed the Quantiflex range at Cyprane, Keighley with Fraser Sweatman. With the closure of the Keighley Ohmeda factory in the 1990's, support for sedation flowmeters had deteriorated – Janet and Chris were determined to reverse this and over the last 25 + years, have successfully brought this extremely safe and useful item of medical equipment back into the focus and use it deserves.

Janet writes and lectures extensively on the subject.

Address for correspondence:

janet@ramedical.com

Dame Margaret Seward - an important influence in the development of UK orthodontics

Chris Stephens and Sophie Riches

Abstract: While there have been obituaries elsewhere describing the remarkable achievements of Dame Margaret Seward CBE, BDS(Hons), DDSc, DDS, FDSRCS Eng (1935-2021),^{1,2,3} here we describe those which have benefitted UK orthodontics but which are less well known. Her contributions were recognised by an Honorary Membership of the British Orthodontic Society and later that of its affiliate the Orthodontic National Group which came into being to cater for the interests of Orthodontic Nurses and Orthodontic Therapists.

Keywords: Orthodontics, Therapists, General Dental Council, Auxiliaries, Women in Dentistry.

Background

In the late 1960s the newly independent British dental profession was regulated by a General Dental Council (GDC) whose Education Committee required dental students on qualification to be "*competent in all aspects of dentistry*". While postgraduate orthodontic qualifications were by this time available from the Royal College of Physicians and Surgeons of Glasgow, and the Royal College of Surgeons of England, these were only required by those wishing to apply for specialist hospital appointments. There was no requirement for dentists, even those who limited their practices to orthodontics, to hold additional qualifications. As a consequence, at this time, all treatment plans for orthodontic cases undertaken within the General Dental Service (GDS) of the NHS had to be approved by the Dental Estimates Board of England, which was advised by an appointed hospital consultant. GDS fees for orthodontics and other items of service were determined by the Board's negotiations with the Dental Rates Study Group of the British Dental Association. Similar independent systems existed in Scotland and Northern Ireland. None of the then five orthodontic associations had any input to any of these discussions. The result of this was that GDS orthodontic treatment was almost entirely carried out using removable appliances, while the fees for fixed appliances were so low as to discourage their use. Indeed, at this time, even within the hospital service, there were very few cases being treated with full upper and lower fixed appliances. Consequently, the standard of NHS orthodontic treatment within Britain was wholly

inadequate and was regarded by many overseas specialists as laughable.

Dame Margaret's career development

Into this muddle arrived the remarkable Margaret Seward who had qualified in 1959 at the London Hospital Dental School. It was fortunate for UK orthodontics that a fellow student in her year was the charismatic David DiBiase. In 1962 Margaret gained her FDSRCS(Eng) and married the then Senior Registrar in Oral Surgery at the London who was later to become Professor Gordon Seward CBE, Dean of the Faculty of Dental Surgery of the Royal College of Surgeons of England. During the next 10 years Margaret gained wide experience of hospital and community dentistry, and published several papers on teething,^{1,2,3} the first significant work on the subject since that of Thomas Fayre of 1553.⁴ Her MDS degree, a higher doctorate of the University of London, was the first to be achieved by a woman.

As there were no maternity leave arrangements at the time, when Gordon and Margaret had decided to start their family Margaret had to step off the dental career ladder. Her subsequent difficulty in getting back to dentistry led to her lifelong campaign for better support for women dental graduates. Her letter to the British Dental Journal (BDJ) in 1973 proposing that there be a "women dentist's retainer scheme" gained support from Desmond Greer Walker of the British Postgraduate Medical Federation.^{5,6} This led ultimately to the scheme being underwritten by Edwina Currie, the then Minister of Health, with it finally coming into being in 1985.^{7,8,9} Today, as a

¹ Obituary, Br Dent J 2021; **231**: 159.

² Obituary, Daily Telegraph. 15th August 2021.

³ Obituary, The Times. 3rd September 2021.

direct result of her efforts, half of those on the U.K. Dentists Register and more than half those on the GDC's Specialist List for Orthodontics, are women.¹⁰

It was fortunate for UK orthodontics that in 1966 her husband Gordon, now a highly experienced and respected Reader in Oral Surgery at the London Hospital, had been told that he would never be appointed to a chair without taking leave to gain experience in leading centres overseas.¹¹ This resulted in his visits to Canada and the United States, and later their joint trip to Singapore, Australia and New Zealand where they had both been impressed by the value of the expanded role of the New Zealand dental nurse. This, and Margaret's Council of Europe Fellowship to study such training in Holland,¹² caused her to write in 1978 to George Gibb, the then Chief Dental Officer and England and Wales, suggesting that experiments be undertaken to assess the value of the expanded duty dental auxiliary to the U.K, something which was still resolutely opposed with the cry "dilution of the profession".

Dame Margaret's contribution to orthodontics

In 1976 Margaret, now with two small children, was elected to the GDC and three years later became the first woman editor of the BDJ, a task she undertook with her usual vision, professionalism and energy, turning it from loss to profit and to it becoming one of the world's leading dental journals. Later she would become the editor of the International Dental Journal with equal success. Both gave her a voice with which to begin to influence national dental events.

In 1973 the British Society for the Study of Orthodontics (BSSO) had submitted a report to the GDC recommending the introduction of dental ancillaries for orthodontics.¹³ Sadly no action was taken by the Council on the matter even though at that time similar requests were being made in Australia.¹⁴ As a result, no further progress was made for the next fifteen years.

In April 1987 Margaret, who by this time had become Chairman of the GDC's Dental Auxiliaries Committee, was invited (we suspect by David DiBiase), to address the annual meeting of the BSSO in Birmingham. In this speech she explained the various stages which would have to be gone



Fig. 1 Dame Margaret Seward opening the first headquarters of the unified British Orthodontic Society in 2002 at 291 Gray's Inn Road London together with the former President of the British Association of Orthodontists Ken Lumsden (left) and the President of the BOS Chris Stephens.

through before the GDC would agree to sanction the establishment of orthodontic auxiliaries. Her subsequent crucial role in bringing this about has been described previously.¹³ Now there are currently nearly 700 Orthodontic Therapists on the GDC lists.¹⁴ At the same meeting Margaret pointed out that if the membership of the then five orthodontic societies could agree to support a single candidate at a future GDC election, this would ensure that the specialty would acquire an influential voice on the Council. This ultimately came to pass in 1996 following the unification which brought into being the British Orthodontic Society.¹⁵ (Figure 1, Figure 2)

In 1993 Margaret assumed Presidency of the BDA and a year later was elected President of the GDC. This was shortly after the General Medical Council and the GDC had been found to be in breach of the European Directives on Medical and Dental Specialist Training.¹⁶ It resulted in the publication the Chief Medical Officer's "Calman Report" on UK specialist medical training,¹⁷ soon followed by the "Mouatt Report" on dental specialist training of 1995.¹⁸ The problem for the UK was that while the "Competent Authority" in each profession was its respective Dental Council, specialist training in the UK had been regulated for many years by the Royal Colleges, moreover by now specialist dental masters degrees of UK Universities had been accepted as "additional dental qualifications" by the GDC. Margaret's role as GDC President in achieving what became



Fig. 2 Dame Margaret opening the present headquarters of the British Orthodontic Society at 12 Bridewell Place in 2006 with Ken Lumsden now its President.

known as “*The Accord*” between these competing interests, resulted in compliance with the EU Directives and the successful introduction of UK dental specialist lists in 2002 to the satisfaction of all parties. A tribute to this achievement was paid to Dame Margaret on the occasion of her retirement from the GDC by Tom Macadam, a long serving member:

“Here were the combined forces of the universities, colleges and the profession all pulling in different directions. Could it be done or was failure the only option? Only some eight years later has the initial work of 1990 (The Distinctive titles Working Party) been completed. Under your guidance the proposal passed through the Council and all parties were placated. It is a far from easy task to achieve anything worthwhile in this Council and this was of major importance.”

But Margaret’s work was far from over. In 1999 the Prime Minister Tony Blair had announced, much to everyone’s surprise, that by September 2001 anyone who wanted NHS dental care would be able to receive it, and the Department of Health subsequently affirmed its commitment to improving access to NHS dentistry in the new NHS plan.

In September 2000 the Parliamentary Health Select Committee’s report “*Modernising NHS Dentistry: Implementing the NHS Plan*” was published,¹⁹ and Margaret was now persuaded to accept the appointment as the first woman Chief Dental Officer of England and Wales (2001-2003)

with the specific role of implementing the new dental strategy which contained much she had worked for in her previous appointments. Her “*Dental Modernisation Steering Group*” affectionately also known as “*Dame Margaret’s Gang*” soon set to work.

Typically, for a woman of such energy, Margaret never really retired. Completing her distinguished professional career in 2003 (which would have resulted in a peerage but, it is suggested, for a change of government) she retained her directorship of “*Better opportunities for Women*” while also taking on: the Chair of the Editorial Board of Women in Dentistry, the Presidency of the Bournemouth and Poole Medical Society and Patronage of “*Dorset Victim Support*” and probably much else we do not know about. Her book “*Open Wide – Memoir of the Dental Dame*” is recommended to anyone with an interest in dental history for it contains over 550 eminent dental and political names in a fascinating behind the scenes account of the development of the dental profession over more than 50 years. At the same time, it confirms the appropriateness of the motto which Margaret chose for her Coat of Arms to which she was entitled on being appointed DBE in 1994. This was adopted from that of Latymer School for Girls of which she had been Head Girl, later becoming Chair of its Board of Governors - “*She who endures conquers*”.

References

- ¹ Seward MH The effectiveness of a teething solution in infants. A clinical study. Br Dent J. 1969; **127**: 457-61.
- ² Seward MH Local disturbances attributed to eruption of the human primary dentition. A survey. Br Dent J. 1971; **130**: 72-7.
- ³ Seward MH. The treatment of teething in infants. A review. Br Dent J. 1972; **132**: 33-6.
- ⁴ Fayre T. *The booke of Children*. Ihon Kingston and Henry Sutton, London 1553.
- ⁵ Seward MH, Walker DG. The need to retain women dentists in practice. Br Dent J. 1974; **137**: 319-21.
- ⁶ Seward MH, Walker DG. Part-time in dentistry. Br Dent J. 1983; **154**: 265-6.
- ⁷ Seward MH, McEwen EM. The provision of dental care by women dentists in England and Wales in 1985: a ten-year review. Br Dent J. 1987; **62**: 50-1.

- ⁸ McEwen EM, Seward MH. The contribution of women to dentistry in the 1980s. *Br Dent J.* 1988; 165: 339-41.
- ⁹ McEwen EM, Seward MH. Women dentists at work. *Br Dent J.* 1988; 165: 380-2.
- ¹⁰ Annual Report and Accounts 2020. General Dental Council, London July 2021. ISBN 978-1-5286-2673-6
- ¹¹ Seward M. *Open wide – memoir of the Dental Dame.* The Memoir Club, Durham, 2009 p.53.
- ¹² Seward MH, Operating ancillary dental personnel in the Netherlands. *Br Dent J.* 1978; 145: 107-11.
- ¹³ Stephens CD, Kettler CJ, Riches S. Moves to establish orthodontic therapists in the UK 1967-2008. *Dent Hist.* 2022; 67(1): 44-50.
- ¹⁴ *Registration Statistical Report 2019.* General Dental Council, London 2020.
- ¹⁵ Stephens CD. *The Unification of UK Orthodontic Societies 1970-1994.* *Dent Hist.* 66(1): 17-24.
- ¹⁶ *The European Primary and Specialist Dental Qualification Regulations.* Statutory Instrument 1998, 811.
- ¹⁷ Calman KC. Hospital Doctors: Training for the Future. The report of the Working Group on Specialist Medical Training. London, Department of Health; April 1993.
- ¹⁸ Mouatt RB. *Training for Dental Specialist of the Future.* Report of the Working Group on Specialist Dental Training. NHS Executive, London, May 1995.
- ¹⁹ *Modernising NHS Dentistry: Implementing the NHS Plan,* Department of Health, London, September 2000.

Authors Biographies:

Chris Stephens: Emeritus Professor Chris Stephens was formerly Head of the Department of Child Dental Health at the Bristol Dental School and a President of the British Orthodontic Society. From 2002 until 2020 he was a member of the BOS Archive and Museum Committee.

Sophie Riches: Sophie has been the Archivist of the British Orthodontic Society since 2013 and before that was a member of staff at the BDA Library and Museum. She holds BA(Hons) degree in Archaeology and Ancient History and an MA in Museum and Artefact Studies.

Address for correspondence:

c.d.stephens@blueyonder.co.uk

European Federation of Conservative Dentistry: the first twenty years

Nairn Wilson, Stephen Dunne, Gottfried Schmalz, L. Şebnem Türkün

Abstract: The formation and first 20 years history of the European Federation of Conservative Dentistry is presented. Based on its achievements and impact to date, the Federation has a critical role to play in shaping the future of dentistry in Europe and beyond.

Keywords: Conservative Dentistry, Europe, Federation

Introduction

The European Federation of Conservative Dentistry (EFCD) is a non-profit making organisation. The prime object is to contribute to the promotion of oral health in the public interest by encouraging excellence in the clinical practice, teaching and research pertinent to all aspects of Conservative Dentistry. The Federation was constituted in Basel, Switzerland, on 20 December 2001.

This paper, which draws heavily on a paper published in ICDigest¹, records the formation and first twenty years of the history of EFCD,

Early history

In 1994 Professor Fons Plasschaert was granted sabbatical leave from Nijmegen University, having completed his term of office as 'Rector Magnificus'. He spent three months in spring of 1994 in Manchester, UK. He worked with Professor Nairn Wilson, then Dean and Professor of Restorative Dentistry in Manchester. Professors Plasschaert and Wilson worked late most evenings, drinking Dutch Jenever or Scottish whisky, drafting papers and discussing a wide range of dental issues. The Academy of Operative Dentistry European Section (AODES) were one of a number of initiatives which stemmed from their discussions. Professor Wilson, being a member of the Executive Council of the Academy of Operative Dentistry at that time, proposed the formation of the European Section. With perseverance, his proposal was finally accepted. The first AODES meeting was held in Riva del Garda, Italy during April 1998. Nairn Wilson was founding President of the Section, Dr Margaret Wilson was Secretary and Fons Plasschaert was incoming President. The AODES was created to facilitate interactions and collaborations amongst members of the Academy of Operative Dentistry based in Europe, typically

individuals with connections or interests in departments of Operative Dentistry in dental schools in North America.

Concurrent to the formation of AODES, in 1997 Nairn Wilson floated the idea of an independent pan-European body for Conservative Dentistry with several opinion leaders in the field. It was agreed to hold a meeting to explore the proposal. At the suggestion of Professor Reinhard Hickel, then Dean of the Ludwig Maximilians University of Munich Dental School, arrangements were made to hold the proposed meeting in the Business Centre of Munich Airport -a convenient airline hub. The meeting, generously funded by Reinhard Hickel, was held in the autumn of 1998. Attendees included Professors Reinhard Hickel (Munich), Nairn Wilson (Manchester), Guido Vanherle, (Leuven) Jean-François Roulet (Berlin) and Dr Massimo Fuzzi (then President of the Italian Academy of Conservative Dentistry). Two subsequent meetings were held during 1998/1999, one in Paris and the other in Madrid, again using airports business centres for convenience.

The outcome of these meetings was agreement that the development of a pan-European body for Conservative Dentistry, offering membership to national organisations for Conservative Dentistry and allied fields, including Cariology, Operative -, General-, Preventive- and Restorative Dentistry, as practised in North America, would be a good, but challenging initiative. The vision was to create a body to serve and promote Conservative Dentistry, using the highly successful European Federation of Periodontology as a model. Before proceeding, it was agreed that a subject-wide, pan-European scientific meeting should be held during the Millennium Year (2000) to test interest in such an event and provide opportunity to engage more colleagues in further discussions on the proposed pan-European body.

Birth of ConsEuro

The Italian Academy of Conservative Dentistry kindly agreed to host the first pan-European scientific meeting on Conservative Dentistry in conjunction with the seventh congress of the Italian Academy of Conservative Dentistry. Dr Massimo Fuzzi (Fig.1) was tasked to organise the meeting in his home city of Bologna.



Fig.1 Dr Massimo Fuzzi



Fig.2 Cover of the programme for the first ConsEuro meeting in Bologna

One of the first actions in organising the meeting, apart from deciding on the title 'ConsEuro' and drafting a programme (Fig.2), was recruiting Quintessence publishers to partner the Italian Academy in running the event.

The arrangements agreed with Quintessence included an agreement that Nairn Wilson, Jean-François Roulet and Massimo Fuzzi would edit a book based on the proceedings of the meeting, with all the royalties from the sale of the book going towards offsetting the cost of the venture. The many, different offers of contributions to this book resulted in:

Roulet, J-F., Wilson, N.H.F. & Fuzzi, M. Eds.
Advances in Operative Dentistry. Vol. 1:
Contemporary clinical practice.
London, Quintessence Publishing Co. Ltd,
2001.
(Italian edition published in 2003, French
edition published in 2003, Chinese and
Turkish editions published in 2006, Russian
edition in 2007)

Wilson, N.H.F., Roulet, J-F. & Fuzzi, M. Eds.
Advances in Operative Dentistry. Vol 2:
Challenges of the Future.
London, Quintessence Publishing Co. Ltd,
2001.
(Italian edition published in 2003, Turkish
edition published in 2006)

As may be noted from Fig.2, the Bologna ConsEuro meeting was held between 11 and 13 May 2000. A major theme of this first ConsEuro meeting, entitled 'Today's approach to tomorrow's challenges' was teaching of Conservative Dentistry in Europe. Members of Scientific and Local Organising Committees for the event are included in Fig. 3.

Given the good, better than anticipated attendance and positive feedback from the superbly hosted ConsEuro in Bologna, Reinhard Hickel, Nairn Wilson, Pascal Zyman, Massimo Fuzzi, Augustin Pascual, Isobel Camps, Peter Minnig and Fons Plasschaert made arrangements to hold a follow-up meeting in Munich on 2 November 2000. At this meeting, it was decided to go ahead with the formation of EFCD. Reinhard Hickel and Nairn Wilson agreed to draft a constitution and bye-laws. Following a further meeting in Rome on 5th



Fig. 3: Members of the Scientific and Local Organising Committee for and first ConsEuro meeting in Bologna in 2000 (from left to right): Elmar Hellwig (Germany), Reinhard Hickel (Germany), Catorina Wallman (Sweden), Fons Plasschaert (Netherlands), Roberto Genovesi (Italy); Massimo Fuzzi (Italy); Peter Minnig (Switzerland); Michel Degrange (France) and Nairn Wilson (United Kingdom)

September 2001, this time attended by Reinhard Hickel, Nairn Wilson, Bart van Meerbeek, Jean-François Roulet, Massimo Fuzzi, Marco Oddera, Roberto Genovesi, Pier Nicola Mason, Marco Ferrari, Caterina Wallman, Catarin Wretlind, Peter Minnig and Fatma Koray, the European Federation of Conservative Dentistry (EFCD) was officially registered in Basel, Switzerland in December 2001.

Membership

Initially there were three classes of membership:

Full membership, comprising:

- SIDOC: Società Italiana di Odontoiatria Conservatrice
- CNEOC: Collège National des Enseignants en Odontologie Conservatrice
- AIC: Accademia Italiana di Odontoiatria Conservativa e Restaurativa
- SEOC: Sociedad Española de Odontología Conservadora y Estética
- SSPRE: Schweizerische Gesellschaft für Präventive, Restaurative und Ästhetische Zahnmedizin
- DGZ: Deutsche Gesellschaft für Zahnerhaltung
- ADA: Académie De Dentisterie Adhésive
- RDD: Turkish Society of Restorative Dentistry
- NWVT: Nederlandse Wetenschappelijke Vereniging van Tandartsen

Associate membership, comprising:

- Leuvense Universitaire Tandheelkundige Vereniging
- Zahnerhaltung der ÖGZMK, Graz Austria

Corporate membership, comprising:

- GABA
- Quintessence
- Heraeus-Kulzer
- Ivoclar Vivadent
- 3MEspe
- Dentsply
- Colgate.

Individual and honorary categories of membership were added subsequently.

Executive Committee

When formally constituted, the EFCD Executive Committee comprised:

President: Reinhard Hickel

Vice President/ President-Elect: Nairn Wilson

Secretary General: Peter Minnig

Treasurer: Marco Oddera

Councillors: Fons Plasschaert, Guido Goracci, Jean-François Roulet, Catarina Wretlind, Fatma Koray and Jose de la Macorra

Webmaster: Marco Ferrari

The Executive Committee of the Federation, for example the Executive Committee of 2013 (Fig.4), including at least two councillors elected by the Federation's General Assembly (see below) shoulders the administration of the Federation on a voluntary basis. All Past-Presidents become consultants to the Executive Committee.

To date, the Federation has not employed any administrators, other than conference administrators to assist with the arrangements for ConsEuro meetings.

Details of the officers of the Federation to date are set out in Table 1.

General Assembly

The General Assembly is the legislative body of the EFCD. It has powers to:

- enact, amend and repeal the Constitution and By-laws of the EFCD;
- elect and approve appointments to the Executive Committee and other constitutional committees of the EFCD;
- appoint auditors;
- authorise the signing of contracts with other

Table 1. Officers of the Federation

	PRESIDENT	TREASURER	GENERAL SECRETARY	WEBMASTER /EDITOR*
<i>2001-2003</i>	Reinhard Hickel	Marco Oddera	Peter Minnig	
<i>2004-2005</i>	Nairn Wilson	Marco Oddera	Peter Minnig	
<i>2006-2007</i>	Marco Ferrari	Peter Minnig	Peter Minnig	Livio Gallottini
<i>2007-2008</i>	Guido Vanherle	Peter Minnig Jurg Meyer (2008 interim)	Peter Minnig Guido Vanherle (2008 interim)	Guido Vanherle
<i>2009-2010</i>	José C. De la Macorra	Adrian Lussi	Stephen Dunne	Guido Vanherle
<i>2011-2012</i>	Fatma Koray	Adrian Lussi	Stephen Dunne	Guido Vanherle
<i>2013-2014 (Fig. 1)</i>	Pierre Colon	Adrian Lussi	Stephen Dunne	Guido Vanherle
<i>2015-2016</i>	Stephen Dunne	Adrian Lussi	Helena Lewis-Greene	Laura Ceballos García
<i>2017-2018</i>	Lorenzo Breschi	Adrian Lussi	Helena Lewis-Greene	Laura Ceballos García
<i>2019-2020</i>	Sebastian Paris	Adrian Lussi	Helena Lewis-Greene	Laura Ceballos García
<i>2021-2022</i>	L. Şebnem Türkün	Julia Amato	Shivana Anand	Laura Ceballos García

*Initially, the President acted as Editor. The position of Editor was created in 2006.

organisations for projects of mutual benefit;

- approve the accounts, the administration and management of the financial affairs of the EFCD by the Executive Committee;
- initiate proposals conferring with the objectives of the EFCD;
- decide on the annual dues and approve the budget;
- approve the time and place of future General Assemblies and scientific meetings.

The membership of the General Assembly comprises all Full Members, all Associate and Corporate Members and all Honorary Members entitled to attend meetings of the General Assembly with the right to vote.

ConsEuro meetings

Following the success of the first ConsEuro in Bologna, it was decided to hold the second ConsEuro scientific meeting in Munich in June 2003, with Reinhard Hickel hosting the event as the first President of the Federation. Again, the meeting



Fig.4 Members of the Executive Committee in 2013, from left to right: Guido Vanherle (Belgium); Gottfried Schmalz (Germany); Pierre Colon (France); Stephen Dunne (United Kingdom); Laura Ceballos (Spain); Marianne Federlin (Germany); L. Şebnem Türkün (Turkey); Helena Lewis-Greene (United Kingdom); Arne Hensten (Norway) and Lorenzo Breschi (Italy).

Table 2. Dates and venues of the ConsEuro meetings

1 st ConsEuro	2 nd ConsEuro	3 rd ConsEuro	4 th ConsEuro	5 th ConsEuro	6 th ConsEuro	7 th ConsEuro	8 th ConsEuro	9 th ConsEuro	10 th ConsEuro
Bologna 2000	Munich 2003	Rome 2006	Seville 2009	Istanbul 2011	Paris 2013	London 2015	Bologna 2017	Berlin 2019	Online 2021

was most successful, thanks in large part to enormous effort by the local organising team led by Reinhard Hickel. Thereafter, it became customary for ConsEuro scientific meetings to be held approximately every three years. However, following the success of the Seville meeting in 2009, the decision was taken to hold a ConsEuro meeting every two years, to be hosted by the serving President. The plan was that each President would serve on the Executive Committee for one year as President-Elect, one year as President (and host of ConsEuro) and one year as Immediate Past-President. The venues and dates of the ConsEuro meetings held to date are listed in Table 2.

Tragic Death of the General Secretary

Peter Minnig (included in Fig.3) served with distinction as General Secretary of the EFCD for seven years. At the General Assembly in 2006, it was agreed that the roles of General Secretary and Treasurer would be merged. Peter accepted the dual position. Tragically, Peter passed away suddenly in 2008. Professor Guido Vanherle kindly stepped in as Interim Secretary, until Professor Stephen Dunne was formally appointed General Secretary in 2009. Peter's sudden death created a major problem, as nobody, including Peter's wife, knew the password for the computer in which all the EFCD files were stored. This explains the absence of some early EFCD records. Fortunately, Guido Vanherle was able to retrieve from colleagues most of the information necessary to fulfil his role as Interim Secretary and subsequently President of the Federation. Following Peter's death, Guido Vanherle had to meet with Jurg Meyer, the EFCD Auditor in Basel, Switzerland, to make arrangements to access the EFCD bank account, to which Peter had previously exclusive access. At the next General Assembly, Jurg was appointed Interim Treasurer to work with Guido Vanherle, who continued as Interim Secretary until Stephen Dunne was appointed General Secretary in 2009.

Award of Excellence

The Award of Excellence is the highest award

of the Federation. The Award is made in recognition of outstanding contributions to Conservative Dentistry over a period, normally in excess of 30 years, in one or more of the fields of clinical practice, education, research, service to society, leadership and the promotion of professional standards. Presentation of annual Awards of Excellence is made by the President of the Federation at their ConsEuro meeting. The Award takes the form of a certificate and a specially commissioned sculpture inscribed with the awardee's name and the year of the Award. The Award is not accompanied by a monetary prize.

Nairn Wilson, who served as second President of the Federation in 2004-2005, was responsible for introduction of the EFCD Award of Excellence. The founding recipient of the Award in 2005 was Professor Ivar Mjør. Recipients of the EFCD Award of Excellence are listed in Table 3.

Table 3. Recipients of the EFCD Award of Excellence

2005	Ivar Andreas Mjør
2006	Carel Davidson
2007	Edwina Kidd
2008	Erik Admussen
2009	Ole Blok Fejerskov
2010	Jacob Martien ten Cate
2011	Gottfried Schmalz
2012	Gunnar Bergenholtz
2013	Jens Ove Andreassen
2014	Guido Vanherle
2015	Thomas Imfeld
2016	Jean-François Roulet
2017	Pierre Colon
2018	Reinhard Hickel (Fig. 3)
2019	Stephen Dunne
2020	Bart van Meerbeek
2021	Adrian Lussi



Fig.3. Prof Dr Reinhard Hickel responding to the presentation of his EFCD Award of Excellence during the 9th ConsEuro held in Berlin in 2019. The Award of Excellence sculpture is on the podium to the left of Professor Hickel.

Scientific Foundation

The creation of a Scientific Foundation was a goal from the outset of the Federation but one that could not be financed during the fledgling years of the organisation. The provisions and arrangements for Scientific Foundation Awards were drafted at the same time as the arrangements and provisions for the Award of Excellence. It was decided to proceed with the Award of Excellence ahead of launching Scientific Foundation Awards, pending the financial strength of the EFCD becoming more secure. The Award of Excellence and the Scientific Foundation Awards were considered good ways to raise the profile of the Federation.

The purpose of Scientific Foundation Awards is to finance scientific visits (3-12 months) to European dental schools to undertake research in Conservative Dentistry. Recipients of Scientific Foundation Awards are listed in Table 4.

Poster prizes

Prizes for best posters were introduced at the second ConsEuro in Munich to encourage the submission of abstracts and, in turn, attendance by young colleagues. Prizes were awarded in several categories, including, Prevention, Materials Science, Clinical Cases etc. In addition to a prize certificate, each prize includes a monetary award, with the value depending on the financial strength of the Federation at that time.

Clinical Oral Investigations/ Springer

Cooperation between Clinical Oral

Table 4. Recipients of EFCD Scientific Foundation Awards

Mine Dündar.	February-July 2009
Anne-Katrin Luchrs	February-August 2013
Barbara Cvikl	February-August 2013
Eugenia Baena Aguilera	February-June 2015
Carmen Arpa Sacristán	October 2015-July 2016
Sophia Lindner	August 2017-March 2018
Tatjana Maravic	November 2018 - November 2019

Investigations (CLOI) and EFCD started in 2003, at the time that Reinhard Hickel organised the second ConsEuro meeting in Munich. The abstracts of that meeting were published in CLOI. Before the ConsEuro meeting 2009 in Seville, Jose de la Macorra, then President of EFCD, and Gottfried Schmalz (Editor-in-Chief of CLOI) negotiated with Springer in Heidelberg to develop a formal cooperation between EFCD and CLOI. The proposed arrangements were taken to the Board of EFCD, which held further discussions with Gottfried Schmalz. In the meantime, the abstracts from the ConsEuro 2009 were published in CLOI (see below).

At the meeting of the EFCD Board held at the time of the ConsEuro meeting in Paris in 2013, attended by a representative of Springer (S. Klemp) and Gottfried Schmalz, a contract for an affiliation between Springer and EFCD was discussed. This contract was signed on behalf of EFCD by Pierre Colon, then President and Adrian Lussi (Treasurer) on July 1st, 2014.

In the contract, CLOI was recognised as the “official journal of EFCD”, with members of the Federation being offered a reduced subscription rate for the journal. Abstracts from ConsEuro meetings would be published in CLOI, both electronically and in print at no cost to the Federation, except for an open access fee of 2200 €.

Gottfried Schmalz, recipient of the Federation’s Award of Excellence in 2011, acted as consultant and liaison between CLOI and the EFCD Board between 2012 and 2021. Since 2021, the new Editor-in-Chief of CLOI, Matthias Hannig has represented CLOI on the EFCD Board.

The contract between EFCD and Springer was amended in August 2020, CLOI having adopted electronic publication. In the revised contract Springer is committed to publishing the abstracts of ConsEuro meetings, together with an outline of the programme for each meeting, and other material

as agreed by EFCD and the Editor-in-Chief of CLOI. The abstracts are published in electronic format and made available to all subscribers

The abstracts of ConsEuro 2003 and all ConsEuro meetings since 2009, all fully citable and included in PubMed, may be found in CLOI as follows:

- ConsEuro 2003: Clinical Oral Investigations 2004; 8: S1–S25
- ConsEuro 2009: Clinical Oral Investigations 2009;13:49-118
- ConsEuro 2011: Clinical Oral Investigations 2011;15:771
- ConsEuro 2013: Clinical Oral Investigations 2013;17:1029–1111
- ConsEuro 2015: Clinical Oral Investigations 2015;19:1701–1754
- ConsEuro 2017: Clinical Oral Investigations 2017;21:1359–1433
- ConsEuro 2019: Clinical Oral Investigations 2019;23: 2515–2572
- ConsEuro 2021: Clinical Oral Investigations 2021;25: 4185–4238

In addition, the following EFCD consensus reports have been published in CLOI and Caries Research:

- Carvalho TS, Colon P, Ganss C, Huysmans MC, Lussi A, Schlueter N, Schmalz G, Shellis RP, Tveit AB, Wiegand A. Consensus report of the EFCD: erosive tooth wear-diagnosis and management. Clinical Oral Investigations 2015; 19:1557-1561.
- Meyer-Lueckel H, Opdam NJM, Breschi L, Buchalla W, Ceballos L, Doméjean S, Federlin M, Field J, Gurgan S, Hayashi M, Laegreid T, Loomans BAC, Lussi A, Lynch CD, Pallesen U, Peumans M, Toth Z, Wilson NHF. EFCD Curriculum for undergraduate students in Integrated Conservative Oral Healthcare (ConsCare). Clinical Oral Investigations 2019;23:3661-3670.
- Splieth CH, Banerjee A, Bottenberg P, Breschi L, Campus G, Ekstrand KR, Giacaman RA, Haak R, Hannig M, Hickel R, Juric H, Lussi A, Machiulskiene V, Manton DJ, Jablonski-Momeni A, Opdam NJM, Paris S, Santamaria RM, Schwendicke F, Tassery H, Ferreira Zandona A, Zero DT, Zimmer S, Doméjean S. How to intervene in the caries process in children: A joint ORCA and EFCD

Expert Delphi Consensus Statement. Caries Research 2020; 54:297-305.

- Schwendicke F, Splieth CH, Bottenberg P, Breschi L, Campus G, Doméjean S, Ekstrand K, Giacaman RA, Haak R, Hannig M, Hickel R, Juric H, Lussi A, Machiulskiene V, Manton D, Jablonski-Momeni A, Opdam N, Paris S, Santamaria R, Tassery H, Zandona A, Zero D, Zimmer S, Banerjee A. How to intervene in the caries process in adults: proximal and secondary caries? An EFCD-ORCA-DGZ Expert Delphi Consensus Statement. Clinical Oral Investigations 2020; 24:3315-3321.
- Paris S, Banerjee A, Bottenberg P, Breschi L, Campus G, Doméjean S, Ekstrand K, Giacaman RA, Haak R, Hannig M, Hickel R, Juric H, Lussi A, Machiulskiene V, Manton D, Jablonski-Momeni A, Santamaria R, Schwendicke F, Splieth CH, Tassery H, Zandona A, Zero D, Zimmer S, Opdam N. How to intervene in the caries process in older adults: A joint ORCA and EFCD Expert Delphi Consensus Statement. Caries Research 2020; 54: 459-465.

COVID-19 pandemic

Given difficulties caused by the COVID-19 pandemic, the activities of the Federation were curtailed in 2020 and 2021.

The tenth ConsEuro meeting was originally planned to be held in Antalya, Turkey between 22nd and 24th of April 2021. The theme of the congress was “Dentistry 2.0 - New technologies and materials in today’s dentistry”. Up until the end of 2020, it was hoped that the conference would take its usual form with delegates being physically present, with lots of face-to-face interactions. However, with the emergence of the COVID-19 pandemic and many European countries going into some form of lockdown with travel restrictions, the Executive Committee decided to postpone the ‘physical’ ConsEuro Conference until 21st to the 23rd April 2022 and to make arrangements to have a ‘virtual’ ConsEuro 2021 congress. For this exceptional meeting, EFCD and RDD (the Turkish Restorative Dentistry Society) invited 12 eminent opinion leaders from across Europe to present their latest research in Conservative Dentistry, with a focus on new technologies and materials, and their applications. The ‘virtual’ conference was a great success. The lectures were pre-recorded and at the end of each day, a live discussion was held with the

speakers of the day. Moreover, it was possible to accept posters for virtual presentation not only from across Europe but from all over the world. A good number of industry sponsors were happy to create virtual stands to be visited by the participants and have live discussions with them between and following lectures.

The 'virtual' ConsEuro experience was very positively received by our members and attracted an encouraging number of participants from around the world. Moreover, the lectures could be re-watched at any time by registered participants up to 21 days after the event.

The way forward

In common with many dental organisations, the EFCD, in the aftermath of the COVID-19 pandemic will need to address a number of critical issues. The Federation anticipates difficulties in attracting new members, sponsors and attendees to 'physical' ConsEuro meetings, even when the recovery from the pandemic is well advanced. However, the EFCD pertains to the most widely practised aspect of dentistry -conservative oral health care (i.e., preventatively orientated, minimum intervention, patient-centred Conservative Dentistry) and, as such, has a critical role to play in shaping the future of dentistry. To thrive as an organisation, as it must, the EFCD will develop new relationships with practitioners, scientists and dental school teachers, collaborations with national societies, and attract individual members in countries with no relevant national society. In these, and other ways, the EFCD aims to gain more visibility and impact and thereby help to ensure that conservative oral health care is recognised as being central to modern oral health care provision.

Reference

1.Dunne S, Schmalz G and Türkün LS. The European Federation of Conservative Dentistry. ICDigest, 2022: 36-42.

Acknowledgement

The authors are grateful to the European Section of the International College of Dentists, specifically the Editor-in-Chief of the Section's journal, ICDigest, for permission to reproduce text, tables and illustrations from the above paper in the process of preparing this history.

Also, the authors acknowledge the invaluable contributions of Professors Fons Plasschaert, Reinhard Hickel, Guido Vanherle and Lorenzo Breschi, and Dr Massimo Fuzzi, together with important contributions from members of the present EFCD Executive Committee.

Author biographies

Nairn Wilson CBE DSc (*h.c.*) DDent (*h.c.*) PhD MSc BDS FCGDent FDS (Edin, Eng, Glasg) FFD FCDSHK DRD FHEA FICD FACD FPFA FADM FKC

Nairn is Emeritus Professor of Dentistry, King's College London and Emeritus President of the College of General Dentistry. He has enjoyed a 50-year long career in academic dentistry. His many, different previous positions, in addition to having been President of the EFCD (2004-2005) include Dean of the University Dental Hospital of Manchester, King's College London Dental Institute and the Faculty of Dental Surgery, Royal College of Surgeons of Edinburgh and, uniquely, President of the General Dental Council, British Dental Association and College of General Dentistry. He has published extensively throughout his career, now with an increasing focus on aspects of recent history of dentistry. In addition to his two honorary doctoral degrees, Nairn has received a number of honorary fellowships and awards, including the Royal College of Surgeons of Edinburgh Medal, the George M Hollenback Memorial Prize, the John Tomes Medal, the AODES Award of Excellence and the IADR Ivar Mjør Award.

Stephen Dunne PhD (U.Lond), BDS (U.Lond), LDSRCS (Eng), FDSRCS (Eng), FCGDent

Stephen is Emeritus Maurice Wohl Foundation Professor of General Dental Practice, King's College London. He has enjoyed a long academic career, first with University College London and subsequently King's College London, where he was appointed Professor of Primary Dental Care, Maurice Wohl Foundation Professor of Primary Dental Care and Advanced General Dental Practice, and Head of Dental Practice and Policy. Stephen was honoured to receive the King's Distinguished Service Award (2015) and the EFCD Award of Excellence (2019). He was appointed Clinical Director of a large dental healthcare company in

2015 and is currently President of the China Britain Medical and Dental Association, Executive Committee Member, Dental Defence Society, External Examiner to several universities, and continues to supervise and examine postgraduate students at King's. He has published extensively throughout his career.

Gottfried Schmalz DDS, DMD, PhD, Dr. h.c. mult.

Gottfried Schmalz is Professor (Operative Dentistry and Periodontology) at the Universities of Regensburg and Bern, Germany/Switzerland. For many years he was Dean of the Dental School at the University of Regensburg. His main research interests are biocompatibility of dental materials and tissue regeneration. He had published more than 280 articles listed in PubMed, and was co-founder/Editor of "Clinical Oral Investigations". He has received a number of scientific prizes/awards including, the Distinguished Scientist Award" of IADR, the "Distinguished Service Award" of IADR and the Award of Excellence from the European Federation of Conservative Dentistry. In 2015 he was the Academy of Operative Dentistry Buonocore Lecturer. In 2018 he received the Global Oral Health Progress Award from the International Dental Manufacturers Association and in 2019 the Ryge-Mahler Award, presented by the IADR/Dental Materials Group. Since 2017 he has been Chairman of ISO TC 106.

L. Şebnem Türkün DDS PhD

Professor Türkün obtained her DDS degree in 1991 and her PhD in Restorative Dentistry in 1998 at Ege University School of Dentistry in Izmir, Turkey. In 2004, she became Associate Professor and since then teaches Restorative Dentistry and Dental Materials to undergraduate and postgraduate students. In 2009, she was promoted to Full-time Professor in Ege University School of Dentistry. She has published more than 110 papers in international (<60) in national (<50) peer-reviewed journals. She is a member of the editorial board of many dental journals, the best known being the Journal of Adhesive Dentistry and the International Journal of Esthetic Dentistry. Since 2007, she has been the translating editor for 'Quintessence Turkey' published in Turkish. In 2016, she contributed a chapter to 'Esthetics in Dentistry', published by Quintessence Publishing and in the same year a chapter to 'Tooth wear and their

treatments' published by the same publisher in Turkish. In 2019, at ConsEuro Berlin, she was elected President of the European Federation of Conservative Dentistry (EFCD), with effect from January 2021. Also in July 2021, she was re-elected for a second term as the Vice-President of the Turkish Association of Restorative Dentistry (RDD). In September 2021, she was elected to be the Turkey representative at the CED/IADR.

Address for correspondence:

sebnemturkun@gmail.com

The history of the textbook "Oral Anatomy"

Barry Berkovitz and Bernard Moxham

Abstract: This article describes the genesis of our textbook Oral Anatomy, histology and embryology. It coincided with advances in printing that allowed books to have numerous high quality, colour illustrations at competitive prices. As young academics committed to teaching dental students, this gave us the opportunity to define the subject matter that we felt met the needs of our students. The first edition appeared in 1978. It contained nearly 250 pages, over 570 illustrations, mostly in colour, 90 diagrams and tables plus a detailed list for further reading. In subsequent years (1992, 2002, 2009, 2018) we were asked to write four new editions. This allowed us to keep up with new developments and research in dentistry over the subsequent 40 years and produce what we hope is a text that still meets the need of today's students. We describe the various changes that have taken place during the evolution of our book from edition to edition, resulting in our 5th edition being expanded to over 460 pages and 2000 illustrations.

Keywords: Dental anatomy textbook, Anatomy for dental students, dental anatomy syllabus, teaching of dental students, oral anatomy.

In the beginning

We can still remember the day in 1975 when lightning struck. We were both teaching gross anatomy and dental histology in the Anatomy Department at Bristol University. We went down to the library and, after reading one or two scientific journals, paused on our way out at a table containing recent library book acquisitions. One was entitled *A colour atlas of the blood* published by Wolfe Medical Publications Ltd. The thing that caught our eye was the cover, with its very striking colour illustration of some blood cells. The book itself was quite small. We picked it up and flicked through the pages. The layout was simple. Each page had a colour illustration of a blood cell, accompanied by a brief paragraph of text. Those were the days when any book that included colour illustrations was prohibitively expensive and hence virtually all images in textbooks, including those on histology, were black and white. Because our own research was mainly histological, we were most impressed by the large number of colour illustrations in this book. It brought the whole subject of blood cells to life and we realised what a major contribution to teaching this book represented.

In addition to our research, we were strongly committed to teaching dental students. It did not take us long to conclude that, if a similar book on dental histology could be produced and the cost of producing colour illustrations kept low, it would be a significant aid to dental teaching and to the learning of dental students.

The next step

The main dental histology textbook used by students at that time was *Introduction to Dental Anatomy* by Scott and Symons, the seventh edition having been published in 1974. Although a good book, it was text-rich and all illustrations were in black and white. We thought how much better it could be if the histological material was shown in colour. By the end of the day, we had decided to look into the feasibility of writing our own dental histology book. In recommending textbooks to students, it was difficult for us to find one fully appropriate to the needs of our students, particularly in terms of content. If we were able to write our own textbook, we could ensure that all of the topics we felt needed to be covered were included. We knew we could draw on colleagues for assistance. At the University of Bristol, there was an *esprit de corps* as the result of being part of the first department of Oral Biology in the United Kingdom. Headed by Professor Declan Anderson, it had at least one dentally qualified academic responsible for teaching dental students within the three biomedical departments of Anatomy, Biochemistry and Physiology. Dr. Rex Holland was a dentally qualified colleague from Physiology who helped with our practical classes and he enthusiastically joined us on the project. During the preparation of the book, Rex moved from Bristol to the University of Iowa so that, in the days well before personal computers and the internet, we communicated frequently by post and occasionally by telephone. With our varying research interests and teaching commitments, we felt that the three of us could cover all the topics needed to be included in a book

of dental histology. However, criticism of our potential involvement in such a project was soon forthcoming, usually along the lines of, “*You’re young, leave it the oldies!*” On the contrary, our view was rather, “*It is time for the young to communicate with the young!*”

Contact with a publisher

We soon contacted Wolfe Medical Publications Ltd. to see if they would be interested in our proposed book. To our great pleasure, and a little surprise, they expressed an interest and suggested that we should submit a formal proposal to them. In the first instance, we were thinking of a book dealing primarily with dental histology and with a layout similar to that of *A colour atlas of the blood*, namely with an illustration on each page together with a brief paragraph of text. As the most important part of the book would be the colour illustrations, we spent the next few weeks getting together the best histological material we could from our own collections and then made an appointment to see Peter Wolfe. We took with us a plastic slide holder containing 26 slides covering various aspects of dental histology at the light microscope level and displaying a variety of stains to demonstrate the benefits of colour.

Peter Wolfe’s office was in Cambridge Circus. Walking up to the second floor, we entered an office that came straight out of Charles Dickens. It was dark and musty. Tables and floor to ceiling bookcases were covered in books, with many more piled up on the floor. We found another table with a clearer surface and sat down at it. We encountered only one other staff member.

We told Peter Wolfe how much we enjoyed seeing his previous colour atlases and how we felt that we could produce a book of similar quality for dental students. We learned he had a printer in Holland who could print colour books relatively cheaply, provided there was a decent print run. We felt he was impressed with the quality of our slides and left in a positive mood. A few weeks later we were delighted to receive a contract to write a colour atlas of dental histology.

The first edition, 1978

Soon after starting the book, issues arose concerning its content. We felt we had a once-in-a-lifetime chance of producing a book in which we could define the topics that we thought essential for

our students to know and understand. In addition to dental histology, the term dental anatomy was also commonly used for more macroscopic considerations. We also taught tooth morphology, including a brief consideration of occlusion. As teachers of gross anatomy, we also decided to include the anatomy of the tooth-bearing bones. Why not include the essential anatomy of the mouth and muscles of mastication? If we were including that, we might as well have a small section of essential radiology. At the time, comparative dental anatomy was included in dental syllabuses, so we decided to include this. In a short time, our original idea of a smallish, colour atlas of dental histology had changed to a much larger book with significantly expanded subject matter.

It soon became apparent that, with the expanded scope, it was not possible to have an image and one brief paragraph on each page. We realised that we would require much more text. Indeed, the colour atlas was turning also into a textbook. Although we had not discussed the text in much detail with the publisher, being young and with no experience of publishing, we decided to go ahead and produce the book we wanted. As long as it was of high quality, we crossed fingers and hoped that the book would be found to be acceptable. If not, we could always simply isolate the dental histology and delete the rest.

We divided up the sections equally between the three of us. In those days, a lecturer had to give all the lectures in a subject and so between us we had a good breadth of knowledge, as well as each having different research interests. Additionally, we had access to staff members at the adjacent Bristol Dental School, particularly the Medical Research Unit under the leadership of Professor Arthur Darling, who also gave us permission to use the extensive collection of teaching slides from their Library. We also contacted research workers (especially in UK Dental schools) and American researchers and Journals for up-to-date material. Although we had amassed a considerable amount of material of our own, with a wide range of topics, to get as much up-to-date material as possible meant that we had to write to people and institutions across the world. As we were junior academics, we were unsure of the reception we would get when writing to more internationally-recognised academics, but we were pleasantly surprised to find that everyone happily provided the material we asked for. Of our eventual total of 575 illustrations, approximately

180 were donated by 54 individuals or institutions.

There followed an intensive two-year period preparing the book. This was in addition to a heavy teaching load and the need to maintain significant research activity. In the days before computers and word processing, we had to rely on pen-written drafts, on cutting and pasting with scissors and glue, and on taking drafts to secretaries for typing. Illustrations were mainly in the form of 2x2 inch glass slides, although there were also numerous black and white photographic prints.

When the book was completed, it logically divided into four parts.

1. Macroscopic appearance of the oral cavity and environs, to include tooth morphology, gross anatomy and radiology.
2. Microscopic appearance of oro-dental tissues
3. Development of oro-dental tissues
4. Comparative dental anatomy

It should be noted that, at this time, comparative dental anatomy was an essential component of the dental course and included comparative dental histology, dentitions of all vertebrate groups, and the evolution of mankind.

The final total of illustrations was far greater than the number for which we had been contracted, and did not include the 90 line diagrams and tables produced directly by us or under our supervision. There was also a very large amount of text. With some trepidation, we handed the draft of our book to our publishers, not being certain of their reactions. We were bare faced in confidently telling them that this was the most up-to-date textbook on the subject, the only one in colour, and, because it brought disparate subjects together, was at least three textbooks in one. We left our packages on the table and sheepishly withdrew. We now anxiously looked out for any mail or telephone calls from our publishers telling us we had broken the terms of our contract but, as the days and weeks went by without hearing from them, we hoped that all was well. No news was good news!

The good news

About six months later, we were most pleased to receive a warning that proofs of the book were on their way to us. Compared with the original

Colour atlas of the blood, the proofs had a very large page size. Instead of a single image on each page, we often had between four and six. No changes had been made or indeed asked for. We could scarcely believe that all our images were kept in the proofs and we were exhilarated to see the book filled with colour illustrations of both histology and gross anatomy. We noticed that a fair number of the colour illustrations were slightly out of focus but were assured by our editor that these would be corrected at the next stage when we met with the printers, Smeets-Weert from Holland. When this meeting took place shortly afterwards, we learnt about some of the problems of colour printing. When a colour image appears slightly blurred, it is termed a '*registration problem*'. It could have one of two causes: the original image was out of focus and the responsibility was therefore the authors, or the image was in focus and it was the printers' problem. In those days, correcting such problems was quite an expensive procedure and consequently there was fierce debate where the fault lay. We decided to take a strong position and argued that most registration problems were the fault of the printer. Honour was about equal. For good measure, we complained that the printer had scratched and effectively destroyed many of our colour slides. In view of our 'perfectionism', we subsequently received a letter from Peter Wolfe stating that "*we were the worst authors he had ever had to deal with*". Be that as it may, there was little he could do about it at that late stage and we weren't going to put up with second best.

After seeing the proofs, we decided that our book was much more than a colour atlas and so we decided that the full title should be "A Colour Atlas and Textbook of Oral Anatomy". It seems that this was the first colour atlas to also be considered a "textbook", something that has subsequently often been copied.

As a final task, we were expected to produce an index for the book. We readily realised that a good index was very important for a book of this nature but, in the days before computers, it was not an easy task to compile one. In the past, the task needed considerable time and effort and would involve reading through each page, underlining key words, writing these down in alphabetical order on numerous sheets of paper laid out on the floor before finally typing a master copy. It was a thankless, but necessary, task. As a final addition,

the book contained a large, up-to-date, reference list for all its chapters to encourage students to delve into the literature on any specific topic.

A preface stated *“Our aim in writing this book has been to gather together the diverse elements of oral anatomy which, in the past, have been scattered through many different textbooks and to arrive at an integrated perspective of the subject. We were further persuaded to our task by the feeling that the time was ripe for such an encyclopaedic approach to oral anatomy”*. We did not lack ambition.

When we received the first printed copy, we were gratified that the publishers had not skimmed on its production. The book had top quality paper and a hard cover. Even today, despite 40 years of handling, it still has the look, feel and smell of a quality book. One of its distinguishing features was its large format, the page size being 30.5 cm x 20.5 cm. This size allows for close grouping of related information and aids the learning process. The first edition contained 247 pages in 26 chapters. There were 575 photographic illustrations, plus 90 diagrams and tables. In some instances, such as tooth morphology, a single figure may have comprised up to five separate images. A breakdown of the photographic images (excluding diagrams) for each topic is shown in Table 1.

For the cover, a single image was used and displayed upper and lower jaws with the roots of the teeth exposed (Fig. 1).

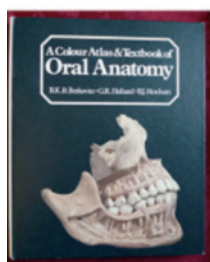


Fig.1 First Edition

It is worth noting here that, of the original 26 colour illustrations that clinched us the contract, not one appeared in the book as, in each case, we found a better image during the two-year preparation of the book. Eventually, the royalty cheques came through, not enough for us to retire, or take a round the world cruise, but sufficient for Bernard's wife to grab the opportunity to buy her first dishwasher and for Barry's wife, an electric typewriter. Subsequently, translations of this first edition were undertaken in German, Italian, Spanish and Japanese.

The Second Edition, 1992

Never having written a book before, we would have been insulted at the thought of the publishers asking us to write a second edition for we believed we had written the definitive book on the subject and that consequently there was little room for improvement. How wrong we were. Eleven years after the first edition, we were asked by our publishers to produce the second edition. By this time, two additional books on dental histology had appeared in the market, Ten Cate's *Oral Histology* and *Dental Anatomy and Embryology* (edited by JW Osborn) to which we contributed some chapters. Ten Cate's book had black and white illustrations and did not cover the range of topics in our book, whilst Osborn's book contained mainly black and white line diagrams.

When commencing the preparation of the second edition, the three of us were all at different institutions. Barry had moved to King's College London, Bernard was at Cardiff University, and Rex had moved to the University of Alberta. With the advent of word processing, writing the text became much easier.

The previous two decades had been a golden age for dental histology. With the techniques of transmission electron- and scanning electron-microscopy being more widely available, new knowledge had been produced, particularly concerning the detailed structure of the dental tissues. The request to produce a second edition gave us the opportunity to replace existing images with improved ones and also to add new material. By this time, the three of us had a further 11 years' experience of teaching and research and had acquired more knowledge and material and knew more about the latest research. Sticking to our original philosophy concerning the content of the book, we reviewed each chapter, updating it where necessary. Less change and improvement were required for the first section relating to macroscopic anatomy, but there was significant room for improvement for the microscopic sections. In the intervening years, with changes to the teaching syllabus, much of the comparative dental anatomy was no longer taught. This section was consequently, but reluctantly, significantly reduced. On the upside, bearing in mind the expansion of other sections, the saving of space meant that the second edition would not be excessively increased in size.

Among the changes for the second edition were the addition of a new chapter on functional anatomy describing mastication, swallowing and speech. We also included some nuclear magnetic resonance images for sectional anatomy. More attention was given to sensory mechanisms in dentine, mechanisms of tooth support and eruption, ectodermal/mesenchymal interactions during tooth and root development, and palatogenesis where we introduced the clinically relevant conditions of cleft lip and cleft palate.

Not reflecting the considerable number of replacement slides and the removal of about 90 comparative anatomy images, in the second edition, there were almost 640 images, nearly 200 being new. As seen in Table 1, new slides appeared in nearly all chapters, particularly in those concerned with regional anatomy, dental pulp, periodontal ligament, salivary glands, early tooth development and palatogenesis.

We took the fruits of our labour to our publishers' offices which, reflecting his continuing success with the colour atlas format, were much larger and grander. Major technical improvements in the processes of printing had occurred since our first edition so that, at the proof stage, it was much easier to make corrections without incurring heavy costs. One unexpected, but pleasant, surprise was to be relieved of providing the index. This task was carried out by a freelance professional; although, being sticklers for detail, we still looked over it and added additional headings.

The second edition appeared in 1992 with the same original, distinguishing format of hard cover and large page size of 30.5 cm x 20.5 cm. For this edition, we had four images on the front cover to indicate the wide range of coverage (Fig. 2). The original image on the cover of

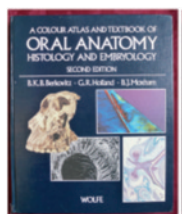


Fig. 2 Second Edition

the first edition was placed on the back cover in the second, and subsequent, editions; to maintain a connection with the first edition.

The Third Edition, 2002

We were asked by our publishers to produce a third edition in 1999, by which time Peter Wolfe had died and the company had become part of Mosby. By this time, Rex had moved to the University of Michigan, Ann Arbor. An initial worry when starting the new edition was the thought that we would not have enough new material. This proved to be ill-founded. Since writing the previous edition, much new information was available, especially concerning the ultrastructure and development of the dental tissues. This related to the increased use of newer techniques for cellular and molecular biology and immunohistochemistry. In addition, we had decided to end most chapters with a section illustrating the clinical correlations of the basic science. We were immediately faced with the decision of including this new information and making the book more detailed, or leaving much out to provide a simpler volume. Although some basic science courses were attempting to 'decongest' the curriculum, we decided to keep the detail. As by now comparative dental anatomy was no longer part of most dental courses, some saving of space was made by excluding that text and its 43 illustrations.

Small improvements, and additions, were made to the first macroscopic section, particularly in describing dental pulps. As indicated by the number of photographic images shown in Table 1, greater changes were made to nearly all the remaining sections, especially to the chapters for enamel integuments, dentine, dental pulp, cementum, bone, oral mucosa, salivary glands, palatal development, and root development. Numerous examples of dental clinical malformations were introduced as well as methods of salivary secretion, cytokeratins, coupling of bone resorption and deposition, and details of the articular disc of the temporomandibular joint. The total number of photographic illustrations was now 833, together with over 180-line diagrams and tables.

The third edition was published in 2002, with a soft cover. The page size was reduced to 28 cm x 22 cm and there were 377 pages. The large increase in written text made superfluous the description of the book as a colour atlas, hence the new title *Oral Anatomy, Histology and Embryology* (Fig. 3).

If truth be known, we felt disappointed with the overall appearance. The loss of the larger format,

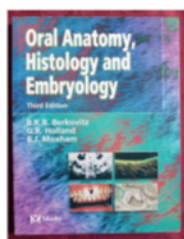


Fig. 3 Third Edition

although allowing students to carry the book more easily, seemed to reduce its distinctiveness and visual impact.

The Fourth Edition, 2009

Our publishers contacted us in 2006 to request the writing of a new edition. Our fears that we would not be able to produce at least 20% of new material were rapidly assuaged. A new chapter was added dealing with ageing and archaeological considerations. As for all previous new editions, each chapter was reviewed and updated. Old slides were replaced by better ones and much new material was added. We extended the clinical correlates to all the chapters and these were particularly evident for the *in vivo* appearance of the mouth, dento-osseous structures, oral mucosa and tooth development. Significant additions were made to the chapters for the temporomandibular joint, alveolar bone, salivary glands, early tooth development and the development of dentitions. Concerning tooth morphology, the five original images for each tooth were retrieved and digitised to provide much sharper replacement images. These 120 new replacement images are not accounted for in Table 1. New clinically-related topics were introduced (such as tooth wear, the 'smile', tooth whitening) while a more detailed account was given to the cell kinetics of bone biology. The fourth edition was published in 2009. It was restored to its original large format, bringing back its distinctive appearance, although with a soft cover (Fig 4).

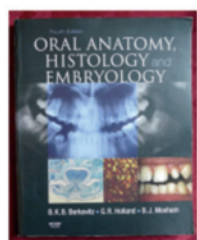


Fig. 4 Fourth Edition

It comprised 398 pages and contained 1037 photographic images and over 200 diagrams and tables. As with previous editions, we were fortunate to receive many important contributions from leading research figures, all of whom were appropriately acknowledged.

The Fifth Edition, 2018

Six years after the appearance of the fourth edition, we were once more invited by our publishers to write the fifth edition. Sadly, Rex Holland was not well enough to contribute. Once again, we were initially unsure as to whether we could produce enough new material and improve what was already present. However, after discussing aspects with colleagues, we were soon happy that a new edition was feasible. Perhaps in view of the fact that this new edition was to be published 40 years after the first edition, our publishers agreed to a major rebranding of the book. We had until now produced our own diagrams, tables and graphs for the previous four editions and these were of varying quality and format, giving them an overall inconsistent appearance. Remarkably, and with no apparent concern for expense, our publishers agreed to replace all of them to ensure consistency of form. The commission was given to the artists responsible for producing the diagrams in *Gray's Anatomy for Students*. Our fifth edition therefore contains over 200 high quality diagrams with a consistent format.

Other additional features ensured that this was an acceptable new edition.

1. We added at the beginning and end of each chapter an overview and learning objectives;
2. In previous editions, the section on tooth morphology had images of teeth at their actual life size. However, this obscured the necessary detail. As an improvement for our fifth edition, we increased all images by 50%, to make clearer the features mentioned in the accompanying text;
3. Significant changes were made by replacing existing images with improved ones. This occurred for the chapter concerned with the *in vivo* appearance of the oral cavity, when the first 11 new images were replaced and, more importantly, in radiology, when Doctor Jimmy Makdissi provided us with 41 replacement radiographs. Neither of these major improvements are reflected in the figure numbers given in Table 1;
4. Significant enhancements were made with the help of Professor Agi Grigoriadis and Professor Timothy Arnett (bone chapter), Professor Peter Morgan (Oral Mucosa), Dr John Harrison (salivary gland chapter) and Professor Roger Linden (oral physiology topics);

Table 1. List of number of photographic illustrations in 5 editions of Oral Anatomy (excluding line diagrams, tables and graphs).

CHAPTERS	1978 FIRST ED.	1992 SECOND ED.	2002 THIRD ED.	2009 FOURTH ED.	2018 FIFTH ED.
IN VIVO MOUTH	9	12	18	32	33
DENTO-OSSEOUS	94	106	118	132	139
REGIONAL ANATOMY	8	18	29	38	43
VESSELS, NERVES	1	1	5	7	7
SECTIONAL ANATOMY	13	10	8	8	14
FUNCTIONAL ANATOMY	—	14	16	17	17
ENAMEL	46	50	59	70	76
ENAMEL INVESTMENTS	12	16	23	23	27
DENTINE	40	42	69	77	79
DENTAL PULP	14	24	46	56	56
CEMENTUM	12	25	32	32	32
PERIODONTAL LIGAMENT	30	56	60	64	65
ALVEOLAR BONE	17	26	36	39	46
ORAL MUCOSA	43	48	75	96	98
TEMPOROMANDIBULAR JOINT	5	9	15	23	29
SALIVARY GLANDS	13	21	31	56	59
FACE DEVELOPMENT	4	5	9	14	14
PALATE DEVELOPMENT	3	18	29	34	34
JAW DEVELOPMENT	10	10	10	10	10
TONGUE DEVELOPMENT	1	1	1	4	6
TOOTH DEVELOPMENT	15	25	33	50	55
AMELOGENESIS	10	11	23	23	25
DENTINIGENESIS	11	13	23	24	25
PULP DEVELOPMENT	2	4	8	8	8
ROOT DEVELOPMENT	5	13	29	31	34
DENTITION DEVELOPMENT	16	26	28	66	66
COMPARATIVE ANATOMY	131	43	---	---	---
AGEING AND ARCHAEOLOGY	---	---	----	0	2
TOTAL	575	637	833	1037	1099

5. New material was added to the chapters dealing with functional anatomy, enamel, temporomandibular joint, amelogenesis and the anthropological applications of tooth structure;

6. References for reading lists was also updated;

7. A new development for the 5th edition was an online facility where students could undertake

self-assessment exercises from a wide range of true/false, extended matching and picture questions.

The fifth edition was published in 2018 with the usual large page format (Fig. 5), with 462 pages and 1099 photographic illustrations (Table 1).

Given that so many changes were made to the

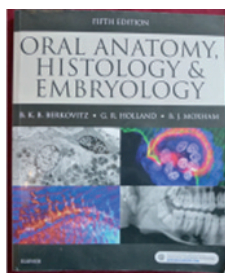


Fig. 5 Fifth Edition

book, the critic might ask, what underlies the philosophy of the book throughout the series? In answer, we can do no better than to quote from the preface for the 5th edition:

“The fifth edition of our book, although following the form and principles established in our earlier editions, has involved us making substantial changes to the text and to the imagery..... Many more references have been added at the end of each chapter so that students can, where interest takes them, follow up and expand upon our descriptions and comments. ... We have retained the considerable number of illustrations so that much of the information we present is in visual form. Indeed, we remain adamant that a single image is ‘worth a thousand words’, particularly where photographs and photomicrographs are employed rather than diagrams or drawings. In this respect, we still wish students to look at ‘real’ material, warts and all!”

There is much talk in the world of healthcare education about the need to teach ‘core’ material and to provide students with clear sets of objectives for their learning. Putting aside the issue of whether we wish students to become deep learners rather than superficial or strategic learners for examinations (the authors would prefer deep learning for a learned profession)... internationally accepted core’ knowledge and agreed objectives presently do not exist!... That said, we are totally wedded to the belief that this book should remain ‘encyclopaedic’ in scope, especially when it seems that there increasingly is a shortage of teachers in the discipline. Furthermore, dentally-qualified teachers in the dental sciences are getting as rare as ‘hens’ teeth’ and hence we have expanded the sections in our book dealing with clinical considerations. As we have said in the prefaces of previous editions of this book, *“we do not pretend to be infallible and would ask for indulgence if we have strayed from scientific rectitude”*.

Over the last 40 years, we feel we have collected from colleagues all over the world the finest

material that has become available during a golden age of dental histology. If we were involved in teaching today, and were asked to produce a similar textbook of Oral Anatomy, I do not think it would be possible. After all, it took us forty years to get it about right. I am not sure what will happen were we invited to write a sixth edition.

Post script:

Since this paper went to press, we have been invited by our publishers to produce a sixth edition. As this will take about two years, we did not feel it warranted holding up the publication of the present paper.

Acknowledgements

We gratefully acknowledge the help of Professor Stanley Gelbier for his constructive criticism of this paper.

Authors Biography

Barry Berkovitz

Emeritus Reader in Dental Anatomy, King’s College London

Bernard Moxham

Emeritus Professor of Anatomy, Cardiff School of Biosciences, Cardiff University

Immediate Past President of the International Federation of Associations of Anatomists (IFAA) and Past President of the Anatomical Society and the European Federation for Experimental Morphology (EFEM)

Founder of the Trans-European Pedagogic Anatomical Research Group (TEPARG)

Corresponding author:

Berkovitz7@aol.com

The missing mahogany WWI Memorial. Mrs Lloyd George and the Royal Dental Hospital twenty-nine

Richard O'Brien

Abstract: One hundred years ago, on the Fifth of November 1919, Mrs Lloyd George, wife of the Prime Minister, unveiled the Roll of Honour at the Royal Dental Hospital (RDH) in Leicester Square. Its whereabouts remains unknown and it may be forever lost. This paper sheds more light on the sacrifice and gallantry of the 29 alumni and students who fell in World War One – and may help to track down the fate or indeed current location of the missing Roll of Honour.

Key Words: World War I, Roll of Honour, Mrs Lloyd George, Royal Dental Hospital

The 5th November 1919

At five p.m. on a grey 5th November in 1919, Mrs Lloyd George, the wife of the “*man who won the war*”, wrapped in her warm fur coat, walked into the foyer of the Royal Dental Hospital (RDH) on the south east corner of Leicester Square. She was met by William Henry Dolamore, the Dean of the School of Dental Surgery, the oldest dental school in Europe. We may be sure that the kindly Welshwoman gave a warm smile as she was presented with a bouquet by that year’s star dental student, Miss Doris Ada Grose, the winner of the school’s ‘blue riband’, the Alfred Woodhouse Scholarship.¹

Mrs Lloyd George had come to the School with two formal purposes. The first was to unveil a Roll of Honour, one week before the first anniversary of Armistice Day, in memory of the twenty-nine alumni and students of the RDH who had lost their lives during the Great War, ‘*the war to end all wars*’. The second was to present the prizes to the most successful students of that year – the first time there had been such a presentation by an outside dignitary since 1913.² One sad duty, marking the end of the conflict, one more positive, representing renaissance after war.

Both purposes were important to Mrs Lloyd George. Speeches she made in the aftermath of war reflect how fully she appreciated the tensions arising when men returned from the Front finding competition from women for their jobs. Nonetheless she was determined that the advance of women was not only important for women themselves but was important for society and the economy as a whole. Wartime shortage of dentists had seen the RDH accepting female students for the first time in 1916, and Mrs Lloyd George was particularly pleased by the success of Miss Grose

and hoped it was just the start. She also fully appreciated the importance of dentistry for the health of the nation: in her speech at the prize giving noting the “*appalling state of the nation’s teeth*”, a fortnight later seeking funds for dental treatment for the needy (including discharged soldiers and sailors)³, and eighteen months later, speaking on the roles and responsibilities of women, remembering her pleasure in awarding the first prize to a woman at the London Dental College.⁴ She was also an active supporter of the Ivory Cross Dental Fund.

This paper however focuses on the first of those two purposes of her visit, the unveiling of the mahogany framed Roll of Honour.⁵

The programme for the visit is shown in Fig. 1. After the warm welcome in the Foyer of the RDH, Mrs Lloyd George was escorted to the first floor Lecture Theatre for the unveiling of the Roll of Honour. An accompanying journalist reported ‘Mrs

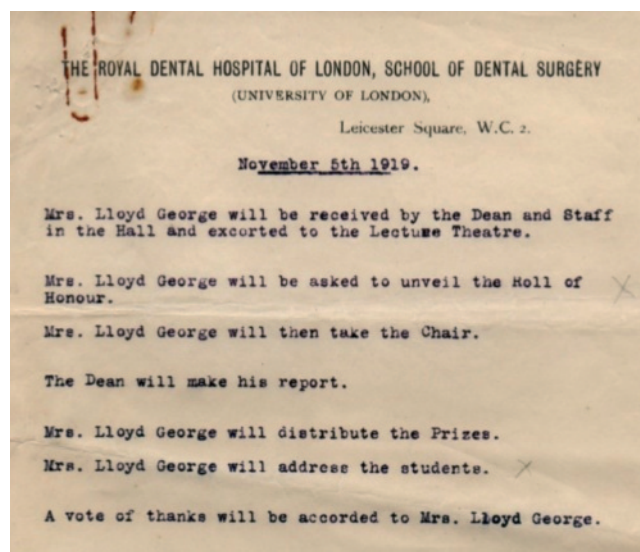


Fig. 1. Programme for the Visit. Source Rev. J.T. Rhys (Margaret Lloyd George) Papers National Library of Wales, JTR MLG SP10 Royal Dental Hospital, reproduced with the kind permission of the Lloyd George family.

*Lloyd George, in her heavy fur coat and big-plumed hat, was quite breathless when the prize-giving began, for we had to climb countless stairs to reach the lecture room. "Patients must not use these stairs," I read as I came panting up. Fancy putting that on the fifth floor! Who'd want to?"*⁶ The Lecture Theatre was crowded, and included the Rev. Dr A.W. Oxford, Mr and Miss Dolamore (presumably one of the Dean's seven daughters), Norman G. Bennett and his wife, C.F. Rilot, E. Lloyd-Williams and J.G. Turner, all members of the Hospital or School management or staff.⁷

The Roll of Honour

The RDH Roll of Honour comprised a group of twenty-nine portraits "*handsomely framed in mahogany and surmounted by the RDH monogram*", with names and brief details as to their dental qualifications, military service, where and when they died.⁸ These records were published in the *British Dental Journal* in 1919, and reproduced by Ernest Smith and Beryl Cottell in their history of the School.⁹ The names on the Roll of Honour were not elaborately carved, which may be one reason why it has gone missing since the Royal left Leicester Square in 1985. Creation of such photographic rolls of honour had become very frequent at the time, some illustrated newspapers carrying a full page of pictures of the fallen, and others running columns of names, all reflecting the huge number of casualties.

We do know that in 1949 the Roll of Honour was in the RDH Museum in Leicester Square, and by 1955 displayed on a landing, by then accompanied by a similar memorial to the five alumni that lost their lives during WWII.¹⁰ Seven of the twenty-nine names are also remembered on the British Dental Association (BDA) Plaque, now displayed at the British Dental Association in Wimpole Street.¹¹

Eleven of the fallen were students of the school. Many are also honoured on their school, town and parish church memorials. Seventeen have marked graves, whilst the other twelve have their names inscribed on the monuments of the Somme, Flanders, Mesopotamia and Plymouth Hoe, their final resting place unknown. One hundred years on, in this paper we have assembled further details of the lives of all twenty-nine, we hope providing for a fuller appreciation of their lives – "*lest we forget*".

Dean W.H. Dolamore had lost his own son, "killed in action" in April 1917 in Mesopotamia, and he had worked to create a memorial for all the fallen, appealing for photographs for at least five of them through the pages of the *British Dental Journal*. From press reports it would seem they had twenty-eight on the memorial by the 5th November 1919.¹² At the time of writing we have been able to find once again photographs of fourteen of the fallen, and most encouragingly, we have rediscovered a photograph of the unveiling scene, so far the only known photograph of the Roll of Honour itself (Fig.2).¹³



Fig. 2. The Unveiling of the Roll of Honour: Mrs Margaret Lloyd George, with the bouquet second left. I believe Dean A.W. Dolamore is on the far right. Photograph British Illustrations Ltd, reproduced with the kind permission of the St George's University Hospitals NHS Foundation Trust, London Metropolitan Archives.

Fortunately, not all those who went to war had to make the ultimate sacrifice: in March 1919 the Annual Meeting of the RDH had been informed "*Of the present students, fifty-seven have served with the Forces, and of the past students approximately 216. Of these the names of twenty-eight appeared upon the Roll of Honour. The Committee is glad to recall the fact that two have been awarded the D.S.O., one the D.S.C., eleven the M.C., one the M.C. with Bar, and five have been mentioned in despatches*".¹⁴

Mrs Lloyd George unveils the Roll of Honour

The Rev. Dr A.W. Oxford, representing the Managing Committee of the School, invited Mrs Lloyd George to unveil the memorial. He acknowledged that the Dean's only son was amongst the fallen. Three versions of Mrs Lloyd George's short remarks at the unveiling have

survived. The following words, from the typed version in the archive of her Private Secretary, the Rev. J.T. Rhys, now being made public for the first time, are the closest we have to her verbatim remarks.¹⁵

"I have the honour to be invited to unveil a roll of honour in memory of the men belonging to this Institute who are now among the "Glorious Dead". The task is to me a very sad one in many ways. The men who fell were all young. They fell on the threshold of life. They had chosen careers which would have enabled them to lessen the sufferings of humanity. Most of them were cut down before they had even qualified themselves for Life's work. Then it saddens me to think that they were the victims, not of disease, but of war. War is not unavoidable. They are the victims of the false ambition and arrogance of man. We would, however, be altogether unworthy of them if we were today filled with feelings of sadness only. At the call of duty, they responded willingly and cheerfully. As we think of them, we are filled with feeling of pride. They nobly championed a noble cause. Demands without parallel in the history of the world were made on their courage. They were equal to every emergency. They bequeathed the race an example of heroism loftier than they ever inherited. Therefore, though we are filled with sorrow, we feel no shame. In the face of incredible difficulties, they were faithful unto death. I trust their example will be an unfailing inspiration to the students of this Institute, through all the generations."

We now also have the handwritten version of her speech, the first page shown in Figure 3.

The BDJ's March 1920 report on the occasion refers to the students "*making the supreme sacrifice*", - as opposed to being "*among the Glorious Dead*" - which may well have been her phrase when realising that the Dean's son was amongst the departed.¹⁶ And perhaps she did omit her phrase that they "*responded to the call of duty willingly and cheerfully*", or perhaps the School just left it out in their report. In reality at least six of the students were already members of their school or university Officer Training Corps before the war, and whilst the School, and indeed the Government, tried to persuade students to finish their courses before signing up, there was often no stopping them. One or two had already served in the army, some

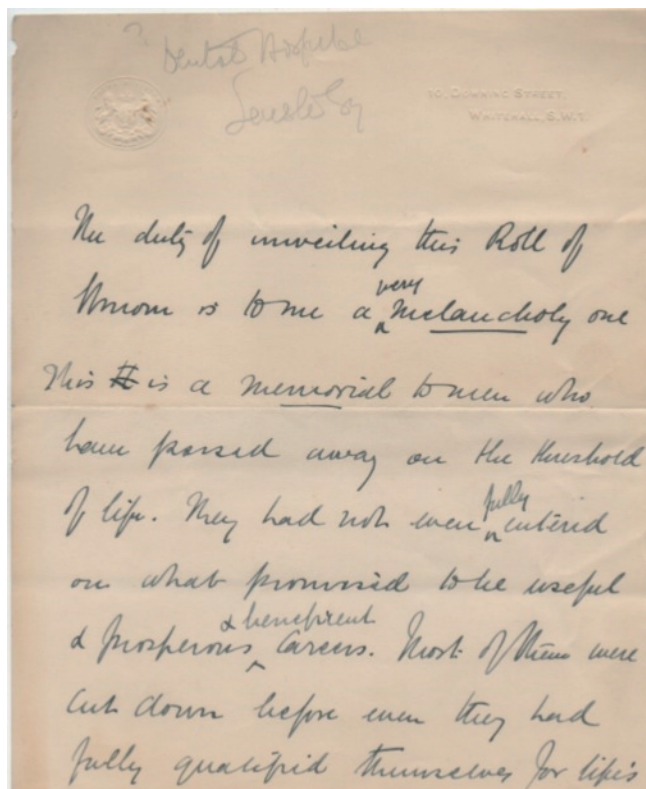


Fig. 3. The first page of the speech by Mrs Lloyd George, on the Prime Minister's notepaper, in the hand of her Private Secretary, the Rev. J.T. Rhys. Source Rev. J.T. Rhys (Margaret Lloyd George) Papers, National Library of Wales, JTR MLG SP10 Royal Dental Hospital, reproduced with the kind permission of the Lloyd George family.

were signed up before war was declared, and at least one signed up as war was declared.

The twenty nine on the Royal Dental Hospital Roll of Honour

FREDERICK JAMES ARBERY LDS, Captain, Dental Surgeon, 1st Duke of Cornwall's Light Infantry (Fig.4). Died of wounds, aged 28, 9th October, 1917 at the 37th Casualty Clearing Station, Godewaersvelde, Pas-de-Calais, France, probably sustained during the Battle of Broodseinde 4th-9th October, during the Battle of Passchendaele.¹⁷ Buried Godewaersvelde Cemetery Plot I, F, 37. With little over a month at the Front he may have been the shortest serving of the twenty-nine. Born in Simla, India, father in the Indian Army, his family came from Penzance, Cornwall.

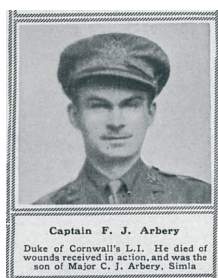


Fig. 4. Capt. Arbery, born in Simla, is buried at Godewaersvelde, Pas-de-Calais. Image: The Sphere, 22.12.1917 p22 ©Illustrated London News Ltd/Mary Evans.

VICTOR LOUIS SYDNEY BECKETT LDS

Eng, Major, Yorkshire Regiment - the "Green Howards" (Fig.5). Died aged 34, at the Heilly Casualty Clearing Station, 14th July 1916, of wounds received at his battalion's first main battle, the attack on Contalmaison on the Somme. Buried at the Heilly Station Cemetery, Mericourt-l'Abbé, Somme, Plot 1, C, 28, and remembered on three memorials in his hometown of Ely, Cambs. Son of physician and surgeon Francis Mears Beckett of Ely, with two brothers following medical careers. Both parents died before the War. He joined the Army from university, received a commission in the Army Service Corps in 1902, resigned in 1905 and went to farm in Canada. After two years he returned to qualify at the Middlesex and RDH and then practiced at Dewsbury, Yorkshire.¹⁸

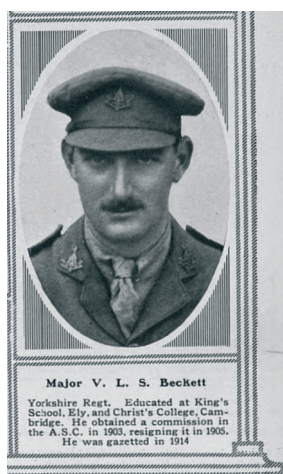


Fig. 5. Major Beckett, buried at Mericourt-l'Abbé, Somme. Image: The Sphere, 28.10.1916 p18 ©Illustrated London News Ltd/Mary Evans.

CECIL WILLIAM BOND MRCS LRCP

LDS, Captain RAMC, attached to the 97th Field Ambulance. Reported missing, presumed dead aged 39, on 1st August 1917 on the fields of Flanders, at the Battle of Pilckem Ridge, the opening engagement of the Battle of Passchendaele. Remembered on the Menin Gate at Ypres, Belgium, Panel 56, (Fig.6) and on Blundell's School website.¹⁹ The second son of a Somerset farmer, his medical career saw him serve in the Boer War, on hospital ships, at St Mary's Hospital, at Fulham Infirmary and at Nottingham and Greenwich Hospitals.

JAMES ARTHUR BALFOUR CARSON

LDS Eng, Captain Dental Surgeon, attached to the RAMC (Fig.7). Died when attached to the RAF in Alexandria, Egypt, aged 35, 10th August 1917, having served for two years. Buried in the Cairo

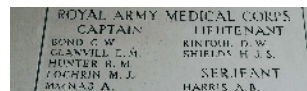


Fig. 6a. RAMC Capt. Bond is commemorated on the Menin Gate, Ypres, as is RAMC Capt. Heath. Fig.6b. The Menin Gate, Ypres, West Flanders. Courtesy of the Commonwealth War Graves Commission.

War Cemetery, Cairo, El Qahira, Egypt. From 1st July 1915 in France as a dental surgeon at No.35 General Hospital in Calais and at Beaumarais infantry base depot. Posted to Margate, June 1917, he applied to serve abroad and was posted to Alexandria.²⁰

"Jim" was a successful rugby player, playing for Cardiff and Blackheath, and well known in Wales where he lived with his married sister Nora. Born in Larne, Co. Antrim, Ireland, the youngest of eight, he was one of four brothers to serve in the War. His brother Herbert died in Damascus, two months after him, of pneumonia after being wounded. His sister May died of 'flu, in late 1918. Their father, a successful grocer, funded two scholarships in memory of Herbert and Jim at the local school for girls.



Fig. 7a. James Carson. Fig.7b. Cairo War Cemetery, Cairo, El Qahira, Egypt. Courtesy of the Commonwealth War Graves Commission.

ALBERT BRANDRETH COLLIS LDS Eng, Corporal, 28th (County of London) Battalion, Artists Rifles, attached to the 190th Brigade, 63rd (Royal Naval) Division. Died, aged 36, in the 2nd West General Hospital, Manchester on 23rd November 1917 of wounds sustained on 30th October at the 2nd Battle of Passchendaele (26th October-10th November 1917), having been transferred home on 12th November 1917. The 2nd West General, the main military hospital in Manchester, had been set up with 520 beds and grew tenfold by November 1918, treating 220,548 patients. Albert was buried in the family grave in Highgate Cemetery, North London. (Fig.8).

Born in Canonbury, North London, the fifth son, and one of twelve children, of a manufacturing engineer, Albert married the South African born Sybil Maud Norton, in Grahamstown, Eastern Cape, in 1910. They had no children and Sybil remarried not long after the War, in South Africa. She paid a supplement for her return voyage home, as a single woman not wanting to travel third class, which was the best fare warranted by her late-husband's rank

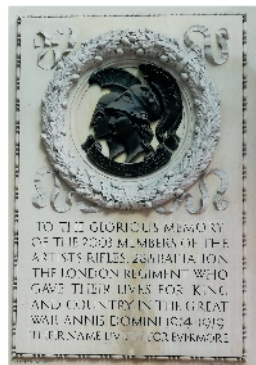


Fig. 8a. Albert Collis memorial, Highgate cemetery. Fig. 8b. Artists Rifles Memorial, Royal Academy.

NEVILLE GEORGE COMPTON, Dental Student, 2nd Lieutenant, 9th Battalion Worcester Regiment (Fig. 9a). *“Killed instantly by a shot in the head in an attack on an enemy trench on 20th April 1916”* as his regiment sought in vain to relieve the besieged garrison of Kut-al-Amara on the Tigris in Mesopotamia. Just 22, he was buried at Beit Aiessa, near the Tigris. His name is honoured on the Basra Memorial, a desert memorial that has been moved due to continued hostilities (Fig. 9b).

Born in Muswell Hill, North London, the youngest of three sons of a GPO clerk, he joined the University of London's Officer Training Course, went to Gallipoli, but possibly did not see action there, thence to Egypt and Mesopotamia. *“A quiet fellow, he has half completed his studies in dentistry and is very keen on that profession and medicine and surgery generally”*.²¹



2ND LIEUT. N. G. COMPTON



Fig. 9a. 2nd Lieut Compton is buried at Beit Aiessa, near the Tigris. Photograph Whitgift School website. Fig. 9b. The Basra Memorial, where both 2nd Lieut Compton and Capt. Dolamore are remembered, Image Courtesy of the Commonwealth War Graves Commission.

DEBENHAM STUART COOMBS, Dental Student, Lieutenant, 7th Battalion Essex Regiment. Wounded in 1917, he became involved in Army medical work but died aged 27 of the Spanish flu on 31st October 1918, and buried in the family plot in Astwood Cemetery, Worcester, his home town (Fig. 10). The fifth of six children of a medical practitioner, he married Violet Mary Brinklow, “a girl from Northampton”, in late 1915.²²



Fig. 10. Coombs family plot, Worcester.

FRANK WHEATLEY COWLEY MC with Bar, Dental Student, Lieutenant, 11th Battalion, E. Yorkshire Regiment (the “Hull Pals”), attached to the 92nd Trench Mortar Battery (Fig. 11). Died of his wounds, aged 21, on the fields of Flanders south east of St Omer, on 9th August, 1918, the second day of the “Hundred Days Offensive” push for victory. Frank was awarded the Military Cross in September 1917 –*“leading his party under very hostile barrage.... retiring to collect stragglers that might have lost their way, displaying total disregard for this own safety...”* and posthumously in November 1918 *“his coolness largely responsible for the success of the attack... a fine example of courage”*.²³ Buried in the Souvenir Cemetery, Longuenesse, St Omer, France Plot V.D.3.

The second of eight children of a Hull wine and drinks merchant, he was educated at Hymer's College, founded in 1887 *“for the training of intelligence in whatever social rank of life it may be found among the vast and varied population of the town and port of Hull”*.²⁴

GORDON ROBERT CRAIG LDS, Eng 2nd Lieutenant, Bedfordshire Regiment (Fig. 12). He died, aged 30, on 3rd April 1918 at a Casualty Clearing Station, of wounds received on 2nd April. He was serving with the 2nd Beds, 90th Brigade, 30th



Fig. 11. Lieut. Cowley, MC with Bar, is buried at Longueness, St Omer, Pas de Calais. Hull Daily Mail, 11.10.1917 p3, ©Mirrorpix Image created courtesy of The British Library Board, accessed from the British Newspaper Archive.

Division, 5th Army as they withstood the German offensive *Operation Michael*. Buried SW of Amiens at the Namps-aul-Val British Cemetery, Namps-Maisnil, Somme, Plot I.K.27. In 1917 he had been wounded on 8th August but remained on duty and fought at Glencourse Wood.²⁵ A practising dentist in his home country of South Africa, his regiment was serving there when war broke out and immediately left for the UK. Educated at the Methodist Kingswood College, Grahamstown, the third of six children of a Methodist shoe retailer, who had emigrated from Coventry and established his family at "Islington Villa" in Port Elizabeth.



Fig. 12. 2nd Lieut. Craig, Buried SW of Amiens at Namps-Maisnil, Somme. Photograph provided by Brian Stacey, descendant. Published in The Bedford Regiment in the Great

LAWRENCE CHARLES CROCKETT LDS Eng DDS Penn (Fig.13). Captain Dental Surgeon, attached RAMC, posted to Valetta, Malta. Died, aged 37, in the Mundsley Sanatorium, Gimmingham, Norfolk, on 17th October, 1918 after being invalided home suffering from pleurisy and tuberculosis. The Sanatorium, established in 1899, was the first in the

UK designed to incorporate fresh air in the treatment of TB.²⁶ He was buried in Abington Churchyard, Northampton, the town of his birth where his family shoe and boot firm (Crockett and Jones) still thrives. He is remembered in St Paul's Church, Warwick and on the BDA Plaque. Lawrence played cricket and hockey for his county, and hockey for the North. The fourth of eight children, a younger brother died on the Somme, another brother served as a dental surgeon in Flanders and two sisters nursed in France. Lawrence married Olive Victoria Mayne in 1914 and he had started to practise dentistry in Eastbourne. They had no children and Olive remarried in 1921.²⁷



Lawrence Charles Crockett, '09 D.

Fig. 13a. RAMC Capt. Dental Surgeon Crockett. Source: Pennsylvania; a record of the University's men in the Great War, by University of Pennsylvania, General Alumni Society, 1920. Fig.13b. Plaque from St Paul's Church, Warwick.

MARCUS EDMUND DINSMORE, LDS Eng Captain Dental Surgeon, attached RAMC, serving on the Special List, Home Service, at Curragh Camp, Kildare, Ireland (Fig.14). Died aged 29 on 12th December 1918, the day after the Armistice, of pneumonia after contracting influenza. A presbyterian, his well-attended funeral was carried out with military honours before burial at the Londonderry City Cemetery, his coffin draped with the Union Flag. He is honoured on the BDA Plaque.

Born in Inishowen, Co. Donegal, he was the son of a publican and had one sister. In 1912 his parents signed the Ulster Solemn League and Covenant, pledging resistance to Home Rule for Ireland.

ARTHUR WILLIAM DOLAMORE, Student, Captain, 10th Duke of Cambridge's Own (Middlesex) Regiment, (Territorial Force) attached to 1st Buffs (E Kent) (Fig.15). Mentioned in Dispatches. Killed in action in Mesopotamia on 14th April 1917, having first gone to India, served

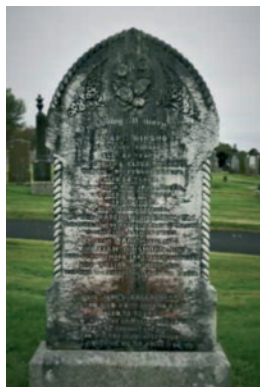


Fig. 14a. Capt. Dinsmore's Headstone, Derry City Cemetery, photo courtesy of John McClenaghan. Fig. 14b. Curragh Military Hospital, where RAMC Captain Dental Surgeon Edmund Dinsmore practised, and died the day after the Armistice was signed.

in Egypt since October 1914 and Mesopotamia since October 1916. He loved horses and wanted to join an Indian cavalry regiment after the war. He is remembered at the Al Basrah Memorial, Mesopotamia, as was fellow dentist Neville George Compton almost exactly a year earlier. He was the only son, with seven sisters, of William Henry Dolamore, the Dean of the Royal Dental Hospital.²⁸

It's hard to identify in what action he died. The *Middlesex County Times* wrote after his death: "He took part in the advance on Kut, and much appreciated the Turk as an opponent describing him as a keen and clean fighter. He seems to have had many narrow escapes, but, fortunately, never felt better in his life. Enthusiastic at his work, he wrote on March 1, in a letter received the day after the dreaded telegram, *"It has been a glorious week; Kut captured, the river crossed, the Turkish Army, or what remains of it, streaking for Bagdad in columns of lumps, and ourselves 40 miles above Kut."*



Fig. 15a. Capt. Dolamore. Source: *Middlesex County Times*, 28.4.1917 p5 ©Mirrorpix Image created courtesy of The British Library Board, accessed from the British Newspaper Archive.



Fig. 15b. The Basra memorial in its original site by the dockside, before its destruction and subsequent reconstruction in the desert.

LINTON ALBERT RAMSAY FENNELLS

LDS Eng, Private, 2nd/28th Battalion, London Regiment (Artists Rifles) (Fig.16). He died, aged 37, whilst still in training, of scarlet fever on 14th April 1917 at Rush Green Isolation Hospital, Romford. There were a number of such cases in Romford at this time, where the Artists trained. A practising dentist in Cornwall for seven years, Linton had been called up in November 1915. Buried in Romford Cemetery and remembered on the BDA Plaque. The son of an engineer and timber merchant he was born in Plaistow Essex, and was "a vocalist of considerable ability".^{29 30} He died on the same day as Arthur Dolamore was killed in Mesopotamia.



Fig. 16a. Pte. Fennell, Romford Cemetery. Fig. 16b. Artists Rifles ceremony, Romford, 1917. He is also commemorated on the BDA Plaque.

Artists Rifles Memorial page accessed 8.8.2019 <https://www.greatwarforum.org/topic/257771-artists-rifles-memorial/>

OWEN HAIRSINE MC MRCS LRCP LDS Eng, Captain RAMC attached to the 71st Field Ambulance (Fig.17). Killed, aged 26, on 7th June 1917 at the Battle of Messines, "dying instantaneously" when struck down on duty with the bearer unit bringing in the wounded. "One of the best officers I have been privileged to command during my long service at home and abroad: beloved in the field ambulance, he won the esteem of all ranks".



Fig. 17. RAMC Capt. Hairsine, MC. Photographs courtesy of the Hairsine family.

The War Diaries kept at the Front record how medical officers would be assigned to wherever they were needed: on 1st April 1917 Capt. Owen

Hairsine returned from leave, on the 4th assigned to the command of the Field Ambulance, on the 5th taking medical charge of the 9th Staffords, on the 16th returning to another advanced dressing station, on the 10th May with the 69th Field Ambulance, then on duty elsewhere with the 9th Yorkshires, on the 5th June assigned to the Bearer Division of the advanced dressing station of the 47th Division, to be killed two days later with three others in his bearer party, six other wounded. *"As brave as a lion and a true friend to us all"*.³¹



Fig. 18. Dentists at the blackboard, Owen Hairsine most likely on the right. Courtesy of the Hairsine family.

He was a Cadet Staff-Serjeant at the university's OTC, and went to France with the Expeditionary Force on 23rd August 1914 and took part in the Retreat from Mons. Twice mentioned in despatches by Field Marshal Sir John French, he received the Military Cross in January 1916 (Fig.19). Owen is buried at the Hop Store Cemetery, Vlamertinge, near Ypres, Plot 1, A, 42 and is also remembered on his school memorial.



Fig. 19. Capt. Hairsine's Military Cross, courtesy of the Hairsine family.

Born in Belgravia, central London, the son of a chemist and druggist, Owen was one of four siblings – his elder brother may also have served

in the war. Their elder brother had died in 1910. In July 1916 Owen married Sylvia Anita Gee, the youngest child of a retired army officer. It is a little curious to note that his mother died on the 29th anniversary of his death and his widow (albeit remarried but by then a widow once more) died one day short of the 50th anniversary of his death.

FRANK CECIL HARRISON MRCS LRCP LDS Eng, Captain, RAMC (Fig. 20). Attached to the Duke of Wellington's Regiment, 49th West Riding Division, after first serving at the No.8 General Hospital, a Base Hospital in Rouen, part of the casualty evacuation chain, further back than the Casualty Clearing Stations. He died of his wounds, aged 26, on 13th October 1918, on the Somme during the final push for the Selle and for victory. Buried at the Wellington Cemetery, Rieux-en-Cambresis, Somme, Plot III, E, 1/8. The RDH 1919 memorial states he was killed in Belgium, possibly an error unless he had been reassigned to Flanders. There are 79 members of the 49th buried alongside him, all killed on 11th October 1918. His military record card says KIA, but possibly dying of his wounds two days later is more correct.

Educated at Sheffield Grammar and King Edward VII School, he was an enthusiastic member of the Sheffield University OTC (where he began his medical studies), obtaining the Coronation Medal in 1911. After Sheffield he went to the RDH, qualifying LDS 1913.³²

Frank was born in Edwinstowe, Notts, eldest of the five children of the distinguished dental surgeon, Frank Harrison of Sheffield, whose pioneering work included publishing the first paper on X rays in dentistry and remembered by a Blue Plaque in Sheffield. Frank Cecil's brother Wilfred served throughout the war with the Yorks and Lancs Regiment, and survived.



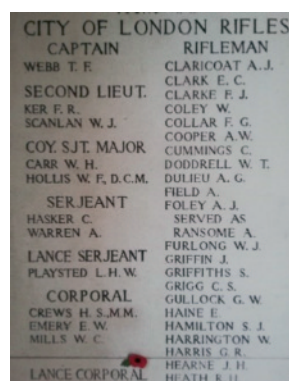
Fig. 20. RAMC Capt. Harrison¹ is buried at the Wellington Cemetery, Rieux-en-Cambresis, Somme.

ROBERT HAROLD HEATH LDS Eng, DDS Penn, Private, Rifleman, 6th London Regiment, later attached to 140th Brigade in 47th (32nd London) Division (Fig.21). He was declared missing, aged 38, on 22nd October 1916, during the battle of the Ypres Salient. His battalion travelled by train from the Somme, immediately to be hit by mines. They started digging out their buried comrades from the craters only to be attacked with machine gunfire. He is remembered at the Menin Gate, Ypres, on Panel 54, and on the BDA plaque.

Born in Edmonton, north London, son of a commercial traveller in brushes, Robert's older brother was a dental surgeon. Robert was in partnership with Mr Warwick James, the distinguished dental surgeon then building up his practice at Portland Place, London. High ideals, shy and sensitive, educated at Ackworth, a Friends School, a member of the Friends but practically disassociated himself, writing to inform them he was to be a soldier. Student and House Surgeon at RDH, Secretary of the Students' Society, Dental Surgeon Marlborough College, Hon. Dental Surgeon Nottingham Children's Hospital. Got fit to get into Army (previously only passed for Home Service), as he had periodic attacks of rheumatism. Warwick James wrote in the BDJ "*He had rendered voluntary assistance at the Royal Dental Hospital, but when his services could no longer be utilised to assist the Army in any capacity while remaining a civilian, he decided to enlist as a private*".³³



Robert Harold Heath, '10 D.



Figs. 21a and 21b. Pte. Heath is commemorated on the Menin Gate, Ypres and on the BDA Plaque. Photograph from Pennsylvania; a record of the University's men in the Great War, by University of Pennsylvania, General Alumni Society, 1920.

ROBERT ERNEST MURRAY HOFMEYR, Dental Student, 2nd Lieutenant, 3/5th Yorkshire Regiment, attached to the Machine Gun Corps, 63rd Company. Killed in action, aged 28, on 24th April, 1917 as his regiment worked its way north towards Arras from the southern Somme battlefields – most likely the day before they reached the town (not that that would have been safety). He is remembered on the Arras Memorial, Bay 5, in Arras (Fig.22). Murray had joined up when with the London University OTC contingent.

Murray was one of four brothers, born in Kaapstad, South Africa, to an auctioneer from a long standing South African family. A younger brother died six months after Robert, in Flanders. His other two brothers were auctioneers in the family firm, which continues today, "the oldest in South Africa". In April 1916 Murray married the widow Muriel Hulme Rycroft, who had a young daughter Erica. She remarried in 1920 and went to live in Tanganyika.

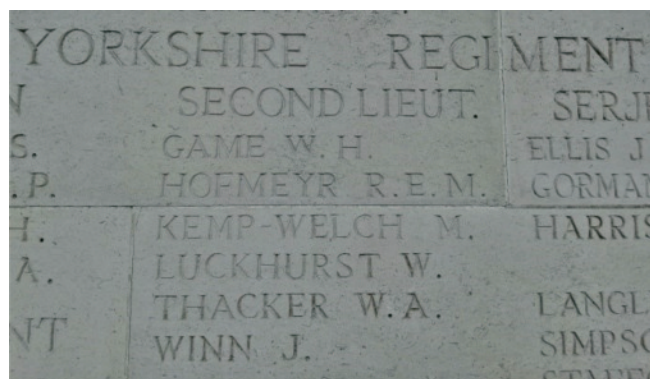


Fig. 22. 2nd Lieut. Hofmeyr is remembered on the Arras Memorial, Arras, Somme

HUMPHRY BRIAN THOMASSON HOPE, Student, 2nd Lieutenant, 4th Battalion Northamptonshire Regiment, attached to the 5th Squadron Royal Flying Corps. He was reported missing on 7th May 1917, his BE2 plane shot down by six enemy aircraft, probably during the 2nd Battle of Arras (Fig.23c). The bulk of No. 5 Squadron's action at this time was in the so-called "Bloody April" when the lives of RFC pilots were short, and the Germans were reinforced by the arrival of Red Baron von Richthoffen on the scene and their superior training. Humphry survived Bloody April but not May. He and almost 1,000 airmen are commemorated on the Arras Flying Services Memorial in Arras (Figs 23a and 23b).

Born in Wellingborough, Northamptonshire, Humphry's father, William Hodgskin Hope, and

his brother William Kenneth Talbot Hope, were both dentists, the latter a Special List Dental Surgeon who also served in the war. Humphry's mother was a daughter of a Northampton bootmaker. Humphry's sister Evelyn Bertha Hope joined the RAF in 1918 to nurse. It has been speculated that her meeting with the famous Women of Pervyse, two heroic sisters who ran a hospital near the Front, may have been facilitated by Humphry also meeting one of the sisters, Mairi Chisholm.

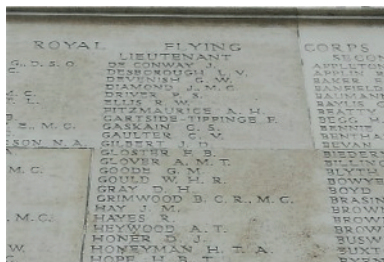


Fig. 23a and 23b. 2nd Lieut Hope, remembered on the column of the Arras Flying Service Memorial, Arras, Somme.



Fig. 23c. 1916 Royal Flying Corps BE2 plane with reconnaissance camera. Source: Image Q33850, Imperial War Museum collections.

THOMAS CLATWORTHY KIDNER MRCS LRCP LDS Eng, Captain, RAMC, attached to the 2nd Battalion Middlesex Regiment. He was killed aged 26 on 26th October 1916 by a shell, at the advanced dressing station during fighting near Transloy in the Somme. *"From 26th to 27th the position gained was strengthened and consolidated, though constantly under heavy shell fire. On the 26th the battalion M.O., Captain T.C. Kidner, was killed"*.³⁴ He was buried near Lesbœufs and is remembered high on the Thiepval Monument, Pier and Face 4C, (Fig.24). A member of the University OTC he had joined the Special Reserve of the RAMC on 21st August 1914 and promoted to Captain six months later.

"One of the most brilliant RDH students", Saunders Scholar, Lyell Medal and Dental House Surgeon. Keen sportsman, member of Kingston Rowing Club, popular with officers and men, and with staff and students.³⁵ Born in Cothelstone, Somerset, Thomas was the youngest of six children of a Somerset farmer, his mother the daughter of a Taunton ironmaster. A brother-in-law died at Ypres in August 1917. Though the RDH memorial cites him as a student he registered as a dentist on

12th March 1913, achieving his LDS RCS Eng in 1912.



Fig. 24. RAMC Capt. Kidner, Pte. Quayle, and Capt. Shelton, MC are all remembered on the Thiepval Memorial, Somme.

HERBERT ALFRED POTTER, Student, Surgeon Probationer, Royal Navy Volunteer Reserve (RNVR). Lost at sea, aged 21, on 18th / 19th September 1917 when his ship, *H.M.S. Contest*, (Fig.25b), a British Acasta class destroyer, was torpedoed by a submarine when escorting a twenty-four-ship convoy out of Plymouth bound for America. *H.M.S. Contest* had gone to the aid of the torpedoed steamer *City of Lincoln*, but was itself hit, causing her ammunition storage (magazine and depth charges) to explode. The survivors took to the boats for the night. Upon their rescue in the morning, one boat with eight men was missing. 35 persons were killed, whilst 60 survivors from *H.M.S. Contest* were picked up by the damaged *City of Lincoln*. He is remembered on the Plymouth Hoe Memorial, (Fig.25c), on a plaque at his home parish church of St Mary's, Hatfield Broad Oak, and on a plaquette (Fig.25a), the so called Death Penny, issued to the next of kin. The youngest of the RDH casualties, possibly in the middle of the Roll of Honour's centre circle (as it looks like someone in naval uniform).

Herbert had started his dentistry studies at RDH in May 1913.³⁶ His father, a farmer from Hatfield, Essex, and his wife, daughter of a clerk, lost their only other child, a daughter, in 1909, possibly to TB.

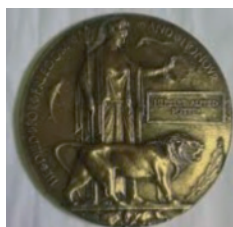


Fig. 25a. The commemorative plaquette of Surgeon Probationer Potter. Fig.25b. HMS Contest. Fig.25c. He is also commemorated on the Plymouth Hoe Memorial.

HMS Contest
<https://wrecksite.eu/wreck.aspx?10759>

FRED QUAYLE LDS Eng, Private, 10th Royal Fusiliers with the 111th Brigade, 34th Division. Killed in action, aged 27y, on 15th July, 1916, on the Somme, during the 13th – 17th July attacks on Pozières. He had served in the 'Theatre of War' just short of a year, since 31st July 1915. He is remembered on the Thiepval Monument, Pier and Face 8C 9A and 16A (Fig.26). He qualified as a dentist in 1910, having been a distinguished RDH student, Saunders scholar, winner of many prizes and certificates, and practiced in Peel, Isle of Man.³⁷ He was born in Patrick, IoM, the seventh of eight children of a grocer, who had died when Fred was four years old.



Fig. 26. Pte. Quayle, Capt. Shelton MC, and RAMC Capt. Kidner are all remembered on the Thiepval Memorial, Somme.

RICHARD ANGWIN RAIL LDS Eng, 2nd Lieutenant, 3rd Battalion, Coldstream Guards (Fig.27). Served with Trench Mortar Battery, 1st Guards Brigade.³⁸ Killed in action, aged 28, on 9th October 1917 during the Battle of Poelcappelle, in the early stages of the Battle of Passchendaele, as his battalion advanced towards Houthulst Forest. On the same day his contemporary Frederick Arbery died in Flanders. This being Passchendaele, Richard's burial place is unknown but he is commemorated at Tyne Cot, Zonnebeke, Ypres, Belgium, his name also inscribed on his father's tomb in South Africa and on the BDA Plaque. One of his fellow Lieutenants inscribed above his name at Tyne Cot was the nephew of Edwin Lutyens, the architect of so many WW1 Memorials, including Thiepval and the Whitehall Cenotaph.

Born in Sydney, Australia, he moved at eight with his family to Cape Town, South Africa, where his father represented an Australian life insurer. His mother's Cornish parents had emigrated to Australia. A keen cricketer, who played for Western Province, South Africa, he is recorded amongst the world's first class cricketers who lost their lives in the war. His sister married a medical practitioner, and one of his three brothers was a doctor.



Fig. 27. Lieut. Rail is commemorated at Tyne Cot, Zonnebeke, Belgium, and on the BDA Plaque. Image: The Sphere 8.12.1917 p209 ©Illustrated London News Ltd/Mary Evans.

WALTER FELIX READ, Dental Student, Lieutenant, 8th Battalion Hampshire Regiment (Territorial), known as Isle of Wight Rifles, Princess Beatrice's Battalion, attached to the 163rd Brigade in the 54th (East Anglian) Division. He went to Suvla Bay in the Dardanelles in July 1915, contracted dysentery in the Gallipoli trenches and died of appendicitis, aged 24, at the Ras-el-Tin Military Hospital in Alexandria, Egypt, (Fig.28a), on 14th September 1915.^{39, 40} He was buried at the Chatby Cemetery, Alexandria, (or Al Iskandariyah), Egypt, Grave No E122, 848 (Fig.28b).

Born in Kensington, the son of a London jeweller and the sixth of seven children, a "promising student" at the RDH, he had started his dental studies at the practice of his brother Harold, dental surgeon of Newport, IoW. His probate was assigned to a fellow dentist who had been invalided out of the army with severe arthritis.



Fig. 28a. Ras el Tin No 21 General Hospital, Alexandria, Egypt. Source: Museums Victoria, Photographer Sergeant John Lord, World War I, circa 1915. Fig.28b.Alexandria (Chatby) Military Cemetery, courtesy Commonwealth War Graves Commission.

HERBERT RAYSON SEARS LDS Eng, MM, Lieutenant Dental Surgeon, attached RAMC, and then a Private with the 23rd Royal Fusiliers (City of London) known as the First Sportsman's. He was killed in action, aged 36, on 17th February 1917 during the Ancre Miraumont Action near Bapaume, Somme, as the allies pushed the German forces back towards the Hindenberg Line. In the two day

action, 17th-18th February, when the regiment was with the 99th Brigade, 2nd Division, there were 2,207 British casualties, 779 borne by the 99th. Herbert was buried at the Regina Trench Cemetery, VII D2, Grandcourt, Somme, just south of Miraumont, in the middle of the fields, isolated from the roads, “*in the corner of some foreign field*”, and quite probably close to where they had fallen (Fig.29). He is also remembered on the BDA Plaque. He was awarded the Military Medal.

In September 1916, presumably taking advantage of having been invalided home (spending three weeks in Endell Street Military Hospital with a leg wound and shrapnel in the neck, suffered at Delville Wood on the Somme) Rayson married Lilian Maud Duggan at the Holy Trinity Church, Marylebone, a so-called Waterloo Church built to celebrate victory over Napoleon. Son of a Cambridgeshire grocer, and his mother was the daughter of a Lincolnshire shoemaker. A Freemason, he had been in dental practice with a partner in Tombland, Norwich. In April 1918 his widow married another veteran of the 23rd and 2nd Fusiliers - perhaps a former friend of his? - who served until August 1918.⁴¹



Fig. 29a. Lieut. RAMC Dental Surgeon Sears, MM, Regina Trench Cemetery, Grandcourt, Somme. Fig. 29b. Aerial view Google Earth 24.9.2017

CHARLES SHELTON, MC, Student, Captain, C “Coy” 8th Battalion, Norfolk Regiment with the 53rd Brigade. Died at 22, on 21st October 1916, “missing in action”, during the Battle for Ancre Heights, between Albert and Bapaume, Somme, 15 months after entering the fray. Charles’ battalion was on the attack and he “*was wounded just before entering a German trench, and was then reported missing*”. His MC commendation stated “*He led his company with great courage and initiative, digging in under heavy fire and consolidating his position*”. His colonel wrote “*He was one of my best officers and a great personal friend of mine; he had been with us since the early days of the regiment. He was*

much loved by us all and his men alike”. He is commemorated on the Thiepval Monument that towers over the landscape, Pier and Face 1C and 1D (Fig.30).^{42, 43}

The son of a Peterborough solicitor, with two elder brothers and three sisters, Charles had started his medical studies at RDH in May 1912. One brother survived Gallipoli but died in April 1917 on the Gaza Strip, Palestine. One sister married a dentist and the youngest sister trained at the London Medical School for Women and ran a medical practice with another woman doctor in Herne Hill, South London. A cousin was also a BDA member. Charles was at St Paul’s School with Arthur Dolamore, albeit one year senior to him.



Fig. 30a. Capt. Shelton, MC, Pte. Quayle, and RAMC Capt. Kidner are all remembered on the Thiepval Memorial, Somme. Fig. 30b. Thiepval from afar, courtesy Commonwealth War Graves Commission.

STANLEY CLARENCE TOMKINSON, Student, Lance-Corporal, 1/12th London Regiment (Rangers). Died, aged 21, on 9th April 1917, on the first day of the First Battle of the Scarpe during the 2nd Battle of Arras, nine months after entering the war. The 12th London were charged with capturing a ridge north of the village of Neuville-Vitasse along which ran a well wired German trench. The trench was captured but the 56th Division suffered 800 casualties that day in covering 2,000 yards. He was buried at The London Cemetery, Grave 1.A.80, Neuville-Vitasse, South of Arras (Fig.31). The cemetery has been adopted by the London Borough of Paddington. He is also commemorated on his home town’s War Memorial in Crewe.^{44, 45}

He started his dental studies in January 1914 at the RDH but we may assume he did not complete them. Stanley was the fifth of six children of an estate agent. His two older brothers both died in 1918, perhaps in the flu epidemic.

JOHN ERIC WHEELER LDS, Captain, Royal Garrison Artillery Territorial Force. Killed, aged 29, on 10th November, 1916, in the Somme, around the time of the Battles of Transloy and Ancre Heights, serving with a Siege Battery. He was buried at the Guillemont Road Cemetery,



Fig. 31. LCpl. Tomkinson, The London Cemetery, Neuville-Vitasse, Somme.

Guillemont, Somme, Plot III K1 – this cemetery, in the centre of the Somme “Theatre of War” was where many from other battlefields were later buried so it may not tell us where he died. He is also commemorated on the war memorial of his school, Wyggeston Grammar, in Leicester, (Fig.32b) and on the BDA Plaque.

Eric had studied at Charing Cross and the RDH, winning the Woodhouse Scholarship amongst other distinctions. He was a pupil of Mr Walter Harrison (in Hove, Brighton) and was associated with his practice for a time, and on the staff of the Brighton and District Public Dental Authority.⁴⁶

The eldest of the five sons of a Leicester wholesale grocer, the fourth son died at 13, in 1909, the third died in Flanders in 1915, and the eldest at Mentone, South of France in 1922, leaving just the youngest, who became a head teacher, to live to his eighties. Their mother having died in 1904 the Leicester grocer outlived all but his youngest son.



Fig. 32a. Capt. Wheeler, buried at Guillemont Road Cemetery, Somme, is also remembered with his peers on the Wyggeston School Memorial, Leicester :Fig.32b. Source: Imperial War Museum © WMR-50797, photograph by Richard MacFarlane, and on the BDA Plaque.

KEITH ERIC WOOD LDS Eng, Lieutenant, 23rd London Regiment, attached to the 142nd Brigade, 47th London Division (Fig.33). Killed in action, aged 26, at the regiment’s first engagement on 26th May, 1915 at the Battle of Givenchy (during the 2nd Battle of Artois) when the 23rd and 24th battalions gained some trenches at the very heavy cost of 237 killed, 262 wounded – 50% casualties. It is possible he died on the 27th, which would have been the day after the 25th/26th offensive. Givenchy is overlooked by the Vimy Ridge, north of Arras.

He was buried in the *Cimetière communal de Bethune*, II 8 18, the mining town north of the battlefield – and his brother Paul, who died in 1917 and has no known grave, is also remembered on his headstone. They are both commemorated on Dulwich College’s online memorial.

Keith had registered as a dentist in May 1914. He had been a member of the 23rd Territorial Force since 1909, had volunteered to be called up for foreign service in the event of war, joined up on the outbreak of war, and after training went to France in March 1915. He was mentioned in despatches, acting gallantly to bring in the wounded.

Was he fighting, being a dentist, or both? The 1915 *BDJ* writes: “*Though he had not had his boots off for three weeks before the end, and had barely one hour in the twenty-four to himself, he managed to walk miles, when in reserve, to give what relief he could to tooth-aching soldier with a few instruments he took with him on the chance of their being a comfort to some comrade*”.⁴⁷

Brother Keith and Paul, sons of a Congregational minister, had three sisters, one of whom served as a Voluntary Aid Detachment nurse in WW2, another working in 1939 as a doctor’s chauffeur.



Fig. 33. Lieut. Keith Eric Wood: The Graphic 3.7.1915 p23 © Illustrated London News Ltd/Mary Evans. He is buried at Bethune Cemetery, Pas-de-Calais.

PAUL BERNARD WOOD LDS Eng, MA Cantab LLB, Lieutenant, 5th, 2nd 1st and 7th Battalion Royal Fusiliers. Killed by a shell while leading his platoon, aged 32/33, on 23rd April 1917 near Gavrelle, north east of Arras, Pas-de-Calais, during the 2nd Battle of the Scarpe, itself during the 2nd Battle of Arras. He is commemorated on the Arras Memorial, Bay 3, (Fig.34), on his brother Keith’s own headstone, (Fig.33) and on the online Dulwich College memorial, along with his younger

brother Keith Wood.⁴⁸

He had enlisted first with the Middlesex Regiment as a private, serving there for six months before gaining his commission with the 23rd. With more than four years of service, he may have been the longest serving of the twenty nine at the Front.

After studying Law at Cambridge, he applied for the Indian Civil Service but was rejected due to ill health. He registered as a dentist in 1914 two days before his brother Keith and was a House Surgeon at the RDH. At Gallipoli in 1915 he was invalided home shortly before the evacuation. He went to the Somme and was gassed twice. After his death his Lt Colonel wrote to his father: *"Though he had only been with the battalion a short time, he proved himself a most capable officer, and was most popular, and beloved by both officers and men"*.⁴⁹ Brothers Paul and Keith had three sisters: one served as a Voluntary Aid Detachment nurse in WW2 and one was working as a doctor's chauffeur in 1939.



Fig. 34. Lieut. Paul Wood, with the kind permission of the Governors of Dulwich College. Paul is remembered on the Arras Memorial, and at the base of his brother Keith's headstone in Bethune Cemetery with the citation: *"Killed Gavrelle 1917, Grave Known to God"*.

Dentists/students in the war

At this time there was no Army Dental Corps, which was not formed until 1921.⁵⁰ Some dentists did no dentistry, simply serving as soldiers, for example in infantry battalions. Others joined up as dentists but did no dentistry at the time of the major battles. With some organisations, those who survived the battles did provide dental treatment, mostly tooth extraction and the fitting of dentures, for which there was a great need. Others were attached to the Royal Army Medical Corps or were actual members if they had also a medical qualification. During major conflicts the dentists (and some dental students) would have had other

roles. For example, the army would not wish its medical officers to be at the Front, if possible. Dentists had surgical training, so could provide emergency treatments to the wounded and help to bring them further back, being under fire from the enemy during this time. The wounded soldiers were taken back to Field Stations where their treatment could commence from the medics. This was the horror to which dentists were exposed.⁵¹

We do know that eleven of the twenty-nine did act in a medical capacity, six of them serving with the RAMC, and at least four employed their dental skills at some stage in their military service. The RAMC Captains Cecil Bond, Owen Hairsine and Frank C. Harrison were also qualified doctors, (MRCS, LRCP, LDSEng) so almost certainly would have had wide-ranging responsibilities. RAMC Captain Dental Surgeon Edmund Dinsmore served at home at the Curragh Barracks in Ireland. RAMC Captain Dental Surgeon Lawrence Crockett served in Malta.

Eighteen of the twenty-nine were students at the Royal Dental Hospital. They came from a wide range of backgrounds: four were sons of dentists or medical men and seven we know had siblings who were dentists. Frank Cecil Harrison was the son of a famous professor of dentistry, Frank Harrison, who is himself honoured in Sheffield by a Blue Plaque where he established a dental school. A.W. Dolamore was the son of the RDH Dean. The list of the professions of the other dentists' fathers is very varied: six in food and drink retailing: four grocers, a publican, and a wine and spirit merchant; one in the "professions", a solicitor; one in finance, an insurance manager; three in sales: an auctioneer, an estate agent and a commercial traveller of brushes; plus three farmers, three shoe/boot manufacturers, two engineers, a man of the cloth, a jeweller, a Post Office clerk and a colonial army man.

Six of the fallen were born outside England: two Irishmen, two born in South Africa, one in Australia, and one in Simla, India, the summer capital of the British Raj.

Eight of the families suffered at least one other family loss during the war, including the Wood brothers' family.

The length of service of the 29 in the war ranged from a little over one month, to more than four years, all having that service ended in the ultimate



Fig. 35. The reconstructed RDH Roll of Honour

sacrifice. Their ages ranged between 21y and 39y when they died, averaging 28y, which did mean that the majority were unmarried and none had children (though one had a step-daughter). But the relative youth of the twenty-nine also meant that most left behind grieving parents (some who suffered multiple losses) and siblings – such as Dean Dolamore and his wife and seven daughters. When the BDA was arranging for its own war memorial to be created (now displayed in the BDA Headquarters) funds were being considered to support families and those incapacitated by the war.⁵²

Three of the fallen, Frank Wheatley Cowley, Owen Hairsine, and Charles Shelton, received the Military Cross, and Herbert Rayson Sears, the Military Medal. Several were mentioned in despatches, and almost all were awarded the two or three appropriate campaign medals if their family applied for them at a later date.

The chronology of the RDH at War

1915 In May Keith Wood was the first to fall,

at Givenchy, north of Arras, on a battlefield overlooked by Vimy Ridge. Later that year, in September Walter Read died in hospital in Alexandria, Egypt, after contracting dysentery in the trenches of Gallipoli.

1916 In April Neville Compton was killed in action in Mesopotamia, and in July Victor Beckett and Fred Quayle died a day apart in separate actions on the Somme. In October/November of 1916 the Somme claimed three more lives from the Royal - Charles Shelton, Thomas Kidner, and John Wheeler, whilst Robert Heath was the first to fall on the fields of Flanders.

1917 Thirteen lives lost, Herbert Sears, and Stanley Tomkinson falling on the Somme in January and April respectively, whilst on 14th April, three and a half thousand miles apart, William Dolamore was killed in Mesopotamia and Larson Fennell succumbed to scarlet fever in a Romford isolation hospital before his training had been completed. Before the end of that month Keith Wood's brother Paul, and Robert Hofmeyr died on the Somme and Humphry Hope's BE2

reconnaissance plane was shot from the sky by six enemy planes. From June to November it was Flanders and Passchendaele which took another five lives: Owen Hairsine, when bringing the wounded in from the battlefield; Cecil Bond and Robert Rail, disappearing in the mud; Frank Arbery, shot three times; and Albert Collis, invalided home to die in Manchester. In the open sea of the Western Approaches, a U-Boat's torpedo killed Albert Potter and 34 of his fellow seamen from *HMS Contest*.

1918 After the winter respite, and in the final year of the war, in April Gordon Craig died of his wounds on the Somme, on 9th August, dental surgeon Jim Carson died of an illness in hospital in Egypt, the same day that Frank Cowley fell at Ypres, and on 13th October Frank Harrison died of his wounds in the final push for victory on the Somme – the last of the 29 to die in combat.

If war was not enough, in mid-October Lawrence Crockett died in a Norfolk sanatorium after contracting pleurisy and TB in Malta, and on the last day of October Stuart Coombs died of the Spanish flu at home, as did Edmund Dinsmore in his Irish barracks the day after Armistice. The flu epidemic of 1918-19 was not something that could be banished by political treaty.

At the annual reunion dinner of the RDH Alumni in October 2019, in the former RDH building, Richard O'Brien presented his reconstruction of the missing Roll of Honour, incorporating fourteen photographs of the fallen, or in the absence of photographs, images of their memorials.

Acknowledgments Coming from outside the world of dentistry I am indebted to all the advice and encouragement I have received in preparing this paper, notably to Peter Frost and Stanley Gelbier, to Rachel Bairsto and her colleagues at the BDA Library and Museum, and to the Hon Curator of the BDA Museum and Editor of the *Dental Historian* Margaret Wilson.

References

- ¹ British Dental Journal 40, 835, 1919
- ² The Prize Giving is described by the author in *Dental Historian*, Volume 65 (1) January 2020 31-36, Mrs Lloyd George and the first Women Students at the Royal School of Dentists 1916 to 1926
- ³ Nottingham Journal, 22.11.1919
- ⁴ Bucks Herald, 4.6.1921 p9
- ⁵ This is one of a series of writings by the author on the public speeches of Dame Margaret Lloyd George, drawing on the private archive of his grandfather, the Rev. J.T. Rhys, private secretary at No.10. Downing Street from 1917 to 1922. Copies of these speeches are now available at the National Library of Wales, within its extensive Lloyd George collections.
- ⁶ Sunday Mirror, 9.11.1919 p13
- ⁷ British Dental Journal 40, 835, 1919
- ⁸ British Dental Journal 40, 835-838, 1919
- ⁹ Ernest Smith and Beryl Cottell, A history of the Royal Dental Hospital of London and School of Dental Surgery, 1858–1985, London and Atlantic Highlands, NJ, Athlone Press, 1997
- ¹⁰ London Metropolitan Archives 1949 Inventory H42/RD/A/10/032; 1955 Inventory H42/RD/A/10/282
- ¹¹ Listed on the BDA Plaque as Lawrence C. Crockett, Edmund Dinsmore, Linton R. Fennell, Robert H. Heath, Richard A. Rail, Herbert R. Sears and John Eric Wheeler.
- ¹² The Times, 6.11.1919 p8.
- ¹³ London Metropolitan Archives RDH photographic archive 1958-1985, H42/RD/PH/01/002
- ¹⁴ British Dental Journal 40, 334-5, 1919, from the report on the Annual Meeting of March 20th 1919
- ¹⁵ The J.T. Rhys Collection includes the programme of the day, a typed version of her speech at the unveiling, typed notes for the prize giving, and handwritten drafts by her private secretary the Rev. J.T. Rhys. The British Dental Journal 40, 835-838, 1919 also published an extensive report on the occasion, (albeit not *verbatim*) as well as listing the names and brief details as to their medical qualifications, military service, where and when they died of the twenty-nine, a list which was also published in Ernest Smith and Beryl Cottell, A history of the Royal Dental Hospital of London and School of Dental Surgery, 1858–1985, London and Atlantic Highlands, NJ, Athlone Press, 1997
- ¹⁶ British Dental Journal 40, 836-838, 1919
- ¹⁷ Passchendaele Archives. The Memorial Museum Passchendaele 1917 accessed online 21.5.2019 <https://archives.passchendaele.be/en/soldier/1316>
- ¹⁸ British Dental Journal. 1916 37:589 and 594
- ¹⁹ Blundells School website accessed 28.5.2019 http://www.blundells.org/archive/in-memorial/bond_cw.html

²⁰ Photo and information from De Ruvigny Roll of Honour via Ancestry.com

²¹ The Badsey Society, Neville George Compton <https://www.badseysociety.uk/sladden-archive/people/717>

²² Image from Ancestry.com, and information from Remember the Fallen.co.uk, accessed 28.5.2019 <http://www.rememberthefallen.co.uk/casualty/combbs-debenham-stuart/>

²³ Supplement to the London Gazette 15.10.1918 <https://www.thegazette.co.uk/London/issue/30950/supplement/12058/data.pdf>

²⁴ Hymers College, History, accessed 28.5.2019 <https://www.hymerscollege.co.uk/history>

²⁵ South African War Graves <http://www.southafricawargraves.org/search/print.php?id=4627>

²⁶ The BDA First World War Memorial, F. S. S. Gray, British Dental Journal 2018 volume 225, pages 892–897

²⁷ British Dental Journal 1918 39:743

²⁸ British Dental Journal 1917 38:391

²⁹ British Dental Journal 38:393

³⁰ Listed as singer at Camborne Public Rooms in aid of the Crystal Palace Band Fund, Cornubian and Redruth Times, 22.9.1910 p5

³¹ UK WW1 War Diaries RAMC 23rd Division, Piece 20178 Divisional Troops (1915-1917) accessed via Ancestry.com

³² British Dental Journal 1918 39:683

³³ Full page in British Dental Journal 1918 39:25-26

³⁴ Everard Wyrall, *The Die Hards in the Great War, Vol 1*, page 323, Andrew UK, 2013

³⁵ British Dental Journal 1916 37:887 and 982 (citing *The Lancet* 2.12.1916)

³⁶ British Dental Journal J 1917 38:792

³⁷ British Dental Journal 1915 36:757

³⁸ British Dental Journal 1917 38:252

³⁹ British Dental Journal J 1915 36:1025

⁴⁰ The Hampshire Regiment, The Long Long Trail <https://www.longlongtrail.co.uk/army/regiments-and-corps/the-british-infantry-regiments-of-1914-1918/hampshire-regiment/>

⁴¹ British Dental Journal 1917 38:304-305

⁴² British Dental Journal 1917 38:206

⁴³ Second Supplement, The London Gazette, Friday, 2.11.1916

⁴⁴ <https://londonwarmemorial.co.uk/>

⁴⁵ Cheshire Roll, Crewe War Memorial, accessed 28.5.2019 <https://www.cheshireroll.co.uk/war-memorial-in/crewe>

⁴⁶ British Dental Journal 1916 37:928-929

⁴⁷ British Dental Journal J 1915 36:570-571

⁴⁸ Dulwich College, The Fallen of the Great War, Wood P.B. <https://dulwichcollege1914-18.co.uk/fallen/wood-pb/>

⁴⁹ British Dental Journal 1917 38:448-449

⁵⁰ L Godden, History of the Royal Army Dental Corps

⁵¹ I am indebted to Stanley Gelbier for this paragraph on the army history of the dentists.

⁵² British Dental Journal 40, 864, 1919 Unless otherwise stated, images of all memorials in Flanders and France were photographed by the author in the centenary year of 2019.

Author Biography: Richard O'Brien is an economist, futurist, singer-songwriter, author and historian, and member of the Advisory Board of the Annual Register. He is currently engaged in researching and writing about the J.T. Rhys Collection, the archive of papers of his late grandfather, Private Secretary to Dame Margaret Lloyd George. His book "The Campaigns of Margaret Lloyd George, The Wife of the Prime Minister, 1916 – 1922" will be published in October 2022 by YLolfa.

Address for correspondence:
richardrhysobrien@btinternet.com