

DENTAL HISTORIAN



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LINDSAY SOCIETY FOR THE HISTORY OF DENTISTRY

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Membership eligibility

In Britain: members of the British Dental Association, dental students and other interested persons not dentally qualified. Overseas: all dental practitioners and other interested persons not dentally qualified. Membership applications should be sent to the Honorary Secretary.

Subscriptions

£22 (£27 for overseas members) per annum payable in sterling in October to Dr P Frost, Hon Treasurer, 178 Peckham Rye, London, SE22 9QA. Free to student members of the BDA.

Dental Historian

Persons wishing to submit papers for publication (ideally as an email attachment) should send them to the Editor, Prof S Gelbier, Wellcome Trust Centre for the History of Medicine at UCL, 183 Euston Road, London NW1 2BE, UK; email: s.gelbier@ucl.ac.uk.

Dental Historian is sent free to members. Non-members wishing to purchase an issue can do so by sending a cheque for £10 sterling made out to the Lindsay Society to the Distribution Manager, Dr G Garnett, Hey Barn, Back Lane, Newton-in-Bowland, Clitheroe, Lancs, BB7 3EE.

EDITORIAL: THE ORIGINS OF DENTAL HISTORIAN

Stanley Gelbier

This issue number 50 celebrates a long line of reports published by the Lindsay Society for the History of Dentistry since its foundation in 1962. However it was not until issue No 11, in October 1985, that *Dental Historian* first appeared.

The first publication from the society was simply a 'News Sheet', initially one photocopied single-sided sheet of A4 paper. For example the May 1984 issue announced the name of the Lindsay Society's committee elected in February: chairman (Muriel Cohen), secretary (Margaret Clennett), treasurer (Christine Hillam) and committee members (Stanley Gelbier, Ann Hargreaves and David Wright). It announced forthcoming meetings: in June (at the annual conference of the BDA) – Prof W Hoffman-Axthelm (the historical development of periodontology); November – Dr S Gelbier (Baron Dr Cornelius Ver Heyden de Lancey: Doctor, dentist and lawyer; February – Richard E Ellis (James Robinson and general anaesthesia). There was also a note on some publications of interest. The secretary reminded members that a bulletin cannot be produced "from thin air" so appealed for items from the members: reports on research progress, other items of interest to members. She wrote: "No contributions means no bulletin."

An annual 'Occasional Newsletter' appeared in 1975. Again they were duplicated on A4 paper. Number 9 in 1980 was the first to be bound. In its 21-pages the chairman, Ronald Cohen, reported on publication of the BDA's centenary book *The Advance of the Dental Profession* (ed Cohen) on which the committee had been working. A bound copy had been presented to The Duke of Edinburgh, President of Honour at the association's Centenary Presidential Meeting. The issue reported on past and present meetings, the Ruby Wedding of Eileen and Archie Donaldson (a past editor of the *BDJ* and honorary curator of the BDA museum), a number of obituaries, six papers, additions to the BDA library's rare book collection, new books on dental history and a bibliography of periodical publications on the history of dentistry.

The April 1985 News Sheet reported on an AGM and two general meetings and announced forthcoming meetings: in June – Dr C Hillam (Development of dental practice in the provinces before 1855); November – A Hargreaves (WA Hunt: the first Englishman to experiment with cocaine). The secretary reported an "excellent response" to the 1984 call for papers for the Newsletter. The committee hoped to build on this response, eventually transforming it into a formal journal for which it had adopted the title *Dental Historian*.

And so in October 1985 *Dental Historian* made its debut with the subtitle 'Lindsay Club Newsletter No 11'. It was reduced to the current A5 size, with 50 pages with 8 articles, news of meetings, a list of relevant journals received in the BDA library and additions to the BDA bookstock and archives. The front cover carried illustrations of toothbrushes from a 19th century French book by F Maury: a translation by Marion R Craig appeared inside.

By 1988 there were two issues a year: No 14 in April and No 15 in November. In April 1989 the words 'Lindsay Club Newsletter' disappeared from the cover. Inside the committee was described as of 'The Lindsay Club: Society for the history of dentistry'. Included was a list of all the papers

presented at the society's meetings between 1962 and 1987. The first was by Sir Zachary Cope, who spoke in October 1962 on 'The Tomes' Tradition'.¹ There were generally three meetings a year in the early days.

There have been occasional supplements to *Dental Historian*: June 1995 - Joseph Fox of Guy's (1775-1816) Dentist and philanthropist (RA Cohen); 1997 - Selected papers of RA Cohen MA FFD LDS FSA (C Hillam); September 1999 - Development of industrial dental services in the UK (S Gelbier); and April 2000 - Yorkshire and the BDA: the first 100 years (G Pearson)

COVER ILLUSTRATION

Rachel Bairsto^{2*}

The picture on the front cover shows a selection of 19th century tongue scrapers. Tongue scraping was part of the toilet routine for the richer classes. A scraper was often accompanied by a toothpick and ear-scoop in a set. The shovel shaped design was mentioned by Walter Ryff (1500-62) but continued into the 19th century. The sugar tong design and the right angled blade design with ivory handles were introduced from the 1770s onwards.

¹ Published in *Br Dent J* 1963; 114: 407-411.

² Mrs R Bairsto MA, Head of Museum Services, BDA Museum, British Dental Association, 64 Wimpole Street, London W1G 8YS; email: r.bairsto@bda.org

A CENTURY OF ORTHODONTICS IN THE UNITED KINGDOM⁺

James P Moss^{*}

Introduction

Winston Churchill said: "The further you can look back the further you can look forward" and this is true when looking at the speciality of orthodontics. This paper will look at four aspects:

The contribution of Lilian Lindsay to orthodontics

The beginning of orthodontics as a speciality

A century of the development of orthodontic treatment in the UK

A century of the development of orthodontic societies in the UK.

The contribution of Lilian Lindsay to orthodontics

Lilian was born to the Murray family in Holloway, London on 24 July 1871. She was educated at Camden School for Girls and won a scholarship to the North London Collegiate School where the formidable Miss Buss was the Headmistress. As headmistress she determined that Lilian Murray should become a teacher for the deaf and dumb. However Murray had other ideas and wanted to become a dentist. As a result she missed out on a further two year scholarship. In order to further her ambition Murray became an apprentice to a dental surgeon for three years and then applied to enter a dental school in London. She was refused entry "because women did not train to be dentists". Murray therefore applied north of the border to the Edinburgh Dental School and was given a place

⁺ The Lilian Lindsay Memorial Lecture delivered on 3 May 2008 at the BDA annual conference, Manchester.

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despite the fact that some people felt that she was taking "the bread from the men's mouths"! She qualified with honours in 1895 and became the first qualified woman dentist. After qualification Murray returned to London where she practised. She also had a country practice until marrying her dental school sweetheart, Robert Lindsay, in 1905. After her marriage Lilian Murray (now Lindsay) joined her husband in practice in Edinburgh. When Robert was appointed as Dental Secretary to the BDA they moved to London and lived in a flat above the BDA headquarters in Russell Square.¹

Lilian joined the BSSO with her husband on her return from Edinburgh on 6 March 1922. She was the second woman member of the society: first was Petronel Iago who joined on 16 January 1922. Lilian gave papers in 1925, 1926, 1928, 1931, 1934, 1935, 1936, 1937, 1938, 1942, 1943, 1948, often with Robert.² Their first paper to the society in 1925 was on growth and formation of bone, with its bearing upon orthodontic practice.³ Lindsay explained she would be limited in discussion as she was no longer practising. The paper discussed the results of the observations of Francke and Brash on the growth of the jaws; and the observations of Wolff and his comments on the formation of bone. It drew on the evidence of previously published papers indicating that the authors were very well informed about the available literature both here and abroad on the subject under discussion.

Lilian Lindsay's second paper was on the stimulation of bone formation by percussion following treatment.⁴ She used an automatic gold plugger with a rubber Novocaine top attached to its point to achieve the stimulation of the bone and thus promote bone formation around the tooth.

In 1931 the second International Orthodontic Congress in London brought together many important orthodontists from all over the world, including Lindsay (Fig 1). George Badcock was president

¹ R Cutler, *Lilian Lindsay. A short biography*, London: BDA publication.

² See Appendix for list of some of Lilian Lindsay's papers to the BSSO.

³ Lilian Lindsay and Robert Lindsay, Some considerations of recent research into the growth and formation of bone, with special reference to its bearing upon orthodontic practice, *Transactions of the British Society for the Study of Orthodontics* 1925; 14: 76-87.

⁴ L Lindsay, A note on percussion as a stimulus to the growth of bone, *Trans BSSO* 1926; 15: 22-25.

and George Northcroft was vice-president of the meeting. As an active member of the Society, Lindsay continued to give papers in 1928, 1931, 1934, 1935, 1936 and 1937.

Figure 1 The Second International Orthodontic Congress 1931. Lilian Lindsay can be seen sitting in the front row far left. George Northcroft the vice-president is sitting on the far right with the president, George Badcock, on his right.



In 1938 Lindsay became president of the BSSO. Her presidential address on 'Human facial proportions'⁵ examined facial proportions through the life and work of Durer. In his 1528 book entitled *The theory of human proportions* Durer looked for the ideal proportions of the body and felt this could be expressed mathematically. He found a plan of measurement for this but when looking at faces which were so varied he realised the proportions were not correct. Ahead of his time he was the first to use faceting to show the three dimensional nature of the head, which is used today to illustrate the 3D nature of objects on a computer screen. He decided a composite picture was the only way to obtain an ideal face. In 1928 Karl Pearson at University College produced a composite of all the male and female students which Lindsay included in her lecture. She complimented Northcroft who was interested in the development of the occlusion and 3D facial changes who had practiced what he preached: he had taken face masks and study

⁵ Lilian Lindsay, Human proportions, *Trans BSSO* 1938; 27: 9-22.

models of his son William. He presented her with some of the results in the form of profiles for inclusion in her lecture. She finished with a quote from Durer: "If we wish to sharpen our reason by learning and to practise ourselves therein, having once found the right path, we may seek, learn, comprehend and finally reach and attain unto something true."

One of Lindsay's last papers to the society was a tribute to Northcroft and his contribution to the BSSO.⁶ She suggested that each year there should be a Northcroft Memorial Lecture, which is now given at the annual Conference of the British Orthodontic Society. Northcroft's aim, stated in 1927, was similar to Durer: "To contribute something, however little, towards constructing that great palace of truth, in the building of which all scientists are collaborating." Lindsay commented that he has stimulated others to follow in his footsteps.

Lindsay was editor of the society's Transactions (1930-1934), vice-president (1935-1936), president-elect 1937, president 1938, immediate past-president (1939-1944) and senior vice-president (1947-1955). On 30 March 1944 a letter from Lindsay suggested collection of photographs of the presidents. They are now in the museum of the BSO.

Robert Lindsay died in 1930. Lilian was appointed sub-editor of the *BDJ* in 1931. In 1946 she was elected president of the BDA. On her 80th birthday in 1957 she was presented with her portrait painted by Dugdale. Miss Corisande Smythe, an orthodontist, presented her with a cheque and a bouquet from the women dental practitioners.

Lilian Lindsay died on 31 January 1960, aged 88 years.

The beginning of orthodontics as a speciality

Pierre Fauchard (1677-1761), the 'Father of Orthodontics', initiated oral appliance therapy in 1723. He wrote on orthodontic treatment for crooked, badly aligned and luxated teeth.⁷ Fauchard was the first real reference to orthodontics and treatment with two

chapters in his book devoted to crooked and badly aligned teeth. Lindsay felt this book was so important that she translated it into English and presented a signed copy to the BSSO. In it Fauchard says:

Before straightening a tilted tooth, we will check that it is either wider or longer than the adjacent teeth. If the tooth is too wide we could extract one or even two adjacent teeth to allocate the space to those teeth that need it or we could reduce the width of the tooth with files.

He then described the files he used. His appliances were ligatures made of waxed silk, a gold or silver blade to which he attached ligatures to bring pressure on the teeth and luxation of a tooth which was then held with ligatures.

Robert Bunon (1702-1748) advocated a form of serial extraction to relieve crowding.⁸ Bernard Bourdet (1722-1789) developed Fauchard's appliances using ivory as an arch wire to which he ligated the teeth to be aligned.

John Hunter (1728-1793) was an anatomist and naturalist who described the growth of the jaws and supported preventive mixed dentition treatment.⁹ He also transplanted teeth. A picture by Rowlandson the caricaturist captured the scene of such an operation: a copy is in the BDA museum. There is a documented case of a transplanted tooth surviving for 13 years.

Joseph Fox (1776-1816) of London was greatly influenced by Hunter and advocated preventive serial extraction.¹⁰ He developed Bourdet's plate to move incisors over the bite by incorporating ivory blocks over the molar teeth. In 1806 Fox used a chin cap to influence facial growth.

Jean Schanche published a book on tooth straightening in 1807. He demonstrated the band with a tightening screw which Angle and

⁶ L Lindsay, George Northcroft 1869-1942, *Trans BSSO* 1942-43; 30: 2-4.

⁷ Pierre Fauchard, *The surgeon dentist or a treatise on the teeth*, translated by Lilian Lindsay, London, 1946; reprinted Birmingham, Alabama: Classics of Dentistry, 1980.

⁸ R Bunon, *Essay sur les maladies des dents* [Essay on diseases of the teeth], Paris: chez Briasson, Chaubert et de Hansey, 1743.

⁹ John Hunter, *A practical treatise on the diseases of the teeth intended as a supplement to the natural history of those parts*, London, 1778.

¹⁰ James Fox, *The history and treatment of the diseases of the teeth, gums and the alveolar processes*, London, 1806.

Farrar later adopted. In 1841 Schange also used elastics and silk to align the teeth.

Georg Carabelli (1787-1842), a professor in Vienna, also developed ingenious tooth regulating appliances incorporating screws to move individual teeth.¹¹

In 1822 Gunnel designed the first Extra Oral Traction.¹² 1879 saw M Kingsley using EOT and an inclined bite plane.¹³ At this time in America with Kingsley, Edward Angle was developing fixed appliances in precious metals and was using some of the ideas that had been put forward by various European orthodontists.

**Three main systems orthodontic treatment
in past 100 years**

Removable appliances
Functional appliance
Fixed appliances

Removable Appliances

Removable plates were often made of bone or ivory. Hickory wood pegs were inserted into the base to move the teeth. George Badcock will be particularly remembered for his design in 1903 of the Badcock expansion screw which, with the development of Vulcanite, transformed removable appliance therapy. Most appliances were previously made in precious metal manufactured in the USA. Later German silver was used as piano wire used for springs rusted and become unhygienic.

Most appliances were made of vulcanite and German silver wires until Lucien De Coster introduced stainless steel.¹⁴ He gave a

¹¹ Georg Carabelli, *Instruction sur les maladies des gencives et des dents*, 1793.

¹² J S Gunnel, A remedy for the protrusion of the lower jaw, *Amer J Dent Sci* 1841, p. 65.

¹³ N W Kingsley, *A treatise on oral deformity with appropriate preventive and remedial treatment*, New York: Appleton & Co, 1880.

¹⁴ L De Coster, *The use of rustless steel in dentofacial orthopaedics*, The Second International Orthodontic Congress, St Louis: The C V Mosby Company, 1933, p. 475.

paper on it at the second International Congress in 1931 in London. Sheldon Friel visited De Coster in Belgium after his paper at the Congress and spent time developing its use in orthodontics with Hugh Theodore Alexander McKeag of Belfast. The change from precious metal to stainless steel was a great advance as it brought the possibility of orthodontic treatment to the masses.

Various clasps were developed to retain the appliances by Jackson, Visick and Tischler. However removable appliance therapy was revolutionised by the advent of the Adam's clasp in 1957.¹⁵ It vastly improved the retention of appliances making them more effective in moving teeth. The advent of acrylic in World War II and stainless steel revolutionised removable appliance therapy. The Badcock screw was replaced by the Glenross screw which was more stable. Schwartz (1966) in Vienna also introduced many types of screw plates for the movement of teeth.¹⁶

Various types of springs were used to move the teeth but Rix found the use of auxiliary springs attached to a labial arch gave a large range of movement with gentle pressure. Various springs were then adapted for tooth movement to enhance the effectiveness of removable appliances (eg by Adams). The major problem of the removable appliance was that bodily tooth movement was almost impossible with such appliances.

As fixed appliances became easier to construct and place in the mouth the use of removable appliances declined, except for retention. However there has been resurgence in the use of removable appliances as adults do not wish to have appliances that can be seen and do not wish the inconvenience of fixed appliances. Invisalign removable appliances made of clear acrylic were introduced to improve the aesthetics of the appliances, especially for adults. However they require expensive 3D imaging to produce the appliances. A series of clear appliances are constructed each with a little more tooth displacement resulting in movement of the teeth. The appliances are worn consecutively until the teeth are aligned.

¹⁵ C P Adams., *The design and construction of removable appliances*, Bristol: John Wright & Sons Ltd, 1970.

¹⁶ A M Schwartz and M Gratzinger, *Removable orthodontic appliances*, Philadelphia: W B Saunders Company, 1966.

Clearstep, introduced as the UK's equivalent of Invisalign, appears to be as effective and is cheaper.

Functional appliances

The concept of applying the principles of the correction of function to the treatment of patients was advocated by Lefoulon (1844)¹⁷ and Kingsley (1880).¹⁸ It was Wolff (1892)¹⁹ and Roux (1895)²⁰ who demonstrated the link between form and function. Pierre Robin utilised the forces to correct breathing and malocclusion using his Monobloc. He also advocated correct bottle and breast feeding to improve jaw position. Robin's Monobloc was also used to improve the habit of mouth breathing.²¹

The original aluminium oral screen developed by Northcroft and Warwick James was used to correct mouth breathing and the function of the soft tissues. Later it was constructed in Vulcanite and then acrylic. Various variations of this have been developed.

Viggio Andresen was a Danish orthodontist who moved to Oslo in Norway. He modified the Monobloc in 1936 to act as a retainer²² and found it effective as a tooth moving appliance. Andresen used the passive appliance to move the lower jaw forward into a new position. The added advantage of the appliance was that visits to the orthodontist could be less frequent. In view of the fact that the appliance was loose in the mouth and required closing movements of the jaw to maintain it in position it was renamed the Andresen Activator.

Karl Haupl of Prague (1893-1960) maintained that jaw remodelling should be obtained by stimulating the muscular complex and circulatory system so that it gives a new remodelled structure

¹⁷ P J Lefoulon, *A new treatise on the theory and practice of dental surgery*, translated by Thomas E Bond, Baltimore, 1844.

¹⁸ N W Kingsley, *A treatise on oral deformity with appropriate preventive and remedial treatment*, New York: Appleton & Co. 1880.

¹⁹ J Wolff, *Das gesetz der transformation der knochen*, Berlin, 1892.

²⁰ W Roux, *Gesammelte Abhandlungen*, Bd. 1 and 2, Leipzig, 1895.

²¹ P Robin, Observation sur un nouvel appareil de redressement, *Revue de Stom* 1902, 9: 561 – 569.

²² Viggio Andresen, The Norwegian system of functional gnatho-orthopedics, *Acta Gnathologica* 1936; 1 (1).

which has adjusted to the new position.²³ The soft tissues were an important factor through their function, volume, tonus and posture and he described the remodelling of the TMJ. In 1952 Endicott, Pedley and Grossman, a student of Haupl, popularised functional appliances in the UK. These ideas were contrary to the ideas of Clifford Ballard (1957) who believed in the unchangeable apical base.²⁴

Haupl, Grossmann and Clarkson introduced a modification of the appliance to correct Class III malocclusions – the Sliding Norwegian Plate. In 1952 Balters, Bimler and Stockfish also modified the functional appliances to make them more effective.

Frankel developed his appliance in East Germany in the 1980s.²⁵ It was introduced into the UK by Hans Eirew and became popular both in the UK and America.

Clark (1982) developed the twin block appliance with inclined planes which enabled the patient to wear the functional appliance all day.²⁶ Bass modified the functional appliance with an uprighting spring on the anterior teeth to prevent the excessive retroclination of the incisors. He has recently combined the sloping plane of the twin block into his modified functional appliance.

Fixed appliances

In America there was greater emphasis on fixed appliances, whereas in Europe there was more of an emphasis on removable appliances. This dichotomy existed for many years until stainless steel and later bonding were introduced.

Edward Hartley Angle introduced his Pin and Tube appliance in 1880. Anna Hopkins became his secretary in 1892 and in 1909 became his wife, having qualified in dentistry at Iowa University. Angle published his first 14 pages of text in the Loomis Haskell

²³ K Haupl, W J Grossmann, and P Clarkson, *Textbook of functional jaw orthopaedics*, London: Henry Kimpton, 1952.

²⁴ Clifford F Ballard, The aetiology of malocclusion – an assessment, *Trans BSSO* 1957, p. 15.

²⁵ R Frankel and C Frankel, *Orofacial orthopedics with the function regulator*, Basel: Karger, 1989.

²⁶ W J Clark, The Twin block traction technique, *European J Orthodontics* 1982, 4: 129.

Dental text in 1887.²⁷ The intervening editions of his text were published as commercial pamphlets by S S White. The 6th edition of his book was published in 1900 and the famous 7th edition in 1907. Much of the text was written by Anna Angle.

Angle introduced the Ribbon arch and the Edgewise appliance. He took out patents on his E-Arch (1900), his Pin and Tube appliance (1910) and his Ribbon arch (1916); and developed the Edgewise bracket which he patented in 1925.

Angle was responsible for the development of the speciality of orthodontics. He set up a School of Orthodontia which attracted many prominent dentists from across the world, lots of whom became prominent orthodontists in their own countries.

Most appliances were made in precious metal manufactured in the USA. Later German silver was used in appliances with clamp bands on the molars.

Angle believed in non-extraction therapy, although in his 6th edition in 1902 he said extraction may be necessary:

First where the jaws are small either naturally or because of arrested development, so that the angles of inclination would be too great if all the teeth were placed in line. Second, where extraction is necessary from the requirements of the facial lines. The placing of the teeth in the line of the occlusion would result in undue prominence of the facial lines.

His 7th edition states: "The present ease and certainty of tooth movement by use of proper appliances makes inexcusable the extraction of teeth." In America this provoked arguments about extractions and stability and two opposite camps were formed. One led by Angle and the other by Case and Tweed who said that extractions were necessary for stability. Other Angle students, including Dewey, Hellman and Ketcham, followed their example.

John Mershon on the east coast of America developed and popularised the lingual arch. He demonstrated it at the meeting of the BSSO in 1925.²⁸

²⁷ Edward Angle, *Loomis Haskell Dental text*, 1887.

²⁸ G Mershon, A practical talk on why the lingual arch is applicable to the orthodontic problem, *Trans BSSO* 1925, p. 58.

In his 1909 presidential address Northcroft said: "The use of x-rays has not been overlooked as a means of diagnosis and research," pointing forward to cephalometry. At that time he was using the Prosopometer, a device for taking measurements of the face and jaws. In 1920 George Campion, in his presidential address to the BSSO, described his analysis of faces and jaws in his paper 'Orthodontics a study in 6 dimensions'. This was the result of a study of patients and a careful analysis of standardised facial photographs. It was Broadbent who, in 1930, developed cephalometry which became important in understanding the changes that occur during treatment and growth.

Sheldon Friel visited Lucien DeCoster in Belgium after his paper at the 1931 Congress in London and spent time with McKeag of Belfast in developing the use of stainless steel in orthodontics. No longer was it necessary to use precious metal to construct fixed appliances.

The development of the spot welder by Harold Watkin (Fig 4) revolutionised fixed appliance therapy by enabling bands to be made for individual teeth and brackets to be welded on them. Gold bands and brackets had to be soldered and often lost their resilience if heated to a too high a temperature.

Various other fixed appliances were developed and introduced to the UK. Alexander Sved of New York developed his sectional arches and Johnson his twin wire arch in 1940. The ripple brackets used with the twin wire arch were useful in other applications and most orthodontists in the UK used them during the 'fifties.

Tick Begg practised in Adelaide. In 1956 he demonstrated the Begg technique at the AAO meeting.²⁹ Begg had been a student of Angle and milled his first Edgewise brackets and set up the cases for him. He modified the pin and tube appliance and with the help of Arthur Wilcock, a metallurgist from Melbourne, developed light wires for tooth movement. The Begg technique was introduced to the UK by students of Begg and became extremely popular.

Direct and indirect bonding of brackets to the teeth was developed as adhesives were improved. The use of better-looking

²⁹ P R Begg, Differential force in orthodontic treatment, *Amer J Orthodontics* 1956; 42: 481.

brackets, especially with clear material, made them more acceptable to patients. The strength of clear brackets improved when changed from acrylic to ceramic material.

The Andrews Straight wire technique, which Andrews developed in 1980, was popularised in the UK by Bennett, Birnie, Harradine and the team at the London Hospital Dental School. This utilises the edgewise bracket with resilient wires. It is now the most used technique of fixed appliance therapy. Recently mini implants have been used to improve the anchorage when moving teeth.

In an attempt to make appliances less visible the lingual technique was developed but is time consuming to place and to adjust. It can now be custom made for the individual in precious metal.

A century of orthodontic societies

Over the past 100 years various orthodontic societies have been formed in the UK, each with a different remit. They merged in 1994 to form the British Orthodontic Society (BOS).

UK orthodontic societies in past 100 years

1907 British Society for the Study of Orthodontics (BSSO)
 1960 Consultant Orthodontists Group (COG)
 1965 British Association of Orthodontists (BAO)
 1974 Community Orthodontists Group (ComOG)
 1978 Association of University Teachers in Orthodontics (AUTO)
 1994 British Orthodontic Society (BOS)

In 1907 George Northcroft gathered together a group of people interested in orthodontics. This study group became the BSSO.

Northcroft (Fig 2) was born on 8 July 1869 at Lancing in Sussex, the youngest son of a quantity surveyor and from a family of 18 children. He was educated at Woodhouse Grove and at the Leys School in Cambridge where he won several examination prizes. Whilst at school Northcroft won a scholarship to the USA to study dentistry. At the University of Michigan he joined the first class to study dentistry in 1887. He gained a DDS degree in 1890. Northcroft

realized he would also need an English qualification so enrolled at the London School of Dental Surgery.³⁰ He qualified with an LDS in 1892.

Northcroft practised in Windsor for eight years and then moved to 1 Wimpole Street, London.³¹ When his sisters purchased a 50-year lease at 115 Harley Street he gradually transferred all his time to that practice. Northcroft had a large clientele of patients from the Royal families of Europe and many famous people. It was here he met his wife, Baroness Eva von Schlotheim, a talented and artistic young lady who was working for the Salvation Army in the East End. She was an excellent artist who trained in Paris, spoke four languages, had a good soprano voice and was a good cook. They had three children: George, born in 1911; William, 1915; and Evelyn, 1919. Their house, with its beautiful Adams staircase and fireplaces, and a marble floor, housed the family, seven domestics, two secretaries, a door-maid (who also sterilized the instruments) and two technicians in the basement. The surgery was on the ground floor where the dining room served as a waiting room which had to be vacated quickly by the family if an early patient was expected. It was here that Northcroft invited colleagues interested in orthodontics to a meeting on 21 October 1907 to consider starting a study group.

Figure 2. George Northcroft, founder of the BSSO



The group first met on 5 December 1907. The famous members included George Badcock, Sim Wallace, George Campion, Harold Chapman and Norman Bennett. The majority were general practitioners with an interest in orthodontics. Badcock (Fig 3) was elected as president and George Northcroft as vice-president. Northcroft had experienced the American scene on the east coast

³⁰ Which became the Royal Dental Hospital and School in 1901.

³¹ Now home to the Royal Society of Medicine.

where orthodontics was not looked upon as a speciality but as part of dentistry. However, on the west coast Angle was advocating a speciality of orthodontics and had set up his School of Orthodontia.

Several of the founding members had attended Angle's courses, including Hubert Visick, the first curator of the society, Harold Chapman, Alfred Cookman Lockett and Herbert Cragg Highton.³² Edward Angle demonstrated at the 1897 BDA meeting in Dublin and Lilian Lindsay's husband Robert was a convert to his ideas, which also influenced the early development of orthodontics in this country.

Badcock's dental training started as an apprentice. He then studied at the London School of Dental Surgery and Charing Cross Hospital. Nearly fifty years were spent in practice in Harley Street. Although practising all aspects of dentistry he had a particular interest in orthodontics. Badcock gave the first UK course on orthodontics at Guy's Hospital. He served on many committees and was elected president of the 1931 Second International Congress of Orthodontics held in London. Badcock, who chaired the initial meeting of the BSSO, said: "It was not a Society of specialists but would serve the needs of the general practitioner in order that the profession could meet on common ground to elucidate the problems of Orthodontia." Its sole objective was to promote the study of orthodontia. This precluded it from matters of remuneration, professional, organisational, political matters and delivery of treatment. This exclusive object to promote study led eventually to the formation of other orthodontic groups.

In 1919 an invitation to attend the Medical Parliamentary Committee was rejected as was a 1920 invitation to join the Federation of Medical Societies. Even a 1949 invitation by the National Health Service to discuss orthodontics in the NHS was rejected. Similarly support in 1948 by the Faculty of Physicians and Surgeons of Glasgow for a proposed Diploma in Orthodontics was declined, although a report of the society favoured a diploma. It was this refusal to participate in political discussions that promoted the formation of the Consultant Orthodontists Group (COG) in 1961, the British Association of Orthodontists (BAO) in 1965 and the Association of Community Orthodontists (ACO) in 1974.

³² H Chapman, H, Fifty years in retrospect, *Trans BSSO*, 1954, p 100.

Figure 3 George Badcock the first resident of the BSSO



In January 1929 B Maxwell Stephens presented a Presidential Badge to the society. In the centre it had a picture of Pierre Fauchard, 'The Father of Orthodontics' (Fig 4). The papers given to the Society were of a high scientific and clinical nature. Northcroft realised³³ that without an understanding of *normal* growth and development it was impossible to understand the abnormal, so he monitored the growth of his children by making annual study models and plaster casts. Only his middle son William had a relatively complete set of masks and models taken. They are now in the BOS Museum. Northcroft produced, with the facial masks of William,

one of the first longitudinal studies of three-dimensional facial growth over an age range from 6 to 21 years. Northcroft was interested in the development of the occlusion and 3D facial changes. Further records of William were taken at the ages of 75 and 88 years. William died in 2007 aged 91 years. Northcroft continued to practice at 115 Harley Street during the World War II blitz, living there with his wife and daughter whilst the bombs fell all around him. He had been awarded an OBE for his services during World War I for treating jaw injuries.

During World War I no ordinary meetings were held and the society's officers remained in post. The BSSO suspended meetings in the Second World War but continued them after 1943.

George Northcroft died in 1943 after a short illness. His wife died in 1968 at the age of 88 years.

³³ G Northcroft, The idea of normality in orthodontics, *Trans European Orthodontic Soc* 1927, p. 9.

Figure 4 Harold Watkin the inventor of the Watkin welder for stainless steel, which revolutionised fixed appliance therapy. He is wearing the Presidential Badge of the BSSO with the picture of Pierre Fauchard on it



The premises of the Medical Society of London were the venue for the meetings until 1930. Then, due to an increased membership and the need for space for the museum and library, the BSSO moved to 28 Portland Place at the Royal Society for Tropical Medicine and Hygiene. Lindsay suggested they bought a flat in memory of Northcroft to house the museum and library, but it was not agreed by the Council. Two years later the meetings moved to Manson House next door.

In 1950 McKeag suggested the society should meet outside London and in 1955 Jim Gardiner held a two-day meeting in Sheffield. This was so successful that meetings outside London were held every year. The society held six meetings in the winter months at the Medical Society of London and then at Manson House. An annual conference was later added. As the membership grew the evening meetings became too large for Manson House. They were reduced to two and were held at the Royal Society of Architects, with a one-day meeting in the spring. It was traditional for the BSSO meetings to have papers with a high scientific and academic content.

BSSO awards

The annual Northcroft Memorial Lecture, suggested by Lilian Lindsay, is of high international prestige. The Chapman Prize is given to the best paper by a junior member in honour of Harold Chapman. In 1993 a Houston Research fund was formed in memory of William J B (Bill) Houston who died prematurely in 1992.

The Consultant Orthodontic Group

The COG was formed in 1960 at a yearly meeting organised by Professor Clifford Ballard at the Eastman Dental Hospital, to represent consultants in orthodontics. These meetings originally started as a forum for the discussion of clinical cases but later became more political as the number of consultants increased. Grainger McCallin was the first chairman, Gordon Dickson the vice-chairman and J R E (Dick) Mills the secretary/treasurer.

The group was politically active with many of its members on national committees: Standing Dental Advisory Committee, the BDA's Central Committee for Hospital Dental Services, Dental Education Advisory Committee, Specialist Advisory Committee and the Joint Committee for Higher Training of the Royal surgical colleges. Two meetings a year were held: the annual Symposium and from 1983 a meeting at the annual conference of the BSSO, COG and BAO. The emphasis of the lectures was clinical and political. Later a Training Grades Group was formed to give representation to those who were training for consultant posts.

British Association of Orthodontists

This was formed at a 1965 meeting at the BDA to discuss the problems of orthodontic practice, to make representations to bodies and authorities and to have a register of orthodontists. Jack Alexander was elected as first president, Frankland, secretary and Hans Eirew, treasurer. The original presidential badge was made by a member. It depicted a Unicorn, the symbol of the hotel in Stow in the Wold where the first meeting was held.

All NHS orthodontic treatment was subject to prior approval by the Dental Estimates Board which decided on payment as there were no items of orthodontic treatment on the fee scale. Meetings dealt with practical, clinical and practice management interests with an element of political discussion. Full membership was restricted to those holding a postgraduate qualification. Associate members could not vote. The BAO ran two conferences a year, in the spring and autumn, to inform members of political and financial changes and to give educational input from international orthodontists.

In 1968 the society published *The Orthodontist*, with the sub-title *British Journal of Orthodontics*. In 1972 it combined with the BSSO *Transactions* to form the *British Journal of Orthodontics*.

Association of Community Orthodontists Community Orthodontists Group

1974 the ACO brought together community orthodontists at a meeting of the BAO financed by the latter. In 1981 the name was changed to Community Orthodontists Group. It kept its members informed of the changes in the orthodontic scene and negotiated with various committees on their behalf.

Association of University Teachers of Orthodontics

AUTO was formed in 1978 by a group of academics to further the interest and knowledge of orthodontic teaching. Prior to formation of the group, from 1955, teachers of orthodontics met every two years to discuss the teaching of their subject. In 1983, 1988, 1990, 1992 and 1994 AUTO published papers on the undergraduate curriculum and the staffing of academic posts.

Unification

It was clear the BSSO, COG, BAO were duplicating activity and had areas in which they could work together, so unification became a way forward. Also political representation needed a common voice. In 1975 the BSSO and BAO jointly met in Oxford and a member suggested unification.

In 1978 the BAO, BSSO and COG established a working party to set standards in orthodontics. It later included AUTO and ComOG. In 1980 Raymond Bird, president of the BSSO, produced a discussion paper on 'The organisation of the Orthodontic Societies into a single Society'. A 1986 joint conference in Bournemouth brought together the BSSO, BAO, COG and AUTO. This was a huge success under the careful chairmanship of David DiBiase. After the first two conferences the membership decided they should continue, since when there have been annual British Orthodontic conferences.

In 1990 a working party was set up between the BAO and the BSSO to look at unification. All the orthodontic societies agreed to meet. After 13 meetings final proposals were agreed and subsequently accepted by all societies at a Glasgow conference in September 1993. 92-100% of the members of the groups were in favour, indicating that only the officers of the societies were having difficulty in coming to an agreement.

Another factor which promoted unification was the 1995 Schanschieff report³⁴ questioning the validity of some orthodontic treatment in the NHS. A Joint Response Committee set up by the societies produced a damning criticism of the report, the result of which was a restructuring of the orthodontic services of the GDS and the virtual end of prior approval for orthodontics.

In 1994 the British Orthodontic Society was founded by unification of the societies. Six groups represent the different areas of orthodontic employment.

The six BSSO groups

Community
Consultant Orthodontists
Practitioners
Orthodontic Specialists
Training Grades
University Teachers.

The first full meeting of Council was held at the annual Conference in Harrogate on 2 October 1994. Committees were set up to deal with: Finance, *British Journal of Orthodontics*, British Orthodontic Conference, Standards and General Orthodontic Services.

The BOS is now recognised as the sole national representative of orthodontics by the BDA and the GDC. The respect given to it greatly exceeds that given to any of the founding societies. Outside bodies such as the Department of Health regard it as the appropriate body to consult on matters relating to orthodontics and members regard the

³⁴ Report of the Committee of Enquiry (chairman S G Schanschieff) into Unnecessary Dental Treatment, London: HMSO for the Department of Health and Social Security, 1986.

new society as the natural and complete successor to the founding societies.

The society was originally housed at the Eastman Dental Institute. In 1996 it moved to 291 Gray's Inn Road where the society purchased the property with space for the office, rooms for Council and other meetings and the Museum. With growth the rooms were not large enough. In 2006 the society moved to premises in Bridewell Place in the City of London, with prestigious offices, meeting rooms and museum. It was opened on 29 June 2006 by Dame Margaret Seward and the president of the BOS, Ken Lumsden. On 5 December 2007, one hundred years after the first meeting of the BSSO, a century of British orthodontics was celebrated in the new headquarters.

In 1998 the society became a Company Limited by Guarantee. It was restructured and a Board of Trustees formed consisting of the six group chairmen, the chairman of the Conference and Meetings Committee, the BOS chairman and the treasurer. The society appointed an executive secretary to replace the honorary secretary; he and the president are non-voting members. A new Representative Body has been formed as the main information forum for all the groups. The society now has over 1,700 members.

The main objectives of the founding fathers have been realised as the BOS is recognised nationally and internationally as the voice of orthodontics in the UK. The quality, training and contribution to orthodontic knowledge of UK orthodontists is recognised throughout the world and the BOS has been invited to host the 8th World International Congress of Orthodontic Societies in 2015.

Appendix: Some papers by Lilian Lindsay to the BSSO

(with R Lindsay) Some considerations of recent research into the growth and formation of bone, with special reference to its bearing upon orthodontic practice. *Transactions of the British Society for the Study of Orthodontics* 1925; 14: 76-87.

A note on percussion as a stimulus to the growth of bone, *Trans BSSO* 1926; 15: 22-25.

A note on certain histological researches of Drs Stein and Weinman on the movement of teeth, *Trans BSSO* 1928; 17: 50-51.

Changes in the bone of the mandible and the temporomandibular joint, incident to the application of orthodontic appliances—suggestions as to the etiology of inferior protrusion, *Trans BSSO* 1931; 20: 35-49.

Roentgen studies of malocclusion from the articles of E Bustin and M Leist, *Trans BSSO* 1934; 23: 61-65.

Early treatment of orthodontic cases with headcap and traction, *Trans BSSO* 1935; 24: 118-120.

Foreign orthodontic literature. *Trans BSSO* 1936; 25: 78-94.

Human proportions, *Trans BSSO* 1938; 27: 9-22.

George Northcroft 1869-43, *Trans BSSO* 1942-43; 30: 2-4.

Dr Rubbrecht's studies on sagittal maxillo-facial variations and heredity, *Trans BSSO* 1937; 26: 111-133.

Heredity versus practice, *Trans BSSO* 1948; 34: 91-102.

A note on certain histological researches of Drs Stein and Weinman on the movement of teeth, *Trans BSSO* 1928; 17: 50-51.

Changes in the bone of the mandible and the temporomandibular joint, incident to the application of orthodontic appliances—suggestions as to the etiology of inferior protrusion, *Trans BSSO* 1931; 20: 35-49.

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Acknowledgements

I am grateful to Ann Wright, the staff of the BOS office, Stuart Taylor plus Rachel Bairsto and Sally Dummer of the BDA Museum for their help.

Figure 5 Professor Jim Moss delivering the 2008 Lilian Lindsay Memorial Lecture



DENTAL IMPLANTS: PAST, PRESENT AND FUTURE*

Richard B Johns†

Introduction

The dictum "You cannot know where you are going unless you know where you are and where you have come from"¹ is entirely appropriate when studying the history of dental implants. However, it was George Bernard Shaw who wrote²: "The reasonable man adapts himself to the world: the unreasonable one persists in trying to adapt the world to himself. Therefore all progress depends on the unreasonable man." There have certainly been plenty examples, over the last two centuries, of *unreasonable* dentists. These dentists have often claimed to have discovered the "Magic Bullet" when promoting their own idiosyncratic design for dental implants.

Many of those who have reviewed the topic of dental implants seem to have a desire to find evidence of the earliest example of something which can, with imagination, resemble an artificial tooth, embedded in bone. Confusion with early forms of bridgework only add to the misrepresentation of what can reasonably called *evidence* of a dental implant having been invented. An example of such "fuzzy" evidence was a claim made by Eric Crubézy *et al*³ in an article which appeared in *Nature* in January 1998. They asserted that a jawbone found in France and dated as being from 1st or 2nd century AD, showed evidence of "False teeth in the Roman world". They claimed moreover that. "A dental implant made of wrought iron and showing evidence of having been "osseointegrated" had been found. No histological attempt had been made to support their claim.

* Based on a lecture given to the Annual Meeting of the Lindsay Society in Stirling, 4 October 2008.

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¹ David Attenborough, in a BBC lecture on 'The History of Television', 30 April 2008.

² George Bernard Shaw, "Maxims for Revolutionists" in *Arms and the Man*, 1903.

³ E Crubézy, L G Pascal Murail and J-P Bernadou, *Nature* 1998; 392: 29.

Spurious claims do little more than seek the limelight for a short time and add little to the scientific literature. Never the less it is interesting to look into the history of dental implants in the last 200 years. This gives a yardstick by which to measure and assess recent developments. Credit must however be given to those who conceived strange solutions to the problem.

Aims and objectives

The goal for a successful dental implant is that it must be able to transfer functional loads directly from an artificial tooth to the jawbone, while at the same time not allowing the ingress of infection to the underlying soft tissue or bone. In Figure 1 the diagram shows⁴ a simplistic representation of three possible relationships of an implant to the tissues. 'A' is completely enclosed within the tissues. 'B' is both within the tissues and the oral environment with a seal at the site of penetration. 'C' indicates that the implant has been exteriorized. Clearly the aim and objective for a successful dental implant is indicated in 'B'.

Implant designs

Of the innumerable designs suggested in the 19th century and the first half of the 20th century just three examples are shown in Figure 2.

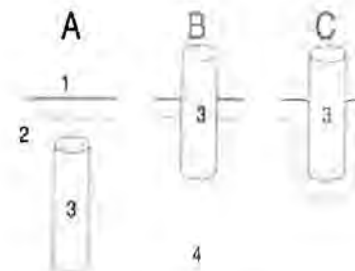
Subperiosteal implant

An interesting example of the ingenuity and mechanistic approach to the problem of design and load transfer to the jawbone, was that of the subperiosteal implant. Following surgical exposure, an impression of the bone was taken and a cast chrome cobalt alloy implant framework made. At a second operation, as soon as possible after the first, the casting was fitted directly onto the surface of the jawbone, usually retained in position by small screws. For a second time the soft tissues were sutured back in position. The framework had abutments as an integral part of the casting, they were located at suitable locations so as to protrude

through the soft tissues into the oral cavity. These abutments provided support for a removable prosthesis. The whole technique involving subperiosteal implants and having been reported widely in the literature, failed lamentably. These implants invariably gave rise to chronic infection and became slowly exteriorized.

Figure 1 Three possible relationships an implant may have with the tissues

- (1) Oral cavity (2) Epithelium (3) Implant (4) Bone
 A Total implantation without any epithelium involvement
 B Partial implantation with discontinuity of the epithelium
 C Partial implantation with exteriorization of the implant by the epithelium



In the second half of the 20th century implant designs concentrated on intraosseous "blades" (Linkow), "cylinders" or screw shaped devices inserted into the jawbone.

Osseointegration

It was Brånemark and his team who, in describing the screw design, termed the relationship between the implant material and the bone as being one of "Osseointegration." The whole procedure was predicted on the basis of their meticulous, painstaking and long-term research. It was not just the design which was innovative. It was their understanding of the importance of bone biology and the preparation and decontamination of the implant surface itself, which accounted for their success. They demonstrated the importance of minimizing thermal trauma to the bone, when preparing the implant site. Their

⁴ Richard B Johns, *A study of the response of tissue to endodontic and endosseous implants in Macaca irus monkeys*, PhD thesis University of London, 1973.

work was also able to demonstrate, conclusively, that epithelium can indeed form a long-term stable attachment to an implant and provide an effective seal without the risk of the implant becoming exteriorized (Fig 3 A).

Figure 2 Examples of three "Magic Bullet" implant designs



(a) Maggiolo-1809 (b) Greenfield -1913 (c) Formaigginini-1947

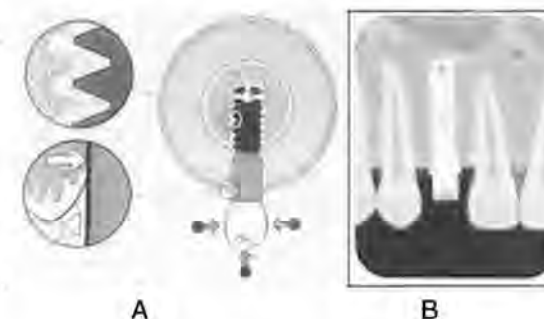
Materials used for implants

The list of materials used for implants is both long and bizarre. It appears that once again, as with design, there was the hope of finding a material which would provide the substance for the "Magic Bullet." The long list of experimental organic materials included coral, wood, gutta percha and vitreous carbon. Of the inorganic materials proposed the list contains a wide variety of ceramics materials, lead, various glasses, plaster of Paris, hydroxyapatite, polymers and even sapphire. To this group has to be added precious metals and their alloys. Of the non precious metals and their alloys the list has included various corrosion resistant steels (stainless steel), chrome/cobalt alloys, notably *Vitallium*. The transitional metals tantalum and titanium were found to be particularly inert in the tissue environment. In 1940 Bothe *et al.*⁵ noted the lack of a tissue response to commercially

⁵ R T Bothe, L E Beaton and H A Davenport, Reaction of bone to multiple metallic implants, *Surgery, Gynecology and Obstetrics* 1940; 71: 598-602.

pure titanium, when implanted in the femur of cats. They stated, somewhat prophetically, "Titanium was as well tolerated as vitallium and stainless steel, perhaps better in that bone had a tendency to grow into contact with it."

Figure 3 (A) diagrammatic representation of the relationship of an implant and artificial crown to bone and soft tissue;⁶ (B) radiograph of implant for the replacement of an upper right second incisor



Titanium

Titanium, one of the most abundant metals in the earth's crust, was first identified by the Rev Gregor in 1791⁷ in combination with iron. It was found as a black magnetic sand (ilmanite) in the leat of Tregonwell Mill at Menaccan, Cornwall. However Gregor was not able to separate, what he recognised as a new element, from the iron. It was not until 1910 that Hunter succeeded in producing a 99.9% pure form of the metal. The technique was further refined in 1940 by the Kroll method and this led to commercially pure titanium became generally available. The use of titanium is now widespread. As a constituent of various alloys applications vary from the aerospace industries, desalination plants, sports equipment and any situations where strength and corrosion resistance is important. It has more recently claimed a role in the

⁶ P I Brånemark, K Gröndahl, B K Brånemark, 'How Human Applications Began', in: P I Brånemark, *The Osseointegration Book: From Calvarium to Calcaneus*, Quintessenz Verlags-GmbH, Berlin, 2005.

⁷ W Gregor, Beobachtungen und Versuche über den Manakanite Sand [Observations and experiments on the Manakanite sand], *Crell's Chemische Annalen* 1791; 15: 40-54, 103-119.

art of jewellery. Titanium dioxide is white and it is used extensively in the production of paints and paper as well as medicinal products.

Titanium as a prosthetic implant material

The development of a reliable and predictable system for providing support for prostheses using titanium as a dental implant material, were recognised by Brånemark and his team. The landmark dates in this progress are shown in Table 1.

Table 1 Significant dates in the development by Brånemark and his team of a dental implant system.

1956	Study of Microcirculation in soft tissue and bone
1960	Tissue integrated prostheses experiments
1965	Osseointegration in dentistry
1977	Treatment of Maxillofacial defects
1987	Orthopaedic applications

Avoiding thermal trauma to bone

As referred to above one of the most crucial concepts in the whole implant procedure as used today was verified by Eriksson.⁸ In his thesis, using elegant experiments, he quantifying the risks of inflicting thermal trauma when drilling cortical bone. He showed that bone temperatures adjacent to the drill when allowed to exceed 44°C were inevitably detrimental to the healing processes of bone and therefore to osseointegration. Techniques to overcome the generation of heat when drilling bone were developed by the team and incorporated into the system.

⁸ R A Eriksson, thesis, University of Göteborg, Sweden, 1984.

Table 2 Summary of findings in Eriksson's thesis

38° C	Thermal trauma for less than one minute causes minimal damage and allows normal healing.
40° C	
42° C	
44° C	
46° C	Thermal trauma for more than one minute causes long-term damage & bone necrosis.
48° C	
50° C	

Adaptation of bone to functional stress and strain

Wolff's Law:

It is important to appreciate the ability that bone has to respond to the presence of functional loads, whether the result of a fracture or the placing of a dental implants.

Julius Wolff⁹ (1836-1902) had shown in 1892, prior to the clinical use of x-rays, that mechanical stress in bone was responsible for determining the architecture of both cortical and cancellous bone. He also showed that bone has the ability to adapt itself so as to provide support following a fracture, even when the components are not aligned (Fig 4).

Picton and Moss¹⁰ demonstrate that mineralized bone support for the teeth of a monkey was very much greater when the teeth were in function than when they were not in functional occlusion. Figure 5 is from unpublished work from the same study.

⁹ J Wolff, *Das Gesetz der Transformation der Knochen*, Berlin: A Hirschwald, 1892; English translation by P Maquet and R Furlong is *The law of bone remodeling*, Berlin: Springer-verlag, 1986.

¹⁰ Dennis C A Picton and Jim Moss, Experimental mesial drift in adult monkeys (*Macaca Irus*), *Archs oral Biol* 1967; 12: 1313-1320.

Figure 4

A: macroscopic view of tibia and fibula following an unreduced fracture of both bones
 B: longitudinal ground section of a similar specimen to A showing the architecture



From the work of Picton and Moss, as well as that of Wolff, it is reasonable to conclude that dental implants indeed stimulate osseogenesis. This stimulation has not only been found close to the interface with the bone but also at more distant sites to which stress has been transferred. An important consequence of this phenomenon is that dental implants do not therefore have to be loaded axially, as it was initially believed.

Figure 5 Low powered magnification of two cross sections through maxilla of a monkey.

A: well mineralized bone supporting the roots of the teeth where opposing teeth present and in functional occlusion.
 B: similar section when the teeth had been out of occlusion 32 weeks previously.



Orthopaedic applications¹¹

In spite of initial scepticism in relation to the phenomenon of osseointegration, it is now well recognised by orthopaedic surgeons that there are many applications for this technique beyond prosthetic craniofacial reconstructions. The technique can be used in providing support for the prosthetic replacement of lost limbs or digits (Fig 6). Moreover there is now clear evidence that there can be a sense of touch from prosthetic devices to the brain (osseoperception).¹²

¹¹ K Hagberg, 'Physiotherapy for patients having a trans-femoral amputation', in P I Brånemark, *op cit.*, fn. 6.

¹² P I Brånemark *et al.*, *Osseoperception and musculo-skeletal function*, Göteborg: Elixir Reklambyrå, 1999.

Figure 6 The rehabilitation of lower limb amputees¹³

The contribution to reconstructive surgery using osseointegrated implants and the original identification of the element titanium are commemorated on a plaque at Tregonwell Mill, Manaccan, Cornwall (Fig 7). Professor Brånemark unveiled the plaque on 2 April 1992 as part of an international meeting recorded by the author in *The Osseointegration Book*.¹⁴

Conclusion

It was Brånemark's outstanding fundamental research work, over many years, which led to the successful implanting of an artificial tooth, permanently into the jawbone. The integrity with which the laboratory and clinical research was conducted is an inspiration to all those who are responsible for developing new techniques.¹⁵

¹³ P I Brånemark, K Gröndahl and B K Brånemark, 'How human applications began', in P I Brånemark, op cit., fn. 6.

¹⁴ R B Johns, Chapter 2 in P I Brånemark, op cit., fn. 6.

Figure 7 The commemorative plaque at Tregonwell Mill, unveiled 9 April 2002

"This titanium plaque commemorates the identification

of the metal menachanite, later called titanium, by the Reverend William Gregor

in the leat of Tregonwell Mill,

in the Parish of Menaccan in Menage in 1791

It also acknowledges

the work of

Professor Per-Ingvar Brånemark. MD., PhD., of Göteborg, Sweden,

Valediction: professional responsibilities

For those who use dental implants as a part of their armamentarium in restorative dentistry, there are two inalienable responsibilities when replace missing teeth. First, the scientific evidence on which any implant system the dentist elects to use is both valid and that it has been subjected to peer review in reputable publications. Secondly, however attractive the use of an implant system may be to the dentist, it should only be used as part of an overall treatment strategy which is in the best long-term interests of the patient.

Quintessenz Verlags-GmbH have given their permission for the reproduction of Figures 3 and 6 in this article, as they appeared in *The Osseointegration Book: From Calvarium to Calcaneus*, ISBN:1-85097-090-4, published by Quintessenz Verlags-GmbH, Berlin 2005.

This article and the lecture on which it is based are the last professional contributions the author intends to make.

THE IMPORTANCE OF BOOKS*

Geoff Garnett[†]

Introduction

Many people will agree that with the universal introduction of computers, search engines and the internet, over the last ten to twenty years, we are taking part - willingly or unwillingly - in a paradigm shift in the way mankind communicates and stores information. The paper therefore discusses some of the books with which we are familiar and sets them in their own context in the light of these opening remarks.¹ At the Lindsay Society meeting I was able to share with members some of the books in my collection (Fig 1).

Figure 1 Members examining books at the Lindsay Society meeting



* Based on a lecture and demonstration to the Lindsay Society for the History of Dentistry, 5 October 2008.

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¹ Some of the inspiration for this lecture came from a book by Maryanne Wolf, a leading American cognitive neuro-scientist, *Proust and the squid. The story and science of the reading brain*, Cambridge: Icon Books, 2008.

Let us postulate that mankind as a species with which we are familiar has been around for 50,000 years. I am not able to say how long we have communicated with each other by means of speech. However we do know that recording numbers for means of exchange and barter goes back perhaps 6,000 years, and a type of script for recording the history of a people or community perhaps 5,000 years. Most histories and sagas were however committed to memory and passed orally from generation to generation. A big change occurred about 3,000 years ago with the development of an alphabet from which all words could be assembled. This enabled stories and information to be written down and conserved.

Socrates himself deplored this development. He believed that wisdom and information were better stored and pondered within the mind and memory rather than being inscribed on tablets of clay. Thankfully Plato, his pupil, must have disagreed because he recorded his master's words for posterity. Since that time, books and their equivalent have been the norm. As a result our brains, ever adaptable, developed the function of reading and then a little later of writing.

Of course the education of a minority group was essential for the development of these new skills, both at the court of a nation's leaders, in its law courts and in that alternative hierarchy, the Church. Books stored the information and recorded the history and the stories. However due to the expense of production and their rarity they were a powerful resource reserved for the few. Learning to read was the doorway to a life at court or in the cloister and must have seemed very desirable to the young who had ambition.

To give perhaps a typical example, *The Book of Kells* is an 8th possibly 9th century production of the Four Gospels in Latin.² It currently has 340 folios (ie 680 pages). Originally it had about 380 folios quite large, all made of calf vellum. I don't know how many folios of vellum can be obtained from a single calf, but I suspect not many. One wonders how many calves were required to produce this rather magnificent book.

The nearest thing in my collection is a single folio on vellum from an 11th century bible manuscript.³ German in origin it is the

² *The Book of Kells*. reproductions from the Manuscript in Trinity College Dublin, London: Thames and Hudson, 1974.

³ Bible leaf on Vellum, *Hosea*, Chapter I, Germany, c 1100.

opening page of the Book of the Prophet Hosea. For 2000 years this was how books were produced, hand-written and then stitched together by hand. It is obvious that books were rare and precious objects until a paradigm shift which commenced in 1456. By the standards of the time the invention of a moveable and reusable type-face by Gutenberg at Mainz in Germany heralded the era of mass production.

Caxton, the first to print texts in London, learnt the craft of printing in Cologne. Most early books were of a religious nature and published in Latin. The press in Cologne dated from 1465. Caxton was unusual in that he wanted to print in English. He made his own translation of the *History of Troy* and went ahead with printing it in Bruges in 1473. The other book he printed there was the *Game of Chess*. Caxton opened his Westminster Press in 1477. In turn he was succeeded by his assistant, Wynkyn de Worde. I showed a single folio from the Wynkyn de Worde Press in the early 1500s.⁴ It is worth noting the quality of both manuscript and early printed page, both remarkable for their dignity and style.

Incunabula, the word signifies the early stages of anything, usually refers to these early books. An incunabulum is any book published prior to 1501. They are very valuable and much sought after by collectors. I have one, a very humble example but nevertheless worth some £500. It is *Augustinus De Fide ad Petrum Diaconum Coloniae*, 1473.⁵ The brief notes on the inside cover indicate that it is not in the British Museum.

Printing presses developed all over Europe, some in Paris, Plantin in Antwerp. Perhaps the most prolific at producing the classical texts was the Aldus Press in Venice, noted for their symbol or logo of a dolphin and anchor. This is an interesting book. It is bound in vellum and bears the arms of the Honourable George Fortescue, a tiny crescent moon indicating that he is the second son. It was published in Venice in 1559 by Aldus Manutium. Its italic typeface was invented at the Aldus Press: referred to as *italics*, as from Italy. The title is *De Bello Gallico* by

a certain Julius Caesar.⁶ How many readers have laboured over these very Commentaries in school Latin classes?

A slight digression.

In London in 1963 there was a large International Printing Exhibition (IPEX). It was agreed there would be a subsidiary exhibition of the most important books published in the development of our Western Civilization. All the great collectors, the Queen included, and libraries joined in to make it a very noteworthy exhibition. A catalogue was produced, followed by a book used by all the dealers and auction houses: *Printing and the Mind of Man*.⁷ It has 424 entries. The second edition (Fig 2, shown at the lecture) has useful notes on all the books cited; and the dealers use the sign PMM and the number to refer to any particular book. PMM1 is *The Bible in Latin*.⁸ The last entry is PMM 424, *The Lion's Voice*, a speech in the House of Commons by Winston Leonard Spencer Churchill, 20 August 1940.

Returning to the early 16th century, power rested in the hands of kings and emperors. Even more power lay with the Pope and the Christian Church. The Bible, the so called fount of all authority, was mostly in Latin, Greek or Hebrew, so all religion and belief could only be accessed through the Church. Tyndale, Coverdale and others in this country pressed for a Bible in English and thus accessible to all who took the trouble to learn to read.

After several false starts, executions, burnings, the King's Trouble over his marriage, the Dissolution of the Monasteries and the Declaration of a Church of England whose head was the monarch, the Great Bible was produced. The King himself decreed that it should be placed in every parish Church in the land.

The *Great Bible in English* 6th edition 1541⁹ (the first was 1539) was exhibited at the exhibition. Thomas Cromwell, the King's Vice Regent, ordered the clergy that it "be set up in some convenient place within the said church that ye have cure of, where as your parishioners may most commodiously resort to the same and read

⁴ Wynkyn de Worde, *Lyf of the Seven Sleepers*, Single page Westminster Press, c 1510.

⁵ Liber Sancti augustini ad petrum diaconem de fide, Coloniae, 1473.

⁶ Pauli Manutii (ed) *Caesar's Commentariorum de bello Gallico etc.*, Aldus Venetiis, 1559.

⁷ *Printing and the Mind of Man*, Munchen: Carter and Muir Karl Pressler, 2nd ed, 1983.

⁸ PMM1, *The Bible in Latin*, Johann Gutenberg, Johann Fust and Peter Schoeffer, Mainz, c 1455.

⁹ *Great Bible in English*, Darlow and Moule 62, 6th ed, 1541.

it". This copy of 1541 is much sought after: it has Cranmer's Arms and Cromwell's Arms defaced. Thomas Cromwell had by now been executed. It is interesting to note that the Apocrypha is present. It is published in a Gothic or Black Letter typeface and there are no verse numbers. Verse numbers were introduced in the Geneva Version of 1560. The Geneva Bible was also the first version to use Roman Typeface.

Figure 2 Dr Garnett holding the second edition of *Printing and the Mind of Man*



Other seminal works of the 16th Century were the *Book of Common Prayer* of 1549 and revised in 1552, and Foxe's *Book of Martyrs*¹⁰ (some consider this to be the forerunner of our national antipathy to all things European). It was a period when Puritans and Presbyterians were in the ascendant and was to lead to the publication in 1611 of the *Authorised Version* 1611 of the Bible; perhaps the only book to be successfully translated by a committee.

The Roman Catholic Church responded to the Protestant Reformation in all Europe with the Council of Trent 1545-1563. The Council's legacy was the Tridentine Mass, an order of service still capable of causing strong controversy.¹¹ The Calendar of Festivals at the front of the book demonstrates graphically the meaning of Red Letter Days.

The reaction to Puritanism came in the reign of Charles I. The sound-bite of the day was "No Bishop, No King". Archbishop Laud attempted to re-introduce the Prayer Book. Where better to do it than in the heart of Calvinistic Scotland where Presbyterianism was in the ascendant. St Giles Cathedral was the place chosen

¹⁰ Foxe's *Book of Martyrs*, 3rd ed, 1576.

¹¹ The copy shown at the lecture was produced by the Plantin Press in Antwerp in 1598.

for the launch of the new *Book of Common Prayer for Scotland* 1637.¹² Rent-a-mob were on hand and the service ended in tumult. It was to be the beginning of Civil Strife throughout the Kingdom.

Later Oliver Cromwell banned the Prayer Book and the *Directory for the Public Worship of God*¹³ was introduced, a very slight and mean-spirited publication, though another very rare book, *The Restoration of the Monarchy* occurred in 1660.¹⁴ The *Prayer Book for the Public Worship of God for use in the Church of England* followed in 1662¹⁵, and is still in use to this very day.

The 17th century

The Royal Society was founded in Charles II's reign and the books in PMM begin to reflect the scientific new age. Galileo 1610, Napier on Logarithms, Harvey on Modern Physiology, Robert Boyle on Gases, Isaac Newton on Gravity, Huygens on the Pendulum Clock etc.

In 1728 we find PMM 186, Pierre Fauchard (1678-1761), *Le Chirurgien Dentiste*, 2vols, Paris.¹⁶ Fauchard's disciples, Lemaire and Gardette, introduced French dental expertise into the USA while serving under Lafayette and Rochambeau. They served with the French expeditionary force which supported the Americans in their War of Independence. Perhaps those followers of Fauchard are the reason that for so long American dentistry was pre-eminent. Lilian Lindsay was the first to translate Fauchard into English in 1946. She describes the book as having held the first position among dental literature for over two centuries. Her translation, sponsored by the Representative Board and Council of the BDA is from the second edition of 1746.

It would be remiss of me not to mention two books solely on dentistry which pre-date the Fauchard. In 1530 *Zene Artzney* was

¹² *Book of Common Prayer for the use of the Church of Scotland*, Edinburgh, 1637.

¹³ *A Directory for the Publique Worship of God throughout the Three Kingdomes of England, Ireland and Scotland*, London: Die Jovis martii, 1644.

¹⁴ *Classics of Dentistry*, 1981.

¹⁵ *Book of Common Prayer for the use of the Church of England*, London, 1662.

¹⁶ *Le Chirurgien Dentiste ou Traité des Dents*, Pierre Fauchard, being a facsimile of the 1746 French edition, together with the Lindsay translation of 1946, Birmingham, Alabama: Classics of Dentistry, 1980, 2 volumes.

published by Michael Blum of Leipzig.¹⁷ A book of 44 pages it ran to 14 editions over the next 46 years. It is estimated that some 8,000 copies were produced. It is in German, Black Letter of course, and is a practical treatise on the care of teeth, drawing on the previous writings of Pliny, Celsus, Avicenna, Mesue and Vigo.

The first dental text in English was Charles Allen's *The Operator for the Teeth* 1685 York, 1686 Dublin and 1687 London.¹⁸ Lillian Lindsay edited a copy in 1924 and a reprint was produced by R A Cohen in 1969. Cohen's detailed introduction to this work is in the *Selected Papers of R A Cohen*, Lindsay Society 1997.

The Classics of Dentistry Library

Published by Leslie B Adams of Gryphon Editions, Alabama, this venture commenced in 1979 and continued for at least ten years. It then seemed merge into the Classics of Medicine Library. They did manage to re-issue some beautiful leather bound facsimiles of some of our really important dental texts. In my possession are copies of Fauchard, Hurlock, Berdmore, Miller, Harris, Black, Magitot, Kingsley, Fox, De Chemant, Tomes and Hunter's *Natural History of the Human Teeth*¹⁹ together with *A Practical Treatise on the Diseases Of the Teeth*, 1778, all truly magnificent books.

The 19th century

The Darwin-Wallace papers on Natural Selection were presented to the Linnean Society on 1 July 1858 under the presidency of Thomas Bell, our dental representative. Darwin's *On the Origin of Species* was published in London in 1859 (PMM 344). The century previous had seen the scientific establishment consumed by the problem of species. How to define them, did they change, and if so what was the mechanism of change? In pursuing this problem, the durability of jaws and teeth and the

¹⁷ *Zene Artzney*, being a facsimile of the 1st edition of 1530 together with an English translation of the 4th edition of 1541.

¹⁸ Charles Allen, *The Operator for the Teeth*, 1685. facsimile with a new Introduction by R A Cohen, London: Dawsons of Pall Mall, 1969.

¹⁹ John Hunter, *The Natural History of the Human Teeth and A Practical Treatise on the Diseases of the Teeth*, 2nd ed, London, 1778, reproduced in Facsimile Classics of Dentistry, 1979.

method of mastication were regarded as of prime importance. Two books of the period are outstanding. First, John Hunter's *Natural History of the Teeth*, backed by his then un-rivalled knowledge of Comparative Anatomy. Second must be Richard Owen's monumental work, *Odontology* 1840-1845.²⁰ It studies the morphology of jaw and tooth structure, and the microscopic appearance of the teeth, in living animals and in fossils.

Books such as these were a reflection on the then importance of species definition and the study of comparative anatomy. Comparative dental anatomy was for many years a staple of the pre-clinical dental curriculum. Sadly this is no longer the case. With my respects to Hunter and Owen I demonstrated to the Lindsay Society meeting two animal skulls for identification and comments (Fig 3). The first was a stoat prepared by myself; the second might have been a juvenile badger. The late Henry Noble still referred to Owen's *Odontology* when presented with jaw and tooth identification problems such as these.

In similar vein one of John Tomes's great works was the discovery of his eponymous fibrils of the dentine. The whole paper on the subject is reproduced in Zachary Cope's biography of Tomes. This paper was published in 1856. By then Tomes had already made his mark as a teacher. A series of lectures was advertised in the *Medical Gazette* on 1 October 1845: "Mr Tomes Dentist to the Hospital (Middlesex), will lecture on Mondays at four o'clock on Diseases and Operations on the Teeth. The course - one guinea." The course of sixteen lectures was revised and issued in book form in 1848.²¹ Were they popular lectures? On one occasion Tomes issued a note to the effect that he would not consent to lecture unless more than six persons were attending.

The dental reforms

Tomes's other great contribution was of course dental reform and the establishment of a true professional standing for dentists and the art of dentistry. The intricacy and Machiavellian nature of these reforms was for ever preserved by Alfred Hill's 1877 *History*

²⁰ Richard Owen FRS, *Odontology or a Treatise on the Comparative Anatomy of the Teeth*, London, 1840-1845, 2 vols.

²¹ John Tomes, *A Course of Lectures on Dental Physiology and Surgery*, London, 1848.

of the Reform Movement of the Dental Profession during the last twenty years.²²

Figure 3 Skulls of a stoat prepared by Dr Garnett plus possibly a juvenile badger



The first of the reforms was the introduction of the LDS by the Royal College of Surgeons of England in 1860. The culmination was the Dentist's Act of 1878 and the publication by the General Medical Council of the Dentist's Register in 1879.²³ The copy I showed is

interesting. Beautifully rebound it belonged to Archie Donaldson. Before him it had been presented and inscribed to Leslie Godden on his retirement in 1968 by none other than J Menzies Campbell, in his day the doyen of dental historians. Godden (1953-1968) and then Donaldson (1968-1979) were both editors of the *British Dental Journal*. I have not yet presumed to put my signature in the book.

Part and parcel of being a professional gentleman in those days was the opportunity it gave to join learned societies such as The Royal Society, the Linnean Society, the Zoological Society and the Ray Society. Thomas Bell was a fellow or member of them all. Eventually, of course, an Odontological Society of London (later of Great Britain) was founded in 1856. A learned society needs a record of its transactions and proceedings and so it was with the Odontological Society. The first volume of its *Transactions*²⁴ was published in London in 1856/57. Some fascinating topics are covered in the early series. It is also a great personal record. There are some portraits of the great and the good in later issues.

²² Alfred Hill, *The History of the Reform Movement in the Dental Profession in Great Britain*, London, 1877.

²³ *The Dentists Register and An Act to Amend the Law relating to Dental Practitioners*, London: General Medical Council, 1879.

²⁴ *Transactions of the Odontological Society of London 1856-57*, London: John Churchill, 1858.

Of great value is the membership list, when they are proposed for membership and by whom, and a record also of their qualifications. Which demonstrates the greater *éclat*, Saunders with his 'dentist to HM the Queen and Prince Consort' or Tomes with no medical or dental qualification, just a simple FRS after his name?

The 20th century

Coming to the last century, I find it difficult to judge which are the most significant books for our profession. Two that come to mind are the perhaps forgotten *Acrylic Resins in Dentistry* by John Osborne²⁵ and *Parodontal Disease* by E Wilfred Fish.²⁶ And perhaps *The Advance of the Dental Profession* edited by R A Cohen.²⁷ as a reference book.

The decision for you must be yours. Perhaps the day of the book for the storage of information and dissemination of knowledge is coming to a close, the role to be taken over by computers. Books of the future may well be for pleasure and entertainment only.

Acknowledgements

I would like to thank Franco Sanna for kindly producing some of the photographs.

²⁵ John Osborne, *Acrylic Resins in Dentistry*, Oxford: Blackwell, 1943.

²⁶ E Wilfred Fish, *Parodontal Disease. A Manual of Treatment and an Atlas of Pathology*, London: Eyre and Spottiswoode, 1944.

²⁷ R A Cohen (ed) *The Advance of the Dental Profession. A Centenary History, 1880-1980*, London: British Dental Association, 1979.

BIRMINGHAM DENTAL HOSPITAL'S 150TH ANNIVERSARY*

Peter Rock*

One hundred and fifty years is a long time. In preparing this paper I am grateful to the late Ronald Cohen for his scholarly work.¹

The story begins on Friday 18 December 1857 when a committee of eight men met in Birmingham. Their purpose was to consider setting up an organisation to be called the Birmingham Dental Dispensary: to give "gratuitous advice and assistance to the poor, in all cases of diseases of the teeth". There already is a lesson for us, how changing and less tolerant times alter the implied meaning of formerly honest words. Then gratuitous meant free of charge. Now, more often, the word is used in its other meaning of 'uncalled for'; for example a gratuitous insult.

The Dispensary was to provide services including the operations of extracting, stopping, scaling and the regulation of children's teeth, the importance of orthodontics being recognised from the outset. Opening hours were from nine until ten o'clock on Tuesday, Thursday and Saturday mornings, although it is probable that these times were for registration and initial examination.

The inspiration came from a 27-year-old dentist Samuel Adams Parker. Parker had worked with John Tomes in the out-patient department at the Middlesex Hospital and seen the effects of dental neglect on the general health of patients. The committee elected him "dentist", not "a dentist" or "the dentist", merely "dentist". Samuel's father was a well-connected surgeon in the city and his influence persuaded important men to join the committee. Birmingham's Victorian city fathers could, and indeed did, 'move mountains'. After all they flooded an area of Wales to ensure the city's water supply, which was fluoridated in 1964 by the joint action of the city council and the health authorities. In the 1980s the fluoridated area was extended to cover the whole of the West

* Based on a talk at a dinner to celebrate the 150th anniversary of the Birmingham Dental Hospital at Birmingham Council House on 7th November 2007.

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¹ Ronald A Cohen, *The history of the Birmingham Dental Hospital and Dental School 1858-1958*, Birmingham: Board of Governors of the United Birmingham Hospitals, 1958.

Midlands, a population of five and a half million people. At that time I was proud to serve under chairman John Charlton, as academic representative on the Fluoridation Action Group of the old West Midlands Regional Health Authority. What a struggle we had. I never became used to the necessary appearances on prime time TV.

But back to the 1800s. The project must have moved with great speed since it is generally accepted that the Birmingham Dental Dispensary opened on 1 January 1858, less than a fortnight after the first meeting. What a pity the same type of men and similar circumstances do not apply to present day projects. The original Birmingham hospital beat by 11 months the Dental Hospital of London,² which opened in December 1858, thus earning its title as the oldest in the country.

The Dispensary opened at 13 Temple Street, a site shared with the *Birmingham Times* newspaper and the Birmingham Building Society. By the end of August 350 patients had been treated; there were 104 stoppings, 25 scalings, 269 extractions and 22 various other cases. One shudders to think what they were. In 1859 the name was changed to "The Birmingham and Midland Dispensary for Diseases of the Teeth". "And School" might have appeared somewhere, since pupils were accepted almost from the beginning. An advertisement of 1862 lists the fees for dental pupils at five guineas, for medical pupils the fee was two guineas. The Dispensary depended upon donations for its funding and money was a constant problem in the early days (so no different really from today). In 1863 the committee were strongly attacked in a Birmingham newspaper for excessive expenditure on advertising. Perhaps the accusation had some merit, since the accounts show that 5/12ths of the entire expenditure was spent on printing and advertising. The editor offered to run the adverts without charge.

Despite early financial difficulties the Dispensary continued to develop. After a spell when it shared 2 Upper Priory with the Homeopathic Hospital, in 1871 it moved to larger premises at 9 Broad Street. The name was changed to The Birmingham Dental Hospital and Charles Sims, another of our founding fathers, joined the staff. In 1873 Samuel Adams Parker resigned; according to Cohen this may have been due to ill-health and the death of his father, to whom he was greatly attached. Parker was elected consultant dental surgeon. Perhaps once he became a consultant he stopped treating patients and started to tell everyone else what to do: now there is a novelty!

² In 1901 became the Royal Dental Hospital.

In 1874, 7,036 patients were treated, but the hospital continued to survive only due to legacies and non-recurrent donations. The 1876 AGM was chaired by Alderman Joseph Chamberlain, who had achieved great renown as the reforming Lord Mayor of Birmingham. Chamberlain pointed out that it was up to small charities to convince the public that their existence was necessary. In order to legitimise the hospital Sims suggested obtaining recognition from the Royal College of Surgeons.

Medical education in Birmingham at that time was provided at Queen's College in Bath Row and at the associated Queen's Hospital. Following the passing of the first Dentists Act in 1878 a committee was set up to consider admitting dental students to Queen's College. A structured course was developed and this was recognised by the Royal College of Surgeons of England. In 1881 the first fully fledged students were enrolled and according to Cohen³, the history of the Hospital became so closely associated with that of the School that it is impossible to record one alone. The fee for the dental course was 75 guineas (25 to the Dental Hospital, 20 to the Clinical Board and 30 to Queen's College). Three professors were elected: Thomas Howkins to Dental Surgery and Pathology; F R Batchelor to Dental Anatomy and Physiology; and Charles Sims to Dental Mechanics.

In March 1882 the hospital moved to premises leased at 71 Newhall Street, (Fig 1). Administrative and financial difficulties led to problems between Queen's College and the Dental Hospital. In an attempt to resolve them a Dental Board was formed, headed by Charles Sims and John Humphreys. So great was the clash of personalities that for a time the College considered moving dental training away from the hospital.

Twentieth century changes

In 1892 an amalgamation of Queen's College and Mason's College was proposed. This union received its charter in 1900 as the University of Birmingham, the first in the United Kingdom to grant dental degrees. A site for a new dental hospital was secured at the corner of Great Charles Street and Church Street and plans were prepared. Unfortunately a public appeal for funds in 1901 was unsuccessful and the site had to be abandoned in favour of a smaller one lower down Great Charles Street, on the opposite side of the road. The new hospital was opened there on 6 July 1905 by Oliver Lodge, vice-chancellor of the University. It had a working life of 59 years and 6 months and was my 'home' for the last three and a half years of that time (Fig 2). The cost

³ Cohen, op cit., fn. 1.

was £10,000, including equipment, of which £1,100 was donated by the staff. If a new hospital were to be built today at a cost of say £60 million, the present staff would be required to donate around £7 million, an unlikely scenario.

Figure 1 A clinic in the Newhall Street hospital c 1900



Figure 2 The staff entrance to the Great Charles Street hospital, showing the caretaker's house. The hospital resembles slum property! The "temporary huts" are on the right.



The years after World War I were difficult for the hospital, partly due to a shortage of patients. In 1920, for example, 49 students were attempting to treat a daily average of 6 conservation and 9 anaesthetic cases.

The patients must have been very intensively treated!

In 1935 Humphrey Humphreys was appointed as professor of dental surgery. He was later vice-chancellor of the University, one of two dentists to hold that office. The next year Humphreys persuaded Frank Stammers to start a periodontal department, the first outside London. The new Medical School, which opened in 1938, (Fig 3) incorporated a large preclinical dental department. Plans were drawn up to erect a new Dental Hospital close by. Hitler put an end to that! He also targeted the Great Charles Street hospital; the fire bombs missed but destroyed the building next door. In 1950 the hospital expanded into temporary huts on the derelict site and premises in Barwick Street were added to accommodate orthodontics and operative techniques. This was the Dental Hospital to which I came in 1960.

Figure 3 King George and Queen Elizabeth at the opening of the new medical school



I was interviewed by 'JO', Professor John Osborne. This kindly man is remembered by the Osborne Room at the present hospital and as the author of a series of textbooks: *Full Dentures by Osborne*; *Partial*

Dentures by Osborne and Lammie; and *'Partial Lammies' by Osborne and Denture*.⁴ Arnold Franks, former consultant in prosthetics, once told me of going to see JO, who was working on one of the endless revisions to his books. He raised his eyes wearily from his notes: "You know Arnold, this sort of thing gives you a pain in the tits."

We spent much of the first two years of the course at the Medical School, peering down microscopes, dissecting cadavers from the outside in and then the inside out and studying biochemistry under Professor W Veale Thorpe. It was said that if the Medical School caught fire he would rush back in to rescue a Winchester Quart of urine.

Then began the mechanics course, where we learned comprehensive metal-working skills. I became proficient at soldering and have since plumbed entire houses. I also learned how to assemble what our instructor Harold Harcourt called 'Fulluplowers'. This involved taking plastic teeth out of packets and grinding them flat before mounting them into wax dentures. Every set was Class 3 with no overbite. The creation of such malocclusions gave me an interest into how such conditions might be corrected. I still don't know!

At the beginning of the third year we began to spend more time at the Dental Hospital, beginning with junior operative techniques in Barwick Street. In the basement was Groom's Grotto, run by a remarkable WRVS⁵ lady, Mrs Groom. She had lived through the Second World War and was then preparing for nuclear war, which in the 1960s was a constant threat. In her mind's eye her basement was a nuclear bunker and she gave us lectures on survival. We would have lived on sardines. She was not a figure of fun: I remain convinced we would have pulled through under her watchful care.

Once Ralph Grundy, then senior lecturer in conservative dentistry, judged us competent we were let loose on the unsuspecting public at Great Charles Street. The hospital was on a narrow frontage but went back a long way. The main conservation rooms, 6, 7 and 8, were on the second floor. In the days before 'sit-down' dentistry we stood at our units to work. The waiting room was a bench along the back wall. It was dental surgery with a capital S and there always seemed to be blood about. Cross infection had not been invented and no-one ever wore gloves. We thought that we were sterilising our instruments when we boiled them in two large tanks of murky water. It was better not to leave them in too long or they burnt your hands when they were taken out. I began to plan for my retirement by filling my girlfriend's mouth with

⁴ ? Ray R Lowry, 'Incidentals' Christmas Revue, c1971.

⁵ Women's Royal Voluntary Service.

as much gold as I could; 46 years later it is still there untouched. I have noticed the same girl looking at me nervously during the present financial crisis.

The St Mary's Row hospital was very much the brainchild of Professor Alexander MacGregor, Director of Dental Studies. He had travelled the world, studying the designs of dental hospitals and worked with Bryants on the design of his new one. He supervised the building project closely, aided by commissioning officer John Ruch and his PA Pauline Harrington (Fig 4). MacGregor died suddenly in the spring of 1965 and it is said that the effort was contributory. The move to St Mary's Row had been planned for the end of the 1964 summer term. In anticipation a group of us spent a day knocking down the wall at Great Charles Street that separated male and female common rooms. Sledge-hammers and chisels had been smuggled in and no-one interfered, thinking we must be workmen. Late in the afternoon Professor David Shovelton peered laconically into the dust and observed, "You had better clear up a bit, the move is delayed." For the autumn term we sat on piles of bricks.

Figure 4 The new hospital in the final stages of construction, Queensway is incomplete.



The new hospital opened partly in November 1964; and fully with the transfer of the School, on 1 January 1965, (Fig 5). I was one of the first six house surgeons. Gordon Mitchell was the superintendant. His relaxed style belied a keen mind. On our first day he called us

into his office: "Some of our patients and the dentists who refer them will be demanding or disturbed. They may upset you: do your best and I will always support you." That was management skill.

The Dental Hospital was administratively part of the United Birmingham Hospitals Group, which included Birmingham General, the Queen Elizabeth and the Children's Hospitals. It was a good

arrangement since we were part of the wider medical services in the city, with friends in every major hospital. The General in particular seemed to be an extension of the Dental and as a student I spent a lot of time there. Wards 15 and 16 were dental wards, shared with the Ear, Nose and Throat department. The dental consultant was Dr Reginald Tavenner, known to all as 'Tav'. He was a tall patrician figure with the catch-phrase "Don't use force!" Tav recalled the days when haemophiliacs were treated by "sending a fast runner up to Lewis's basement for some fatty bacon to be sutured over the bleeding sockets".

Figure 5 A clinic in the new hospital. Note the roller towel. Cross infection control was undeveloped.



People often ask if the old days were better. I don't know; they were certainly different, more fun perhaps. The Brummies⁶ of my youth were a tough lot and on the whole accepted suffering meekly. However Colin Brady, formerly consultant in

oral and maxillofacial surgery at Wordesley Hospital recalls one burly man who responded to the early stages of anaesthesia, and presumably an unfortunate degree of hypoxia, by rising to his feet and crashing around the gas room, with the chair strapped to his back like the carapace of a giant turtle. I expect that the anaesthetist pursued him, spraying him from head to foot with ethyl chloride; EC on the throat pack being a technique used at the time to deepen the anaesthetic in a resistant patient.

Acute Ulcerative Gingivitis was a popular diagnosis in the 1960s. To treat AUG we painted the gums with orange chromic acid followed by hydrogen peroxide. The result was an explosion of black foam which burst from the mouth, rather like ectoplasm in a horror film. When the mouth was opened, the gums had gone. It is unfair to scoff too much and dangerous hubris to believe that present treatment methods are the

⁶ Affectionate name for people living in Birmingham.

ultimate. Certainly colleagues now in mid career will look back and say of some present treatments: "Did we really do that to our patients?"

Finally, what of the pioneers? Samuel Adams Parker is commemorated by a plaque outside the Alexander MacGregor Lecture theatre, one of the few pieces of Great Charles Street to survive the move. He was badly hit by the death of his father, never married and died a sad and lonely man.

Charles Sims lives on in his great-great grandson Maurice, who qualified in 2005. Maurice inherited enough of his ancestor's genes to become a highly competent operator. I should know; he treated me in his final year with style and panache, making crowns and fitting them without a hitch. Obviously they *can* still do it.

The future

We can only believe that the future is bright and that one day I may get to see another new hospital, near to the University. But actually, the site of the hospital doesn't really matter. As Julia Roberts says to Richard Gere in the film 'Pretty Woman', "That's just geography." The hospital is its staff and students. Expertise at the Dental Hospital provides treatment for patients whom no-one else can manage. So often it is the referral of last resort. I am proud to have been a part of it and to have worked with such splendid colleagues.

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GEORGES PAULIN (1902-1942): LEGENDARY DENTIST AND RESISTANCE HERO

Xavier Riaud*

A modest childhood: brilliant studies

From time to time it is good to remember dentists for their heroism rather than their dental expertise. Georges Paulin (Fig 1) was one such person. Paulin was born in Paris in 1902. Coming from a humble background he was a gifted child who soon became bored in school. Very early he showed outstanding drawing skills. In 1918, his mother was killed during a bombing raid on Paris. He would never fully get over it.

At the age of fourteen years Paulin became a dental technician and was soon recognized for his talents. He opened his own business and turned to studies as a dental surgeon. Following in his brother's footsteps, he graduated from Garancière [Odontotechnical School]. This professional activity helped to finance his passion for cars.

A beneficial rain

It was in 1927 that Paulin's research began. He was leaning against the window of his dental prosthesis laboratory in Nice when a violent and stormy shower fell on the city. On the opposite pavement stood a magnificent Delage convertible car. In spite of all his efforts, its owner could not close the hood before the leather and velvet interior had been flooded. For Paulin, an idea suddenly clicked.¹

The Eclipse system

In 1931 Paulin became known for his invention of the coupé/convertible car with the help of the coachbuilder Marcel Pourtout, for whom he became a regular designer. He gave up dental practice at

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¹ Jérôme Paulin and Michel Paulin, L'inventeur du coupé/cabriolet [The inventor of the coupe/convertible], in <http://www.georgespaulin-lesite.com>, 2006.

that time. Paulin invented the Eclipse system; the first power-operated retractable hardtop for which he registered a patent. He made a "10-

Figure 1 Georges Paulin (1902-1942)



scale" model of a Citroen Rosalie that ran on electricity. Although in the middle of the elaboration of the front-wheel drive and full of enthusiasm about his project, Citroen did not follow up with manufacture of an actual car. With the help of a financial partner and following Paulin's plans, Pourtout built a four-seat Coach Hotchkiss for the 1933 show. Unable to agree on the redistribution of the benefits, the project was aborted. The two men produced a variety of brands (Renault, Delage, Bentley, etc.) and models, and some quite exceptional coached cars.

The trial against Peugeot

After borrowing some money from a relative, Paulin created a second prototype on a Peugeot frame provided by the car-dealer Darl'mat. He was filled with enthusiasm and launched the 401 and 601 production, modified by Pourtout. Paulin proposed a new system in the context of the creation of the 302 and 402 Eclipse which even today is still revolutionary; for the retractable hardtop does not encroach upon the volume of the trunk. His reputation grew more and more every day. He designed the Darl'mat Peugeot roadsters, two of which were used in 1937 and 1938 at the Le Mans race course.²

The contract signed between Peugeot and Paulin was ending when the 402 was launched. The new salary proposed by the builder was considered too low by Paulin. They went to trial and the law supported Peugeot which was then allowed to use the patent as it wanted. This was a real blow for Georges Paulin who was a passionate man and not inclined to compromise with the company.

Engineer at Bentley

In 1937 André Embiricos, a banker and Nicky Embiricos's brother, who was an amateur racing driver for Bugatti and Era, became the

² Ibid.

owner of a Bentley frame. The French representative of this brand advised him to have it designed by Paulin and Pourtout. The latter suggested an original design for it in 1938, making it an exceptional vehicle with performances defying all the norms of the time. Likely to beat Mercedes, this car was shown from exhibition to exhibition in France and then Germany. In 1939, tired of not being able to own the car, André Embiricos sold it.³ It only reappeared in Le Mans in 1949, where it participated in three races in a row. In 2000, it won an elegance contest in California.⁴ The 1937 Delage won the Vuiton Award in 2006. This car, which is worth three million euros, was exhibited on the Champs Elysées.⁵ According to American and English specialists, Paulin is still considered today as the most gifted automobile designer of the inter-war period.

At the end of 1939, following difficult negotiations, Paulin, who had been deeply affected by the trial he lost against Peugeot, agreed to become a consulting engineer and aerodynamicist for the Rolls Royce/Peugeot group who had been enticed by his previous works. In 1940 German bombing put an end to their partnership by partially destroying the result of their collaboration in the harbour of Dieppe.⁶

The freedom fighter

Georges Paulin was highly admired by his German rivals and only yearned for peace.⁷ However he could not get over his mother's death. On 18 June 1940, whilst he was an engineer in a military aeronautic factory, Paulin pledged in a letter to one of his English friends not to surrender, nor to acknowledge Marshal Petain as their leader whom he partly blamed for the French debacle. In 1940, in the non-occupied zone, he met Walter Sleator, an MI6 or Secret Intelligence agent. Sleator led a network from Madrid and provided the first radio set connected to London.⁸

³ Lamendin Henri, *De l'art dentaire à d'autres arts* [From dental art to other arts], L'Harmattan (ed), Collection Médecine à travers les siècles ["Medicine throughout centuries" collection], Paris, 2007.

⁴ Paulin, op cit., fn. 1.

⁵ Michel-Georges Paulin, Personal communication, 2008.

⁶ Paulin, op cit., fn. 1.

⁷ According to Michel Paulin, his son.

⁸ Jérôme Paulin and Michel Paulin, *Le combattant de la liberté* [The freedom fighter], in <http://www.georges-paulin-lesite.com>, 2006.

The Phill intelligence network

According to Michel (his son) and Jerome (grandson) Paulin:⁹

This network was called Phill. It included fourteen people, many of whom regularly and illegally crossed the forbidden zone and who took down the plans, the equipment, or the strength of the air base of the Luftwaffe. All the data was transmitted to London, subsequently guiding the intervention of the British fighter aircraft and fighter bombers. This network was made up of a remarkable group of men and women who did not have any help to rescue them on the spot and who carried out their missions while spending their own money. It was only near the end of 1941 that they first received funds from England

The actions of the Phill network

Following the armistice between France and Germany the Renault factories located in the suburbs of Paris modified their French tanks on behalf of the Wehrmacht. Paulin and his comrades set up with London a plan to destroy these factories. As a result the RAF bombed the site and achieved its goals, although at the expense of thousands of civilians' lives. In 1941, "the Phill network informed MI6 of the extent of the German research on the jet engine and the progress of the prototype plans".¹⁰

Back to his first loves

It appears that:¹¹

Georges Paulin and his comrades had a fictitious or a part-time professional activity so as to cover their spying activity. Thus, Georges, who had been a dentist, began in November 1940 to work for Durren-Berger, a French dentist from Alsace who spoke German fluently and who had already treated members of the German embassy well before the outbreak of the war. This office had by then attracted remarkable customers: ambassador Otto Abetz, Minister Schleier, Minister Rode, General von Stülpnagel who led the French troops in France, Hermann

⁹ Ibid.

¹⁰ Ibid.

¹¹ Ibid.

Brandl also known as Otto, Chief of the Abwehr in France, Daniel Dubois the French number one of the Gestapo in Paris, Captain Otto Rahn sent by Himmler, consuls Quiring and Studer, etc. Yet, well before the war, Durren-Berger was already an agent from the 2nd office of the French army and during the occupation until 1942, he pursued his spying activity for the 2nd bureau of Vichy. This source of information was worth a considerable amount. Part of the information gathered by Durren-Berger was transmitted to the English by the chief of the intelligence service: lieutenant colonel Perruche. Durren-Berger did not know anything about Georges Paulin's spying activity and neither did Georges Paulin about Durren-Berger's.

The height of daring was such that, from November 1940 to October 1941, Georges Paulin treated Dubois, the traitor who was hunting him up without knowing who he was. They were on good terms with each other and Dubois told his secretary, Miss Méry, that he highly respected Georges Paulin."

Agents from the Phill network followed one another into Paulin's dental office (surgery). In the course of their comings and goings they randomly met the German personalities mentioned above. Any information was deposited in a hollow statue in Paulin's office. The Germans never noticed anything.¹²

Arrest

In November 1941, after having being denounced by a Swiss German "friend", Paulin and his comrades were arrested under the orders of Otto and Radecke from the Abwehr, the German intelligence service. It was Lafont, the head of the French Gestapo in Lauriston Street, and three of his fellows who were in charge of carrying out this mission. Durren-Berger, who was terrified, delivered all the dental records concerning the members of the Phill network, who were then all arrested.

Paulin was handed over to Otto. Dubois later confided to Durren-Berger that Paulin never uttered a single word during eight days of questioning. The Resistance fighters were detained for four months but none of the Phill network, whether known or not by the Swiss German or by Durren-Berger had been harassed. Despite inhuman treatments

¹² Ibid.

inflicted on them, none of those arrested denounced their "free" comrades".¹³

They were tried in Paris on 20 March 1942 and sentenced to death. During their trial Judge Eckard paid tribute to their patriotism stating: "It was honorable for a Frenchman to disobey the French government." This same judge highlighted the fact that the Abwehr had paid the whistleblower 400,000 francs per captured Resistance fighter.¹⁴

Over four months they were tortured and lived in much agony. Paulin had his neck and chest put in plaster to enable him to be tied down to the execution post. He told Abbot Stock, who accompanied him during his last hours, that he died on the week of the anniversary of his mother's death. To those who wanted to avenge him, he left these last words: "Do not avenge me, I love you." He and his colleagues were shot at Mount Valérien.¹⁵

Epilogue

In 1945 Georges Paulin was awarded the war cross with a vermeil star and was acknowledged under military order by General de Gaulle. In 1964, the administration declared that Paulin died for France. In 1967, he was posthumously awarded the rank of lieutenant of the French army and in 1969, he was awarded the Resistance medal.¹⁶

In 2000 Paulin's name and those of thousands others were engraved on the silent bell paying a tribute to the victims of Mount Valérien. The year 2006 saw Mayor Bertrand Delanoë ensure the placing of a tablet in memory of Georges Paulin set on house number 3 of the 'place du 18 juin 1940'. In the same year a legion of honor request was submitted by the Paulin family but they received a flat refusal from the Ministry of Defense.¹⁷

In 1945, the whistleblower fled to Switzerland where he was never bothered. Durren-Berger was sentenced to death on 15 November 1945, reprieved on November 18 and then freed in 1951.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Ibid.

Acknowledgements

Thanks are due to Michel Paulin, Georges's son, and to Jérôme Paulin, his grandson. Also to Michel for supplying the photograph.

THE RISE AND FALL OF AREA DENTAL OFFICERS: SPECIALISTS IN PUBLIC HEALTH DENTISTRY?

Stanley Gelbier*

Introduction

Establishment of the National Health Service on 5 July 1948 allowed the appointment of two grades of dental specialists: consultants in dental surgery and orthodontics. Recognition of surgeons came because of their outstanding maxillofacial work in World War Two.¹ Although mainly oral surgeons, at first they were asked to do other jobs that general practitioners couldn't, or didn't want, to do, for example the provision of 'difficult' dentures. There were no other specialists for many years.

This paper provides a historical context and then focuses on the pressures for the appointment of 'specialist' Area Dental Officers.

Early history

To demonstrate the great deal of disease in children a few 19th century dentists, especially William McPherson Fisher and George Cunningham, ensured the collection of data from simple surveys and treatment statistics. However they were general practitioners with no special training for this role. In 1885 Fisher described his appalling, epidemiological findings to the annual conference of the British Dental Association meeting in Cambridge. His paper on 'Compulsory attention to the teeth of school children' advocated the urgent establishment of a service for state schools.² He argued children should be examined and treated on starting school and at least annually. Fisher's report produced an outcry, but

there was little support for action at first.³ However, on 3 June 1886 Cunningham opened a discussion⁴ at the Eastern Counties Branch AGM in Lincoln of Fisher's earlier paper. Cunningham said he initially disagreed with Fisher, but was now convinced the latter was right. Indeed, his paper "deserves not only the attention of every medical man, but every parent and every teacher within the boundary of this country". Cunningham hoped to see a special committee set up by the association to consider the problem.

Revelations in 1886 about the teeth of naval and army recruits⁵ gained Fisher more support. At the BDA conference in London he kept up the pressure. Fisher said many children at reformatories, industrial schools, endowed hospitals, Poor Law and workhouse schools were under *medical* supervision, but their teeth were neglected. After Fisher presented a further report in Dublin in 1888 the BDA granted ten pounds to provide one hundred books to record information on children's teeth. Each had two pages for reports and 112 for diagrams of deciduous and permanent teeth. Fisher proposed a method for the investigation to be conducted through BDA branches.

In 1890 a committee was appointed (Fig 1) to investigate the teeth of children and report their findings to the Representative Board. It produced a printed code of instructions, but as individual examiners could not discuss them with the committee there was no standardisation of recording data and there were bound to be reporting errors.

Figure 1 The School Committee of the BDA

Frederick Canton,	George Cunningham
William McPherson Fisher,	William Hern,
Leonard Matheson,	William Bromfield Paterson,
Sidney Spokes	E Lloyd Williams
J Smith Turner (Hon sec BDA)	

Seven annual reports⁶ coordinated by Cunningham recorded the teeth of 12,318 children. By 1891 the association was

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¹ Stanley Gelbier, 125 years of developments in dentistry, 1880-2005. Part 7 – War and the dental profession, *Br Dent J* 2005;199: 794-798.

² William McPherson Fisher, Compulsory attention to the teeth of school children, *J Br Dent Ass* 1885, 1: 585-593.

³ Ken C B Webster, The story of school dentistry, *Public Health* 1947, 60: 83-5.

⁴ Eastern Counties Branch, *J Br Dent Ass* 1886; 7: 394-7, p. 397.

⁵ W McPherson Fisher, Compulsory attention to the teeth of school children (army and navy), *J Br Dent Ass* 1886, 2: 714-726.

⁶ British Dental Association, *Reprints of the seven reports of the committee appointed by the Representative Board of the BDA to conduct the collective investigation as to the condition of the teeth of school children, 1891-7*, London: John Bale, undated.

convinced⁷ if more attention was paid to children's teeth then public health would improve, as many adult dental disasters could be traced to childhood diseases. The association emphasised the value of reliable statistics to demonstrate the need for services. There was a need for:

Adequate provision ... to meet the evil, and also to provide sufficient data which would convince those in authority that in giving attention to these matters they would be acting in the interests of the public at large as well as in those of the children themselves.

The BDA said data should convince those in authority that attending to these matters would act in the interests of the public at large, as well as children. Reports on over 10,000 12-year-olds in England and Scotland showed 86% of teeth were affected by caries (Fig 2).

Figure 2 Dental disease in 12-year-olds in England and Scotland

Boys and girls	10,517
Unsound teeth	37,105
Missing	2,174
Total teeth affected	39,279 (ave 3.73)
Sound teeth	1,508 (14.2%)

English children had better dentitions, with a higher ratio of saveable teeth than those in Scotland (Fig 3). Oral hygiene was also investigated. Toothbrushes were generally conspicuous by their absence. When asked when they used a brush children said: 'twice a week', 'occasionally' and 'when I go out to tea'.

Not everyone supported Fisher, but occasional treatment for paupers was purchased by Boards of Guardians. They usually paid a fee for treatment provided, but in 1884 Henry James Moxon, LDS Ire, was appointed by North Surrey District Schools to the first salaried post for pauper children, in Anerley, at a salary of £60 per year.⁸

⁷ First report of the committee appointed by the Representative Board of the BDA to conduct the collective investigation as to the condition of the teeth of school children, London: John Bale & Sons, 1891, p. 3.

⁸ Fisher, op cit., fn. 2, p. 592.

Figure 3 Caries in permanent teeth in England and Scotland

	English	Scotch ⁹
Carious teeth saveable	4216	1532
lost	674	466
condemned	6751	3579
Ratio teeth saved: not saved	1.66:1	0.74:1

Over the years school services developed throughout the UK. As well as providing treatment the dentists kept simple data on needs and treatment, but none had special training for this role.

The 1960s developments

That situation remained until important progress in the mid-1960s. Since 1953 Alexander MacGregor (Fig 4) had been professor of dental surgery and director of dental studies at Birmingham Dental School. Three years later he became a member of the first General Dental Council. In 1962 McGregor was elected dean of the English Faculty of Dental Surgery, so he was extremely influential.

In 1961 McGregor carried out a dental survey in Ghana at the request of WHO.¹⁰ Three years later he advised the Nigerians on the construction of a dental school. He realised there was a problem in the developing world and considered how British dentistry could help. McGregor discussed it with the faculty, which was considering a diploma in children's dentistry to complement its existing orthodontic diploma. He suggested that although good in principle, it was not a priority at that time. MacGregor reminded them the college and faculty had a longstanding interest in overseas dentists. Lots came to the UK to train and study for the Fellowship in Dental Surgery but many failed the examinations and returned empty-handed. Even some dentists who went home with an FDS were inappropriately trained for what was required in the developing world. They needed dentists to assess the health problems of communities and plan appropriate services. FDS training, with its concentration on surgery, was of little help. MacGregor knew a Diploma in Public Dentistry was awarded by the University of St Andrews from 1930, later by Dundee, but felt it

⁹ 'Scotch' is the term used in the original report but nowadays 'Scottish' would be more acceptable.

¹⁰ Obituary: Alexander Brittan MacGregor MA MD BChir FDS FFD RCS LRCP, *Br Dent J* 1965; 118: 89-90.

did not satisfy the need. So he suggested the introduction of a Diploma in Dental Public Health. Just then tragedy struck. On 9 January 1965 MacGregor had a heart attack and died. However the discussions continued under the new dean, Sir Terence Ward, with the support of Professor Robert Bradlaw, dean of the Eastman. MacGregor's obituary stated,¹¹ if the college approved a diploma and regulations it would be:

Figure 4 Professor Alexander MacGregor



"A major contribution to these [developing] countries. ... It is a great tragedy that he will not now see the fruits of his intense and devoted labour. Perhaps it will eventually be seen as his greatest professional attainment."

Regulations were eventually agreed. Students had to attend a one-year, full-time, course recognised by the college or its part-time equivalent. Senior dentists with certain experience could gain exemption from some practical aspects of the course.

The first courses

The six London dental schools¹² established a committee chaired by Professor Geoffrey Slack. At first their course ran half-time so could only be attended by dentists exempted from full-time, so it was not available to the very people for whom it had been designed, from developing countries. Some UK dentists felt a DDPH might serve them well in the future but were not sure how.

¹¹ Ibid., p. 89.

¹² The Eastman, Guy's, King's College, The London, Royal Dental and University College.

So in October 1968 a number of intrepid dentists joined the first course. Most worked in the school services.

The course tutor was Brian Burt (Fig 5), an Australian working with Slack as lecturer (January 1968-September 1974) in the Community Dentistry Unit at the London Hospital. Burt had a BDSc from the University of Western Australia, Perth (1960) and an MPH from the University of Michigan (1966). In 1973 he gained a PhD from the University of London for one of the earliest British dental epidemiological studies. Burt eventually became professor of epidemiology at the School of Public Health at the University of Ann Arbor in Michigan, and professor of dental public health at its dental school. In London his enthusiasm made Burt an outstanding teacher.

Figure 5 Brian Burt, course tutor on the first London course



of years.¹³

The course was held in terrible basement accommodation at the Department of Extra-Mural Studies of the university. The postgraduates rebelled and Slack was told the students would not return unless better premises were found. Quick thinking led to transfer of the course to Wimpole Street, with its good lecture theatre and wonderful library. In return the BDA was paid to buy a bigger stock of appropriate books. The course was well-served and remained there for a number of years.¹³

Although London remained the main base an important programme was developed at Birmingham by Professor Peter James. And the Dundee DPD course was amended to allow its students to take the RCS examinations. By 1974 there were also courses in Belfast, Bristol, Leeds and Manchester;¹⁴ and 79% of the 258 candidates had gained a DDPH. Most students were public dental officers, but there were also academics, staff from the Department of Health and a few GDPs, many from abroad.¹⁵

The first examinations, in June 1969, produced 26 dentists with qualifications in DPH as opposed to a group of 'amateur

¹³ Initially as the Department of Dental Public Health, later Oral Health Policy.

¹⁴ Editorial: Diploma in dental public health, *Br Dent J* 1974; 137: 113-114.

¹⁵ Ibid.

dabblers'.¹⁶ But would the DDPH be of use to these people? Many of them thought they were already at the pinnacle of their professional lives, as school chief dental officers. The answer was, not immediately. They had no idea the formation of a new relevant dental specialty would be bound up with developments in the NHS. Many early holders of the DDPH rose to very influential positions, including chief dental officers of England¹⁷ and Israel.¹⁸

The role of the National Health Service

The original 1948 NHS tripartite administrative structure was based on existing arrangements: local authority, voluntary and insurance committees. There were separate organisations for hospital (regional hospital boards and hospital management committees), school (local authorities) and general practitioner (executive councils) services. As with everybody else dentists were employed by a variety of organisations. GDPs were self employed, with contracts for service held by executive councils; hospital dentists, as doctors, were employed by RHBs or HMCs; and school dentists were employed by county or borough local authorities, managed by medical officers health.

By the mid-1960s there were pressures on the government to reorganise the NHS. Discussions on bringing together the organisations responsible for general practice, hospitals and local authority services included dentistry. Although reorganisations are often seen as a threat some dentists saw opportunities for the profession and themselves.

A plethora of reports and consultative documents followed Kenneth Robinson's 1968 'green consultative paper' on the structure of medical and related services in England,¹⁹ with similar documents in Scotland, Wales and Northern Ireland.

¹⁶ Results DDPH examinations, *Br Dent J* 1969; 127: 392.

¹⁷ Martin Craig Downer, CDO Department of Health England, DDPH 1969.

¹⁸ Aaron Maurice (Moishe) Kelman, CDO Ministry of Health Israel, DDPH 1969.

¹⁹ (a) Ministry of Health (Minister of Health Kenneth Robinson 1968) National Health Service: The administrative structure of the medical and related services in England, London: HMSO. (b) Department of Health (Secretary of State Richard Crossman 1970) *The future structure of the NHS*, London: HMSO. (c) Department of Health (Secretary of State Sir Keith Joseph 1972) *Consultative document on NHS reorganisation*. (d) White Paper (1972) *NHS reorganisation: England*, Cmnd 5055.

The BDA's Public Dental Officers' Group Committee warned the association of a major danger posed by reorganisation. School dentists were managerially under medical officers; and if the BDA was not careful the whole profession would follow. The association was spurred into action and a steering committee was set up representative of all branches of the profession. Robert (Bob) McKechnie, chief dental officer for Renfrew,²⁰ was a member of that group. Although working in Scotland he was an important player on the national scene. McKechnie was resident of the PDO Group (1968-69) and then chairman of the PDO Group Committee (1969-1974); for most of the relevant years he was heavily involved in negotiations and discussions relating to reorganisation in England and Wales, as well as Scotland.

Although not autonomous hospital dentists felt comfortable in their close association with surgeons. When they awoke to the dangers for dentistry they expressed their fears via the Joint Consultants Committee and the Royal surgical colleges. At first GDPs doubted reorganisation would affect them. But they soon realised that as dentistry was self-contained, with few ramifications for other health workers, it would be easy for government to take dental care out of the NHS. A *BDJ* editorial stated:²¹

The suggestion is increasing within the dental profession that ... it is the intention of the present Government to produce a framework of rules within which the (dental) service may quickly wither away.

The 1974 NHS reorganisation in England

The 1973 NHS Reorganisation Act brought everything together under a single administrative framework, with all services in England accountable to the secretary of state for health. From April 1974 there would be several tiers of authority: 14 regional (RHA) and 90 area (AHA) health authorities (some sub-divided into districts), with similar structures elsewhere in the UK. Dentistry would be mainly focussed at the area. AHAs would hold the contracts of GDPs and manage the school services. The CDO chief dental officers to the Ministry or Department of Health were key players. George Gibb (Fig 6) was the third, appointed in

²⁰ Obituary: Bob McKechnie, *Br Dent J* 2006; 201: 183.

²¹ Editorial, The end of an era, *Br Dent J* 1971; 130: 51.

1971 in the middle of the reorganisation battles.²² He was an important appointee. Gibb's GDP background was invaluable. Immediately before appointment he was chairman of the BDA's Council, its most senior committee. Even more important, Gibb chaired the association's working party leading the fight to attain a more secure place for dentistry in the reorganised NHS.

During discussions it became clear the government was committed to consensus management by multidisciplinary teams of equals in which the majority of members would get their way, provided the

Figure 5 George Gibb, Chief dental officer to the DHSS



minority were not strongly against the idea.²³ Unresolved issues would be decided by the health authority. Each Area team would consist of a medical and nursing officer, treasurer and administrator; but no dentist. The BDA protested but the profession and Gibb initially failed to get the secretary of state to change his mind. The minister said there was no need for dentists in management as they worked in their own surgeries rather than clinics or hospitals.

Anyway, if the government gave way to dentists, then pharmacists and works officers would also want a place.²⁴

Some individuals took a back-door approach. The Department of Health asked the King's Fund College in London and Manchester Business School to develop courses to train professionals for administrative roles in the new NHS. A few school dentists visited a senior dental officer at the department, Jimmie Rodgers. Although not in a position to change policy he walked along the corridor to a colleague dealing with organisation of the courses. By the time advertisements appeared for some pilot courses they indicated places would be available to appropriate doctors, nurses, finance officers and administrators –

²² Obituary: George Gibb, *Br Dent J* 1986; 160: 406.

²³ Handbook on management arrangements for the reorganised NHS (the 'Grey Book'), London: HMSO for DHSS, 1972, paras 1.25 and 1.2

²⁴ Sir Keith Joseph, letter to RD Allen, chairman of BDA Council, 3 April 1973.

plus dentists. So Rodgers made sure the door remained open. He ensured Don Norman²⁵ attended the first course and two other dentists attended the second one, with similar activity in Manchester (Fig 7).

Figure 7 Pilot integration courses in England 1972

King Edwards Fund College of Hospital Management	
1 st course (1/72)	Don Norman
2 nd (3/72)	John Timmis, Stanley Gelbier ²⁶
Manchester Business School Tom Dowell ²⁷	

Government ministers came to the King's Fund College to teach. The head of the college introduced Lord Aberdare, the minister for health, to some dental participants. They said the salaried school services being transferred to health authorities were managed by a chief dental officer, so there was a need for a dental-manager at the area level. The message was taken back to the department. By the time a handbook on management arrangements²⁸ appeared it was confirmed there would be an area dental officer for each authority:²⁹ to manage the school service; act as the senior dentist in the area; and liaise between the authority and the profession. Although not a permanent member of the team of officers he would have a right to receive its agendas, working papers and minutes and, importantly, decide for himself when to attend their meetings.

There was to be a major change for school dentists. Instead of being headed by a relatively low-status dentist, at least in the minds of many GDPs and consultants, suddenly they were managed by ADOs, regarded by NHS officials as high-status leaders of the profession.

By 1972 four important committees had looked at management in the medical and nursing professions, which would automatically have membership of local committees:

1966 Committee (chair B Salmon) on senior nurse staff structure

²⁵ Chief dental officer of the London borough of Hounslow.

²⁶ J Timmis, CDO Essex and S Gelbier, CDO Hackney.

²⁷ T B Dowell, CDO Cheshire.

²⁸ 'Grey Book', op cit., fn. 23.

²⁹ AHAs would be the central management point for dentistry, Grey Book, op cit., fn. 23, para 5.5.

1967 Committee (Sir George Godber) on the organisation of medical work in hospitals (the first 'Cogwheel' report)

1969 Working Party (Mayston) on management structure in the local authority nursing services

1972 Working Party (RB Hunter) on medical administration.

Dentists recognised their position was different but sought full membership of all relevant committees. Otherwise there was a danger dentistry might be regarded as a paramedical profession. They again realised a need to exert pressure on the government to exact a change. The profession expressed its views via the BDA. The PDOs also used contacts in other organisations to make their views known, for example, the Dental Group of the Society of Medical Officers of Health, the Association of Municipal Corporations and the County Councils Association, all with central government contacts. The dentists emphasised the need to safeguard school services being transferred from local authority control to the NHS; also the need for a senior dentist to look after dentistry.

The whole profession sought representation by a senior dentist at the regional, area and district levels, but the area dental officer was to be the most important post. As they would be busy managing services as well as giving advice, the BDA suggested ADOs should be able to "opt out when 'irrelevant subjects, were being discussed' by committees. It seems rather strange to request that dentists should be treated differently to doctors and nurses.

Person specification for ADO posts

So what sort of people were needed for these important posts? And what qualifications and training were required before appointment? It was essential to appoint people well-fitted for the posts by wide professional experience, training and qualifications. But the profession needed to know if any special form of training was required by the Department of Health, NHS Staff Commission or by interviewing committees. And if so, were special advantages to be conferred on some members of the profession over others seeking ADO posts?

Discussion with the Department and its non-dental academic advisors indicated special training would be given prior to

reorganisation.³⁰ The management handbook stated: "By reason of the special training he will receive ... he [the ADO] will be able to ... generally promote the improvement of the dental service in the area."³¹ A number of PDOs interpreted training as possession of qualifications which would give them an advantage. The DDPH syllabus suggested their courses had equipped them for many aspects of the ADO job description.³² But few GDPs could have attended the compulsory courses for the DDPH, even if they had wanted to. Others interpreted training to include not only the special training provided for relevant NHS employees, but also that afforded by experience of dentistry. Not all school dentists had a DDPH, so many joined GDPs in stressing that postgraduate qualifications were less important than experience of dentistry.

The BDA sought training opportunities for the whole profession, including participation at multi-disciplinary courses. The Dental Group pressed the Society of Medical Officers of Health to include a dentist in its delegations to the Department to discuss training programmes for doctors, with a chance to directly influence officials who make decisions. In November 1971 three members of the National Coordinating Committee³³ met with Departmental officials to discuss training. They emphasised that if the department saw multi-disciplinary courses as important then as many dentists as possible should be included. Otherwise health authorities would be deprived of trained dentists.

Dentists learned that special courses for doctors would emphasise health services management: (principles and uses epidemiology, behavioural sciences and advances in medicine). The CDOs stressed the need for dentists to receive similar training, so suggested some parts of the medical courses should be available to dentists, especially if true integration was the aim. Otherwise there should be special dentists-only courses. The BDA and PDOs worried selection for courses might imply selection for future posts, so emphasised that *all* dentists, should be able to apply, irrespective of whether they had attended a course. This was very different to the medical profession, which ensured their

³⁰ Notes of informal meeting between DHSS officials and representatives of the National Coordinating committee of CDOs, 17 November 1971.

³¹ 'Grey Book', op cit., fn. 23, p. 128, 'Role specifications: B1 The area dental officer'.

³² See Appendix 1 for DDPH syllabus.

³³ Chairman National Coordinating Committee of CDOs (S Gelbier), secretary (T B Dowell) and secretary PDO Group (J Timmis).

posts would only be open to doctors holding administrative posts, eg medical officers of health and hospital medical superintendents.

The NHS Staff Advisory Committee decided that initially senior posts should only be open to people employed in the merging services, to offer some job protection, so excluded general medical practitioners. The BDA again emphasised it was inappropriate to consider only salaried dentists as it would preclude most practitioners from applying. To their credit support came from PDOs even though it reduced their chances of getting a post if GDPs could apply. The BDA stressed that ADOs would "monitor and seek to coordinate" independent dental practitioners, an activity doomed to failure if GDPs could not apply for the posts.

The BDA emphasised a need for dentists to attend multidisciplinary courses. The Department said 'integration courses' would be about "conversion to integration", rather than training in management sciences. The residential courses began in September 1972. The adverts stated local authority CDOs could apply. The CDOs' coordinating committee was told about 70 dentists would be included in 3,000 places. However 90 dentists would be needed to fill ADOs posts in England, let alone for regional and district dental officers. The Department agreed to advise selection panels for posts that attendance at courses was not essential. The Department allowed Gordon Entwistle, chief dental officer of Lancashire, to attend a medical administrators course. He told the BDA it was very medically orientated and of little value to dentists.

In January 1973 the Department announced a series of 6-9 day courses for dentists on the implications for dentistry of the reorganisation. Although set up jointly between dental and non-dental academics in London and Manchester, the driving forces were CDOs. Applications for courses³⁴ were invited initially from dentists with 10 or more years experience since qualification, who satisfied any of the following criteria: experience of NHS general dental practice, occupied an SDO post or above in local authority service, a senior post in hospital & specialist service or dental teaching hospital, or professional staff of the Dental Estimates Board for England & Wales. The NHS Staff Commission, which had replaced the Staff Advisory Committee, accepted the BDA's

³⁴ Advertisement: Training course for NHS reorganisation. Special courses in the management of integrated health care for dentists only, *Br Dent J* 1973; 134 (1): xxxiii.

submission that PDOs would not be prejudiced by opening posts to all dentists; if not there would be insufficient candidates. So ADO posts in England and Wales were open to all registered dentists working in those parts of the UK.

Panels of assessors were set up for every discipline, chaired by a member of the commission. Members of the Dental Panel are shown in Figure 8. Obviously it could not include public dental officers in England and Wales as they might apply for the posts.

Figure 8 The Dental Assessors Panel of the NHS Staff Commission

Dr DG Haffenden	Member of the Staff Commission
Prof EW Bradford	Prof of dental surgery, Bristol
Prof Sir Robert Bradlaw	President, GDC
LB Comer	Formerly CDO/PSDO Lancashire County Council
JW Craig	CDO City of Edinburgh
GC Dickson	Consultant orthodontist Portsmouth
MA Freeman	Formerly Deputy CDO DHSS
Prof JL Hardwick	Professor preventive dentistry Manchester
Dr PJ Holloway	Reader in community dentistry Manchester
Prof D Jackson	Professor children's and preventive dentistry Leeds
Mrs CM Lindsay	Formerly CDO LB Bromley
R McKechnie	CDO Renfrew CC
S Mead	Formerly hospital SHDO
Dr RG Mitchell	Consultant dental superintendent Birmingham dental hospital
ND Pailthorpe	Retired GDP, formerly member Leicester and Rutland LDC
JN Peacock	Member GDC, formerly secretary BDA
NM Poulter	Orthodontist Somerset CC
Prof GL Slack	Professor dental surgery and director community dental unit, London Hospital
RG Swiss	Member GDC, chairman SDAC, member Middlesex Medical Council
Dr JD Trainer	CDO Scottish Home & Health Department, formerly chairman Scottish DEB
Prof WJ Tulley	Professor orthodontics and children's dentistry Guy's hospital

The people appointed

In the event advertisements made no mention of the need for specific qualifications.³⁵ They simply asked for:

Registered dental practitioners with recent experience and knowledge of the practice of dentistry in the United Kingdom (especially in the Local Authority Service, the School Dental

³⁵ First advertisement, 'NHS reorganisation: appointment to new posts - ADOs', *Br Dent J* 1974; 136 (1): xxxvii.

Service or in one or more branches of the National Health Service). They should have an interest in the planning, management and development of services; experience of the organisation of the Local Authority Service and/or the National Health Service; and of the profession itself. They should be able to understand and interpret the views of the dental and other professions.

365 dentists applied for the ninety jobs.³⁶ Some interviews took place after reorganisation, most between 1 and 16 April 1974. It was April 1975 before the final post was filled. Two-thirds of appointees had one or more higher qualifications. 44.4% had one dental or non-dental higher qualification, 17.8% had 2 and 2.22% had 3. 66 of the ADOs had qualifications in public health dentistry: DDPH 53, DDH Birm 10, DPD St And 2 and MPH Harvard 1. There were also a range of other qualifications: PhD 2, MSc 4, MA 1, FDS 3 and DOrth 2.

Were area dental officers specialists?

So we had ADOs; but were they specialists? A 1974 *BDJ* editorial³⁷ suggested ADOs must fulfil the role of specialists:

A need will be for a full-time specialist skilled and experienced in this type of work who has, above all else, the confidence and support of his colleagues, but also the professional training and experience essential to assist in sensible decision-making. The ADO must fulfil this role.

The profession recognised the need for training; but what type of training was necessary? This question was not new. In 1969 the School Dentists' Society had asked the GDC to recognise community dental health as a speciality.³⁸ It said specialists should have at least eight years experience, including four in community dental health, and be suitably qualified, eg with a DDPH.

³⁶ Stanley Gelbier, *Dentists, dentistry and the NHS: a study of their interaction*, PhD thesis, 1980.

³⁷ Editorial, *The ADO*, *Br Dent J* 1974; 136: 177.

³⁸ Letter School Dentists' Society to General Dental Council, February 1969.

The way in which first a special association was formed, and then trainees and formally 'recognised' specialists were appointed, will be discussed in a future paper.

Appendix 1 Syllabus for the DDPHRC's Eng

a The organisation of health services

Medical and dental services in the UK and other countries

Legislation. Control. Social sciences and welfare. Public finance.

Community service. Dental jurisprudence including forensic dentistry. Consent.

Negligence. Records. Training of personnel. Communicable disease.

Planning and equipment for dental services. Mobile clinics. Provision and supply of dental materials.

b Dental health needs. Their relative importance and priority

Dental caries, gingival and periodontal disease. Oral manifestations of systemic disease. Oral hygiene. Management of special categories: pre-school and school children, expectant and nursing mothers, handicapped, sub-normal, aged and sick. Dentistry in industry and other special groups. Occupational and radiation hazards.

c Epidemiology and dental and oral diseases

Survey methods and techniques

Vital statistics. Morbidity and mortality. Sampling. Measures of incidence, prevalence, control technology, variability. Standard deviation. Correlation analysis of data. Interrelation. Sources of error. Uses of indices in the measurement of dento-facial deformity and dental disease.

d Dental health education

Objectives. Methods. Media. Sources of material. Personnel. Visual aids. Dental health projects. Evaluation.

e Preventive dentistry

Available measures and techniques.

Appendix 2 Glossary of abbreviations

ADO	Area dental officer
AHA	Area health authority
BDA	British Dental Association
CDO	Chief dental officer
CDS	Community dental service
DHSS	Department of Health & Social Security
GDP	General dental practitioner
HMC	Hospital management committee

NHS	National Health Service
PDO	Public dental officer
RHB	Regional hospital board
RHA	Regional health authority

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WHY WAS HAYDEN COFFIN? C R COFFIN AND SONS IN THE LATE 19TH AND EARLY 20TH CENTURY*

John F Beal[†]

The early years

Dentifrice in the late 19th century was often sold in ceramic pots, the lid of which had under glaze printing describing the contents and the manufacturer of the toothpaste or tooth powder. The dentifrice may have been prepared by a large national or regional supplier or by a local chemist. Some pot lids also gave the name of a dentist whose prescription was used to produce the dentifrice. One such pot lid (Fig 1) stated the dentifrice was prepared by William Darling, Chemist of 126, Oxford Street, Manchester, according to the prescription of C R Coffin DDS (Baltimore College of Dental Surgery). Who was C.R. Coffin, what do we know about him and where did he practise?

Figure 1 Coffin pot lid from the collection of the author



The Coffin family from Devonshire, England had emigrated to the USA early in the 17th century.¹ It settled first in Massachusetts, later moving to Portland, Maine. It was there that Charles Reuel Coffin was born 1825 or 1826. For a time he worked in a bookshop where he showed a particular

* Based on a lecture to the Lindsay Society for the history of Dentistry, Stirling, 5 October 2008.

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¹ Obituary: Harold Lewis Coffin, *Br Dent J* 1936; 61: 289-290.

interest in anatomy books and developed an ambition to be a doctor. Later he decided to specialise and become a dentist instead.² He is recorded in the 1848 Directory for Portland as Charles R Coffin, dentist. In the 1850 census³ for Portland he is again shown as a dentist living in the household of Moses Dodge MD. In 1852 he married Sarah P Munsey⁴ and the following year became a graduate of the Baltimore College of Dental Surgery,⁵ the world's first dental school, at which he made a particular study of "Artificial Teeth".⁶ In the same year his first child, Walter Harris Coffin was born.⁷

C R Coffin came to England in 1855⁸ and established a practice at 5 Lime Grove, Chorlton-on-Medlock, Manchester, very close to where the Manchester Dental School now stands. In 1856 his second son, Harold Lewis Coffin, was born. His two daughters, Harriet Powell Coffin and Louisa Kincaid Coffin were born in 1858 and 1860 respectively. He was not at home in Manchester at the time of the 1861 census⁹ but, helpfully, the enumerator added 'Family at Bowden'. Charles, then 37 years of age, Sarah, 29 years, and their four children were lodging with the family of a retired innkeeper in Bowden, Dunham Massey, Cheshire, presumably on holiday. C R Coffin continued to be listed at 5 Lime Grove in both the Citizens Roll¹⁰ and Trade Directories¹¹ for Manchester until 1866/67. In 1868/69 the Trade Directory¹¹ shows Peter Headridge practising at this address, a dentist with whom

² Hayden Coffin, *Hayden Coffin's Book*, London: Alston Rivers, 1930, pp. 17-18.

³ 1850 US Federal Census, Ward 4, City of Portland, County of Cumberland of Maine.

⁴ Civil Records for Portland, Cumberland, Maine, USA.

⁵ Obituary: Dr C R Coffin, *J Br Dent Assn* 1891; 12: 37-38.

⁶ Richard Behles, Baltimore College of Dental Surgery, Personal communication, 2008.

⁷ Obituary: Walter Harris Coffin, *Br Dent J* 1916; 37: 316-317.

⁸ All references to censuses 1861-1901 are to the censuses for England. The enumerators completed returns are held by The National Archives, London. They are available at many libraries on microfilm and on a number of websites.

⁹ Citizens Roll for Manchester, microfilm at Manchester Central Library.

¹⁰ Manchester Directories unless otherwise stated are *Slater's Directories* of Manchester and Salford.

¹¹ *Morris' Manchester Directory*, 1868/69.

Charles and Walter Coffin had an extraordinary exchange of correspondence in the *British Journal of Dental Science* in 1882.¹²

In 1862 Charles' and Sarah's third son, Charles Hayden Coffin, was born.¹³ However, C R Coffin does not appear to have registered the birth of any of his children born in England, nor has the author found any baptism entries in the Parish Registers of the local churches. It seems clear that his experience at Baltimore College of Dental Surgery left a great impression on him as he named two of his sons after his tutors, Chapin A Harris the first dean at the college and Horace H Hayden the first president. His other son may have been named after John Lewis who had invented a hand drill with an adjustable head in 1838.

The 1871 census shows the family had moved to London. An entry for 94 Cornwall Gardens, Kensington shows C R Coffin, dentist, together with his wife and five children. He is first listed in the London Trade Directory¹⁴ in 1872 which states "Charles Reuel Coffin, dentist, 94 Cornwall Gardens, W London (Kelly PO Directory, London)". In the *Monthly Review of Dental Surgery* (1873)¹⁵ there is a comment about Coffin's new toothbrush. It stated:

They are novel in design and very serviceable in use, cleaning the inter-dental spaces better than any other brush we have seen. We are sorry that Dr Coffin has thought it desirable to register the pattern, but as they are not sold at a 'prohibitive' price, the registration is a matter that concerns that gentleman more than any one else.

C R Coffin continued to be listed in the Trade Directories as the sole dentist at 94 Cornwall Gardens until 1876. In 1877 he was joined by Walter Harris Coffin, dentist. In 1879 the entry for this address reads "Dr Charles Reuel Coffin & Sons, american dentists" and in addition to Charles and Walter, Harold Lewis Coffin is listed. The first *Dentists Register*, published in 1879, lists these three Coffins at 94 Cornwall Gardens but also includes Bentley Jay Bonnell at this address, all of them "In practice before

¹² Correspondence in *Brit J Dent Sci* 1882; 25: 45-46, 205-206, 254-255.

¹³ Obituary: Hayden Coffin, *The Stage*, 12 December 1935.

¹⁴ London Directories are *Kelly's Post Office Directories*.

¹⁵ *Monthly Rev Dent Surg* 1873; 2: 331.

July 22, 1878". Bentley Bonnell was soon to become member of the family for in 1883 he married Harriet Coffin.

In 1885 C R Coffin retired from practice due to ill health.¹⁶ He died aged 65 years on 29 December 1890. His obituary stated that he made "some interesting experiments on the properties of gold foil in removing the excess of mercury from amalgam fillings". Other obituaries^{17,18} described him as quiet and unobtrusive, kind and generous, with a keenly observant and appreciative mind, providing good technical work and hospitable, especially to any American coming to London. It was also said he worked hard for the British Dental Association.

Walter Harris Coffin

His eldest son, Walter Harris Coffin, was described¹⁹ as a serious little boy, who thought more of his books than his toys and games. At age 8 he showed considerable ability in writing both prose and poetry. After leaving school he was articled to his father and then studied at the "Royal College of Science",²⁰ St Thomas' Hospital, The Royal Dental Hospital and University College. Although he took the LDS course he never sat the final examination. After joining his father in practice he is recorded in the *Dentists Registers*, *Trade Directories* and censuses for 1881 and 1891 as both residing and practising at 94 Cornwall Gardens. In the 1881 *Kelly's Directory* he is shown as a member of both the Junior Athenaeum and Scientific Clubs. In the 1891 census he is described as a bachelor aged 37 and is shown living with his mother. However, this state was not to last for much longer, for on 7 October 1892 he married Sophia Lydia Walters of Alfred Road, Cromer.²¹ In the 1891 census Sophia had been shown as a 37-year-old single poetess living with her mother in Brighton. The

wedding took place in Erpingham, Norfolk and was witnessed by his brother Harold and sister Louisa.

In February 1892 W H Coffin became president-elect of the Metropolitan Branch of the BDA,²² becoming president in 1893. His 1894 valedictory address²³ mentioned the importance of the young Metropolitan Branch being active in BDA affairs and stressed education and professional discipline for dentists. The 1897 *Kelly's Directory* shows him continuing to practise at 94 Cornwall Gardens but residing in Kew. He is listed as a member of the Authors Club. In the 1901 census he was living with his mother in Kew, where he is described as married but there appears to be no entry for Sophia Coffin or Sophia Walters anywhere in England. Indeed after her marriage to Walter the author has been unable to find any record or mention of her until the death, on 15 September 1913, of Sophia Lydia Lyddingsen [?]. Her death certificate²⁴ states she was the "wife of Walter Coffin, a dentist".

The *Journal of the British Dental Association* at this time contained numerous reports of meetings of the BDA and other dental societies. Walter Coffin seems to have regularly participated in the discussions where he spoke on topics as diverse as expert witnesses at court, radiography, orthodontics, prosthetics, the use of rubber dam and so on. Over the next few years he seems to have been less involved in practice and more involved with the BDA. He was elected to the BDA's Publishing Committee. At the Representative Board meeting in July 1902 the committee's recommendation that he be appointed as editor of the *Journal of the BDA* was carried unanimously.²⁵ It is of note that initially the address given for communications to the journal was 94 Cornwall Gardens but in March 1903 the address changed to 32 Leicester Square. In the following month the journal changed its title to the *British Dental Journal*²⁶ with Walter Coffin as first editor of the re-titled journal. He remained editor until 1915 when he resigned due to ill health.²⁷ His wide ranging interests may be

¹⁶ *J Br Dent Assn* 1891; op.cit., fn. 5.

¹⁷ Obituary: C R Coffin, *Dent Rev (Chicago)* 1891; 5: 210.

¹⁸ Obituary: C R Coffin, *Dent Rec* 1891; 11:96.

¹⁹ Obituary: Walter H Coffin, *Br J Dent Sci* 1916; 59: 253.

²⁰ The college was originally formed as the Normal School of Science in 1881 by merging some courses of the Royal College of Mines and some other science teaching at Kensington. It became the Royal College of Science in 1890 and later incorporated into the Imperial College of Science and Technology. Although it was not actually called Royal College of Science when Coffin was there that is the term used in the obituary cited.

²¹ Copy of Marriage Certificate, General Register Office, England.

²² AGM of Metropolitan Branch of British Dental Association, *J Br Dent Ass* 1892; 13: 72-73.

²³ AGM of Metropolitan Branch of British Dental Association, *J Br Dent Ass* 1894; 15: 74.

²⁴ Copy of Death Certificate, General Register Office, England.

²⁵ Report of the Representative Board, *J Br Dent Ass* 1902; 23:737.

²⁶ Title page, *Br Dent J* 1903; 24 (4): No 4.

²⁷ Obituary: Walter Harris Coffin, *Br Dent J* 1916; 37: 316-317.

judged by the fact that in addition to the BDJ he was editor of the *Transactions of the Odontological Society* of Great Britain, lecturer and examiner at the National Dental Hospital, had numerous publications in the dental literature, was inventor and patentee of an electric endoscopic surgical lamp, was a Fellow of the Royal Society of Medicine, the Linnean Society, the Microscopical Society and the Physical Society of London, a founder member of the Society for Psychical Research and a Foundation Member of the National Liberal Club. He was also a member of the Anthropological Society, the Stage Society and the Fabian Society (he was an associate of Bernard Shaw and Sidney Webb and meetings of the Fabian Society were held at 94 Cornwall Gardens). His recreations are listed as music, literature, drama and sociology. Walter Coffin died on 10 April 1916. His obituary describes him as a man of great learning who considered himself to be 'always a student', having a kindly bearing, highly cultured and intellectual with a dreamy and artistic mind and having 'restless energy'.

The BDA museum has a 'boxed electric lamp with mouth mirror and built resistor, designed by W H Coffin' (catalogue 1766), 'an electric mallet designed by W H Coffin' (2115) and 'Coffin's electromagnetic mallet, patented 1896 (8354).

Harold Lewis Coffin

C R Coffin's second son Harold Lewis Coffin also studied at the Royal College of Science.²⁷ In 1875 he went to Cornell University in New York State to undertake an 'Optional Course'. He returned in 1877 to join his father's practice at 94 Cornwall Gardens. In 1887 he married Alice Louise Allen and in the 1891 census he is shown residing in Nevern Mansions, Earls Court, London, with Alice and their 9-month-old son, Stephen W Coffin. The 1901 census lists Harold and Alice still living at Nevern Mansions but Stephen was away at Beonles School, Petersfield, Hampshire. Harold continued to practise at 94 Cornwall Gardens until 1917 when the practice moved to 30A Wimpole Street. In 1921 his son Stephen Walter Coffin, anaesthetist, was also practising at 30A Wimpole Street. In 1922 his practice had moved again, this time to 51 Welbeck Street. In 1925 the practice was still at this address but he is listed in the Private Residents section of *Kelly's Directory* as living in Golders Green. In 1927 he retired from practice and moved to Thrushington, Hartfield, Tunbridge Wells. He remained on

the *Dentists Register* at that address until his death on 30 July 1936. He is described²⁸ as the most retiring members of the Coffin family who had an idyllic marriage with one son. He joined the BDA in 1886 and on retirement gave many books to the BDA library. His main hobby was photography (Fig 2).

Figure 2 Harold Lewis Coffin with his camera in his hand



Charles Hayden Coffin

The third son of C R Coffin was Charles Hayden Coffin (usually known as Hayden Coffin). In his autobiography he states the family moved to London three months after his birth in 1862.²⁹ However, this does not accord with the Manchester Citizens Rolls already mentioned. Hayden attended University College School, then in Gower Street, from 1876 to 1880 and was School Captain in his last year.³⁰ In 1874 he enrolled to study medicine at University College London but stayed for only one session.³¹ The 1881 census records him living at 94 Cornwall Gardens and describes as a 'dental student'. *Who's Who* in 1901 states he had been a pupil of his father. Information from the Royal College of Surgeons of England³² indicates that Charles Hayden Coffin unsuccessfully took the Preliminary Examination for Membership and Fellowship in March 1881, but passed at the second attempt in the following September. He did not sit any further RCS examinations. Instead, Hayden turned to the stage. He made his debut on the London stage in 1885³³ as an actor / singer with a powerful baritone voice. His career took off and he

²⁸ Obituary: Harold Lewis Coffin, *Br Dent J* 1936; 61: 289-290.

²⁹ Hayden Coffin, 1930 op.cit., fn. 3, p 18.

³⁰ Guy Kendall, Headmaster of University College, letter to the editor, *The Times*, 10 December 1935.

³¹ M A Tedbury, Executive Officer, University College London, Personal communication, 1974.

³² M M Derrick, Library Assistant, Royal College of Surgeons of England, Personal communication, 1974.

³³ Obituary: Hayden Coffin, *The Times* 1935; 9 December.

became one of the best known performers of his time. In 1893 he married Adeline Maris De Leuw, after he was named as co-respondent in the divorce from her first husband Alberto Randegger.³⁴ In later life he turned to dramatic roles, including in Shakespeare's 'First Night',³⁵ and appeared in several films. He usually asked for a small donation to Battersea Dogs Home when asked for his autograph.³⁶

Hayden Coffin, however, maintained a dental connection. He established Hayden Coffin Ltd, manufacturers of tooth powder. Two products are known to exist. The British Dental Association has one of his ceramic tooth powder pots, which with his artistic flair he had produced in the shape of an Egyptian mummy or coffin (Fig 3).

Figure 3 Hayden Coffin's Egyptian coffin tooth powder pot



The author has a Hayden Coffin tooth powder tray, made by Royal Doulton at their Burslem factory in c1902-1920 (Fig 4).³⁷ Hayden Coffin advertised Hall's Wine³⁸ in a tone reminiscent of many dentifrice advertisements of that time:

"For the voice and throat of one who has been before the public for over twenty-five years, without ever having made use of a tonic for the vocal organs I find for the first time in my life the greatest benefit not only for the voice, but for the body and system generally, from Hall's Wine, which has no equal."

³⁴ Adeline Hayden Coffin – <http://www.imdb.com/name/nm0168910/>, accessed 04/07/2007.

³⁵ Obituary of Hayden Coffin, *The Times* 1935 op.cit., fn. 32.

³⁶ G H G S, *The Times*, 11 December 1935.

³⁷ D F Lovering, Doulton & Co Limited, Personal communication, 1974.

³⁸ *Birmingham Gazette*, 21 November 1912..

Figure 4 Hayden Coffin's tooth powder tray



Hayden Coffin died on 8 December 1935. *The Times* newspaper carried his obituary and there are 15 portraits of him in the National Portrait Gallery.

Postscript

When Hayden Coffin was acting on the London stage there was a Music Hall artiste, Vesta Tilley (a male impersonator whose real name was Matilda Alice Powles). The author remembers his grandmother telling him a Music Hall joke she heard as a girl:

Q: 'Why was Hayden Coffin?'

A: 'Because he lent his Vesta Tilley!'

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I wish to thank the very many people who have supplied information about the members of the Coffin family and pointed me in the right direction for further investigation about the history of the family. In particular I acknowledge the help and support of the late Ronald Cohen and the helpful comments of Stanley Gelbier on the manuscript. The BDA Museum kindly supplied figures 2 and 3.

THE COFFIN PLATE AND SPRING*

Michael J Trenouth*

Introduction

Charles Reuel Coffin (1825-1890)¹ graduated DDS Boston in 1853. He then became a student of Norman Williams Kingsley (1829-1913) who is known as the 'father of modern orthodontics'. He went to Manchester in 1855 where he was in general practice at 5 Lime Grove, Chorlton on Medlock, just three streets from the present Manchester Dental Hospital.² He subsequently moved to South Kensington, London in about 1872, where he was in practice with his sons, Walter Harris Coffin (1853-1916)³ and Harold Lewis Coffin (1856-1936).⁴

The Coffin Plate

This was a vulcanite plate capping the buccal segments and split down the midline into two halves. Each half was joined by a W-shaped Coffin spring formed from piano wire. The appliance was retained purely by capping of the molars and premolars (Fig 1). The split plate results in correction with less time and force. The two halves are capable of semi-independent movement producing a continuous light force. This meant the appliance was easy to use, required less frequent visits, and had high levels of patient comfort

* Based on a paper to the Annual Conference of the Lindsay Society, Stirling, 5 October 2008.

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¹ Obituary: C R Coffin, *J Br Dent Ass* 1891;12: 37-38.

² J F Beal, Why was Hayden Coffin? C R Coffin and sons in the late 19th and early 20th century, *Dent Historian* 2009; 50: 81-89.

³ Obituary: W H Coffin, *Br Dent J* 1916; 37: 316-317.

⁴ B W Weinberger, *An introduction to the history of dentistry*, Vol 2, 1948, p. 390.

and toleration. It could also be removed by the patient for cleaning and re-inserted, hence oral hygiene could be maintained without the need for frequent visits.⁵

Figure 1 The Coffin plate and spring



Discovery of the technique

The technique was discovered by C R Coffin around 1860. He inserted a rigid vulcanite plate with Hickory wood sticks embedded to correct imbricated incisors. When exposed to saliva the wood expanded to apply a force. The incisors resisted

successive increments of force with little progress. However, a sudden correction was achieved when the plate accidentally fractured in the midline and the incisors spread due to inadvertent expansion.⁶

The technique was reported by W H Coffin at the 7th International Medical Congress in 1881.⁷ The same paper with only minor alterations was republished in six other journals current at the time.^{8,9,10,11,12,13}

⁵ W H Coffin, A generalized treatment of irregularities, *Transactions Seventh International Medical Congress* 1881;3:542-547.

⁶ Ibid.

⁷ Ibid.

⁸ W H Coffin, A generalized treatment of irregularities, *Dent Rec* 1881; 1: 112-120.

⁹ W H Coffin, A generalized treatment of irregularities, *J Br Dent Ass* 1881; 2: 587-595.

¹⁰ W H Coffin, A generalized treatment of irregularities, *Missouri Dent J* 1881; 13: 487-494.

¹¹ W H Coffin, A generalized treatment of irregularities, *Br J Dent Sci* 1881; 24: 995-999.

¹² W H Coffin, A generalized treatment of irregularities, *Dent Cosmos* 1882; 24: 463-471.

¹³ W H Coffin, A generalized treatment of irregularities, *Dent Reg* 1882; 35: 51-62.

Treatment philosophy

This was developed after treating several thousand cases over a 25-year period. Cases were presented at various meetings by W H and H L Coffin. They gave bench top demonstrations of before and after study models.

When planning treatment the following questions arise:

What is the best thing to do?

What is the best way to do it?

More important is:

What not to do and how to avoid doing it!

To answer these questions retrospective analysis of the results of treatment by every possible means was used. It was concluded that:

Classifying any large series, most conveniently by the mechanical exigencies of each case in certain of them extraction of possible sound teeth may of course be necessary, though these are somewhat less numerous than usually imagined and a possible alternative (expansion) in many instances affords, as shown by casts submitted, satisfactory results.

The base plate

Due to the undercuts on the teeth the right and left halves have different paths of insertion. Therefore a rigid plate which fits well, will be loose when split. If each half is a good fit the plate cannot be inserted before division without blocking out the undercuts. An important requirement was that the resulting vulcanite plate would spring over the teeth to give a snap fit for good retention.

To achieve this end a gutta-percha impression technique was developed to include the undercuts on the teeth because of the elastic nature of this material. Gutta-percha shrinks on setting whilst plaster, which was commonly used at the time, expands.

The impression technique was reported by W H Coffin in five journals.^{14,15,16,17,18} The GP was made very hot, then plunged into

¹⁴ W H Coffin, Gutta-percha impressions in regulating, *Trans Odont Soc*

cold water to cool the surface just before insertion. A hard skin formed on the surface over a molten core, allowing for flow of the material without surface adhesion. The GP yields to slow pressure but is elastic and recoverable to rapid change. Therefore the impression was inserted slowly and removed quickly.

The Coffin Spring

C R Coffin introduced pianoforte wire to expand the maxilla somewhere around 1869¹⁹ or 1871.²⁰ Piano wire was chosen because it had a uniform texture and could be bent without heating.²¹ The wire was formed into a W-shaped spring with 5 loops. A diameter of 0.035 inch or 0.86 mm was chosen (Fig 1). The ends were flattened,²² tinned or coated with soft solder²³ and buried in the Vulcanite base plate, emerging entirely from the lingual side.²⁴ The exposed spring was protected by tin foil before packing and curing the base plate.^{25,26} The wire was held in position in the upper part of the flask because the corners of the tin foil were bent up so that they were embedded in the plaster.²⁷

1881-2; 14: 118-129.

¹⁵ W H Coffin, Gutta-percha impressions in regulating, *Missouri Dent J* 1882; 14: 120-122, 385-386.

¹⁶ W H Coffin, Gutta-percha impressions in regulating, *Dent Rec* 1882; 2: 169-171.

¹⁷ W H Coffin, Gutta-percha impressions in regulating, *J Br Dent Ass* 1882; 3: 118-120.

¹⁸ W H Coffin, Gutta-percha impressions in regulating, *Br J Dent Sci* 1882; 25: 297-299.

¹⁹ A Levrini and L Favero, *The masters of functional orthodontics*, Berlin: Quintessenz Verlag, 2003.

²⁰ N Wahl, Orthodontics in 3 millennia, Chapter 2, 'Entering the modern era', *Am J Orthod Dentofacial Orthop* 2005; 127: 510-515.

²¹ Coffin, op cit., fn. 5.

²² Ibid.

²³ V H Jackson, *Orthodontia and orthopaedia of the face*, Philadelphia and London: J B Lippincott, 1904.

²⁴ Coffin, op cit., fn. 5.

²⁵ Ibid.

²⁶ Jackson, op cit., fn. 23.

²⁷ Ibid.

The vulcanisation of rubber was discovered in 1839 by Charles Goodyear (1800-1860). When heated with sulphur its strength and elasticity are increased with loss of stickiness. Carbon-sulphur bonds form cross-linkages between polymer chains of isoprene (C_5H_8). Saturation of the double bonds occurs as the amount of sulphur increases. This is complete with 32% sulphur as used in Dental Vulcanite.

Controversy over the originator

When W H Coffin reported the technique²⁸ he acknowledged "the contribution of Mr Peter Headridge²⁹ of Manchester, for many years assistant to my father". This publication stimulated correspondence in the journals, first from Headridge (1839-1921) of 1, Lime Grove, Oxford Road, Manchester.^{30,31} To quote:

I must confess I was simply stupefied to find that the author of the paper claims unblushingly the invention of the expansion plate for his father, and all through the paper and subsequent discussion the plate is spoken of as Dr Coffin's Expansion Plate. Now I simply wish to state that Dr Coffin has just as much to do with the invention of that plate as the man in the moon and no more. The invention in its entirety is wholly and absolutely mine, which I can abundantly prove, and in common justice it should be known, both now and here after, not as Dr Coffin's but as Peter Headridge's Expansion Plate, a claim supported by Joseph Williams (1836-1903) of Hollinwood House, Fallowfield, Manchester.^{32,33} He said:

I received from Mr P Headridge about the same time as Dr Coffin the idea which the former so legitimately claims as his own, and I shall for

²⁸ Coffin, op cit., fn. 5.

²⁹ Peter Headridge was part of a dental dynasty. He was in practice with his elder brother William (1836-1902). His son John Parsons Headridge (1868-?) was also in practice. His nephew David Headridge (1870-1938) was a lecturer in dental anatomy at Manchester Dental School.

³⁰ P Headridge, Correspondence, *Dent Rec* 1882; 2: 91.

³¹ P Headridge, Correspondence, *Br J Dent Sci* 1882; 25: 45-46.

³² J Williams, The expansion plate, *Dent Rec* 1882; 2: 186-187.

³³ J Williams, Correspondence, *Br J Dent Sci* 1882; 25: 102.

ever feel grateful to him for it, for it has placed in my hands the means of regulating cases successfully which would have been impossible with the old plan which Dr Coffin employed. My personal knowledge of the invention is of one most certainly introduced by Mr P Headridge, and I must express my astonishment that Dr Coffin should even by implication seek to make it otherwise. He gains nothing but a multitude of words, the simple fact remains that Mr P Headridge was the real inventor of the Sectional Expansion Plate and first to use it. I can assert most positively that at the time I was a pupil, Dr Coffin had no knowledge of any Sectional Expansion Plate.

W H Coffin's defence

In response Coffin wrote:^{34,35}

My father in common with others used expansion plates before Mr Headridge entered the profession; that gentleman, however, (for many years my father's assistant) about 1868, suggesting the employment of tempered steel springs in connection with them.

In 1869, Headridge took out a patent for:

Improvements in Dentistry for Expanding the Upper and Lower Maxillary, claiming, broadly, as new and never before used, first, dividing the base or plates into sections: second, giving these elasticity & c., by springs or other elastic substances.

It was dated 10 April, No 1101 and was procurable for sixpence. Coffin's defence was based on the facts that:

- 1 Split expansion plates were used previous to the 1869 patent (as early as 1830).
- 2 Headridge only suggested the use of steel to join the halves in 1869 (not piano wire).

³⁴ W H Coffin, Correspondence, 'The expansion plate', *Dent Rec* 1882; 2: 141.

³⁵ W H Coffin, Correspondence, 'The expansion plate', *Br J Dent Sci* 1882; 25: 46-47, 101-102.

- 3 The Coffins developed the appliance far beyond that described in the Headridge patent.
- 4 It was commonly referred to by the profession as Dr Coffin's plate.

The final word

The final letter and therefore say in the controversy was submitted by C R Coffin himself.³⁶ It was prefaced by the editorial comment that "we do not hold ourselves responsible for the opinions expressed by our correspondents" and ended by the statement that "we cannot insert any more letters on this subject. -Ed." To quote:

Sir, - I observe with pain and regret that my old friend, Mr Headridge of Manchester, is led by his extraordinary misconception of the origin of expansion plates into some remarkable and utterly unfounded statements, which prefer a serious charge of dishonesty, unfairness and inaccuracy against myself and son.

I did not become acquainted through Mr Headridge with the principles upon which sectional expanding plates are constructed. I never tried to imitate his plate or endeavoured vainly or otherwise to make his springs.

He went on to make the point that Headridge only suggested the use of soft steel not piano wire. That he had used the split expansion plate for some 20 years after a rigid plate accidentally fractured. That "Mr Headridge saw fit to take out a patent of an absurdly comprehensive nature, as he now says only to prevent me from claiming the originating of the said plate". He also pointed out that when his plate was reported by his son at the congress due acknowledgement was given to Headridge. The details of the Headridge plate were presented including a drawing and the difference from the Coffin plate pointed out:

³⁶ C R Coffin, Correspondence, 'The expansion plate', *Br J Dent Sci* 1882; 25: 254-255.

The other statements made by Mr Headridge are as strangely inaccurate as they are irrelevant, that one being his emphatic denial of having ever received one single idea from me bearing upon his plate, which is possible, as curiously, the form of spring I suggested to him and have since used (though he strenuously denied its utility at the time), he attempted to include in his Specification (Fig 2) but unfortunately misdescribes and figures upside down!

The opinion of Tomes

John and Charles Tomes³⁷ had a high opinion of Coffin

Dr Coffin has carried out the use of piano-wire springs for the expansion of teeth with a degree of nicety and success not hitherto attained by others, and he claims for his method a far more general applicability than has usually been attributed to it.

In fact, he employs his expansion plate for the correction of the vast majority of the cases he treats, sometimes combining it with the use of separate elastic wires to make pressure in other directions, and sometimes trusting to nature to reduce the teeth to a regular arch after the increased space allows of this happening (Fig 2). By suitably shaping the plate it can operate on individual teeth, several teeth or the whole arch, and the results attainable with a minimum of discomfort to the patient are very remarkable.

Further development of the Coffin appliance

Victor Hugo Jackson (1850-1929) modified the Coffin appliance in two ways. First he eliminated the molar bite blocks and used clasps on the molars and premolars to reduce the bulk of the appliance. Secondly he inverted the spring from a W to an M-shape, reducing the number of loops from 5 to 3. He also thickened the diameter of the wire to 1.1mm³⁸ (Fig 3).

³⁷ J Tomes and C S Tomes, *A system of dental surgery*, 3rd ed, London: J & A Churchill, 1887.

³⁸ Jackson, *op cit.*, fn. 23.

This became the predominant design for future appliances. In particular it was incorporated into the early Andresen appliance and is still used today in the modern Bionator. By extending the base plate onto the palate on one side, but not the other, Jackson was able to produce differential expansion to correct unilateral crossbites (Fig 4).

Figure 2 Coffin appliances and results after Tomes, 1887



Figure 3 Jackson's modification of the Coffin Spring, 1904



The role in early functional appliance development

Kingsley³⁹ (1829-1913) introduced the sloping anterior bite plane to "jump the bite". He was the first person to introduce the concept of functional orthopedics to correct a Class II malocclusion. The appliance (Fig 5) consisted of a vulcanite base plate tied in situ with molar ligatures. There was an anterior bite plane with a steep

³⁹ N W Kingsley, *A treatise on oral deformities as a branch of mechanical surgery*, New York: D Appleton & Co, 1880.

forward facing slope, which caused the mandible to posture forwards on closure. To quote:

The objection urged against the use of an incline, because the time required had a tendency to alter the articulation of the teeth, was in this case an argument in its favour, and an advantage, because a new articulation was desired, and the incline, as adapted, offered no opposition to the antagonism of the teeth.

In addition a gold bar was placed labially to the upper incisors. Elastic ligatures ran over the gold bar and then through the holes in the vulcanite base plate to a gold hook on the palate. When activated, they helped to reduce the incisor prominence.

Figure 4 Jackson's modification for unilateral crossbites, 1904



Figure 5 Kingsley's sloping anterior bite plane, 1880



The Inclined Plane appliance

The upper appliance was developed from a similar lower one used for correcting incisor crossbites. Such inclined plane appliances were amongst the earliest known. A continuous evolution can be traced from the time of John Hunter.⁴⁰ He described a silver splint in the lower arch to correct anterior crossbite:

⁴⁰ J Hunter, *A practical treatise on the diseases of the teeth*, London: J Johnson, 1778, pp. 84-86.

The best of these means is an instrument of silver, with a socket or groove shaped to the fore Teeth of the lower jaw to receive them, so as to become fast to them, and sloped off as it rises to its upper edge, so as to rise behind the fore Teeth in the upper jaw in such a manner, that, upon shutting the mouth, the Teeth of the upper jaw may catch the anterior part of the slanting surface, and be pushed forward with the power of the inclined plane. The patient, who wears such an instrument, must frequently shut his mouth with this view.

Sigmond⁴¹ refers to the use of gold plates or shields to correct irregularities of the teeth, but no clinical detail is given in what was intended as a domestic manual for patients.

Imrie⁴² describes a technique where a wax impression was taken, modelled to an inclined plane and then embedded in plaster, leaving a small opening at the top. The wax was boiled out and the mould filled with molten tin. Catalan,⁴³ Robertson,⁴⁴ Mortimer,⁴⁵ Robinson⁴⁶ and Salter⁴⁷ all described similar appliances.

⁴¹ J Sigmond, *A practical and domestic treatise of the diseases and irregularities of the teeth and gums; with the methods of treatment*, Bath: Wood & Cunningham, 1825, pp. 120-122.

⁴² W Imrie, *The parents' dental guide, A treatise on the diseases of the teeth and gums from infancy to old age*, London: J Churchill, 1834, pp. 48-49.

⁴³ L J Catalan, *The device suitable for correcting the deformity that involves the lower jaw overlapping in front of the top*, Paris, 1826.

⁴⁴ W Robertson, *A practical treatise on the human teeth*, London: Hayward & Moore, 2nd ed, 1839, pp 90-91.

⁴⁵ W H Mortimer, *Observations on the growth and irregularities of children's teeth*, 2nd ed, London: S Highley, 1849, pp. 67-69.

⁴⁶ J Robinson, *The surgical, mechanical and medical treatment of the teeth*, London: Lindsay & Blakiston, 2nd ed, 1846, p. 51.

⁴⁷ S J A Salter, *Dental pathology and surgery*, London: Longmans Green, 1874, p. 46.

The early Andresen appliance

Andresen (1870-1950)⁴⁸ developed his appliance initially as a retention device but later found it would work as an active functional orthopedic mechanism. He extended the sloping anterior bite plane of Kingsley into the molar regions and split the base plate, incorporating a "Coffin spring" after Jackson's design (Fig 6).

Conclusions

The Coffin Plate:

Solved the problem of retention without clasps.

Extended the time interval between visits.

Improved oral hygiene as it could be removed and cleaned by the patient.

Expansion aided anterior alignment.

Developed into a system for treating a wide range of malocclusion.

Figure 6 Early Andresen appliance, 1936



Acknowledgements

I should like to thank Helen Nield of the BDA Information Centre and Rachel Bairsto and Melanie Parker of the BDA Museum for their help in obtaining the relevant literature. I also thank Karen Pool for her patience and expertise in word processing the manuscript.

⁴⁸ V Andresen, Über das sogenannte "Norwegische system der Funktions - Kieferorthopädie" [On the so-called 'Norwegian system' of functional jaw orthopaedics], *Dtsch Zahnärztl Wochenschr* 1936; 39: 235-238, 283-286.

PROF ORESTES WALTER SIUTTI, DipDent, PhD

Interview by Dr Diana Clara Daich de Eidelsztein*

Introduction

Dr Orestes Walter Siutti (Fig 1) has been a driving force for many years at both the Buenos Aires Faculty of Dentistry and its museum, in Argentina. In celebration of his 92nd birthday it was decided to conduct an oral history interview about his career in dentistry. It was carried out at the museum on 26 August 2008, three days before his birthday. An edited version of the questions and his responses are shown below.

Figure 1 Dr Orestes Walter Siutti of Buenos Aires



How did you decide to become a dentist?

I was born on 29 August 1916 in a house at the corner of Corrientes Avenue and Laprida Street,¹ in the area of the Abasto market in the Abasto neighbourhood.²

Discussion of dentistry was a daily matter in my home. In

1900 my father was a student of Dr Nicasio Etchepareborda³ and Dr Leon Pereira⁴ at BA Dental School, receiving his dental diploma in 1902. He was very active in the social field.

My childhood was very nice. We used to see Carlos Gardel⁵ every morning with his well dressed hair⁶ and his beautiful smile. At school I had great teachers such as Drs Francisco Rofil, Rodolfo Erausquin, Romulo Cabrini, Ciro Durante Avellanah, Alejandro Zabolinsky, Luis Giovachini, Julian San Martin, Raul Loustalan, Carlos Bergara, Carlos Esquirru.

I was educated at primary and secondary schools supported by my parents, finishing high school at the Colegio Nacional de Buenos Aires in 1934. My secondary schooling had been a year longer than others as I had attended the 6th year. In 1935 I entered the School of Dentistry of the University of Buenos Aires. I passed the UBA examinations for the dental diploma at the end of 1939 (the school year ends in December). However the diploma and license were not actually awarded until August 1940, at which point I became a qualified dentist. A doctorate in dentistry followed in 1942, awarded on the basis of a thesis, acknowledged as 'outstanding'.

I received my diploma in 1939 after a five-year course. Although military service was not part of the course it was a duty for every male aged 20 years. So in 1937 I had to serve the obligatory one year military service.

I started in Dr Bergara's first year as head of surgery' and Prof Esquirru's first one as a teacher of maxillofacial surgery. I soon became a Technical Dental Operative. Even before graduation students could – and still can – join a team of teachers of a subject as a TDO provided they have already studied that subject. Their ad-honorem job as an attendant or assistant is to help other students to understand what the teachers explain to them or they see in the practical sessions.

Clinical practice took place at the Military Hospital since there was no room in the Faculty building. It moved to new accommodation in 1939 when a new building was put up for the Faculty, a beautiful neoclassic building on Uriburu St and Cordoba

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¹ It now exists as Mario Bravo Street (Laprida Street exists elsewhere).

² Nowadays there is a shopping centre in that area but once upon a time there was a vegetables and fruits market. It is famous for being one of the tango areas, where Carlos Gardel (see Fn. 5) used to sing.

³ Diana Clara Daich de Eidelsztein, Nicasio Etchepareborda (1857-1935), *Dental Historian* 2008; 48: 55-63.

⁴ Diana Clara Daich de Eidelsztein, Leon Pereira (1859-1926), *Dental Historian* 2009, 49: 41-47.

⁵ A famous tango singer who used to live and sing in this area of the city.

⁶ With gomina, a type of gel

Ave⁷. The chairs were spread out in surrounding buildings. In 1945 the faculties of medicine and of dentistry began to move to a new monumental building.

In 1943, in addition to working in my private practice I started to work for my teacher Prof Chiapori in the Faculty of Dentistry. I also provided treatment in a hospital.

I was upgraded to adjunct professor in 1952. However, after the 1955 revolution⁸ we were removed from the teaching body. I was appointed as a professor at the University of La Plata after a public competition. In 1972 then gained the chair in Dental Operatory Technique in Buenos Aires which was formerly occupied by one of my teachers.

A new museum

By 1980 I had started another development. Starting with some dental items which had belonged to my father I prepared a small exhibition in the entrance hall to the department. When Dr de la Serna⁹ received my request for the creation of a museum and saw the photographic evidence of the valuable objects in my collection he immediately decided to allocate space on the principal (first) floor of the faculty, a place now occupied by the museum. In three months it was open. Over time the three children¹⁰ of Oreste Jose Siutti provided some 600 pieces out of the 2,700 now owned by the museum.

The museum is now connected, as was the original intention, with some similar cultural centers around the world. It has published a magazine called *Revista del Museo y Centro de estudios históricos de la Facultad de Odontología de Buenos Aires* [Magazine of the Museum and Center for Historic Studies of the Faculty of Dentistry of Buenos Aires], or usually *Revista del Museo* [Magazine of the Museum] since 1986.

⁷ Two blocks from the present one.

⁸ In 1955 there was a *Revolucion libertadora* [liberating revolution] which removed the government of Juan Domingo Perón. Amongst a variety of changes teachers and professors were removed from their posts.

⁹ The Intervention Dean of the Faculty at the time (see fn. 11).

¹⁰ A daughter and two sons. Dr Siutti is the middle one between his brother (Alfredo Juan Antonio) and sister (Manuela).

The Museum was formally created in 1980 by Dr de la Serna, the Intervention Dean¹¹ of the Faculty at the time, an honest and great public worker.¹² Over the years it has grown and developed and is now almost 30 years old. It has hosted 18 plastic art (drawing, painting, sculpture) salons or expositions performed by dentists, various celebratory events and homages suggested by the museum. It now occupies an important place in the life of the university.

Tell me about your family

My wife is María Elena Díaz, to whom I have been married for 60 years. I have four sons, fourteen grandchildren and one great-granddaughter. None of them has taken up dentistry so far, but the grandchildren are still young and my great-granddaughter is a toddler. One son is a veterinary doctor, another is a civil engineer. The other two sons did not study but became businessmen.

Do you know why your father took dentistry?

My father was born in Tacuarembó, Uruguay, in 1881. My mother was 8 years younger. My grandparents came over to Buenos Aires. I don't know why but my father took the opportunity to enter the School of Dentistry. He turned out to be not only a good professional but also very active in the social sphere, including activities with the Argentine Odontological Association (similar to the BDA) and at other institutions. He authored many articles, for example for *La Tribuna Odontológica*, which was created in 1916, the year I was born.

My father's general practice in BA had a high quantity of clients (patients), many of them from the social and musical environment. He had a lot of people related to the lyric (opera) and to chamber music.

¹¹ Intervention Dean: During the so-called *Proceso* [Process], the period of dictatorship known by the military government as the Process of National Reorganization, the University of Buenos Aires continued to depend on the State (see fn 12), ie the military government, for support. It appointed Dr de la Serna as dean without a selection process. He had to reorganize the faculty [the *interventor* in Spanish].

¹² Buenos Aires University is a public one depending on national funding.

Why did you choose Dental Operatory?

I decided to enter Dental Operatory (operative dental surgery) which used to be called *Dentisteria Operatoria*. A friend of mine, Dr Manuel Luna, suggested I should try to get the chair, although one suspects that at the time he did not think it would be possible. So I just joined the team to become a useful member of the faculty. This chair is one with a big tradition because it was occupied by Leon Pereira from 1908 until he died in 1926.

There then entered as professor one of the greatest teachers of dentistry teaching: Dr Alejandro Zabolinsky,¹³ an immigrant from Russia with difficulty in pronouncing words. Nevertheless he achieved great consolidation of this important chair. He prepared all the teaching material, he learned from cutting-edge documents referring to the methods used by Dr Black at the North Western University, USA, and was a man of an incredible generosity.

However he died, in 1941, not yet aged much more than 60 years. Then Prof Chiapori, my teacher, took charge and I collaborated with him for many years.

In 1972 Buenos Aires appointed me to the chair in Dental Operatory Technique.

Some final comments

I have been very pleased with what has been achieved over the years, overcoming many struggles and the (sometimes) meanness of some individuals. Difficult circumstances were always challenged, recalling what Baron Pierre de Coubertin (creator of the modern Olympic Games) used to say; that dishonour does not consist of being defeated but of not struggling.

Thank you for interviewing me.¹⁴

¹³ A man for whom Dr Siutti dedicated an article in the museum magazine, Breve biografía del Dr Alejandro Zabolinsky [Short biography of Dr Alejandro Zabolinsky], *Revista del Museo* Dec 2003; 3 : 10.

¹⁴ Author's note: After I thanked Prof Siutti he insisted it was he who wanted to thank me for interviewing him.

Appendix 1 List of promotions and honours

Academic

1947-1952: Adjunct professor, UBA

1964: Head professor in Technical Dental Operatory, La Plata University.

1972: Head professor in Technical Dental Operatory, UBA

1947: Academic Secretary, Faculty Dentistry, UBA

1972: Dean, La Plata University

1982: Extraordinary Consultant Professor, UBA

1995: Extraordinary Emeritus Professor, ULP

1988: Académicos de número [academic member by number] of National Academy of Dentistry

1980 [since its creation until now] Director of Museum and Center for Historic Studies of Faculty of Dentistry, UBA

Others

Honorary representative of both faculties at national and international meetings

Honorary or life member at several institutions

2001: President, Commission on History and Dental Museum of the Argentine Dental Association

1996: Honorary Member, American Academy of Dental History

1996: Member, Commission on Dental History, FDI London

1995: Dental Operatory classroom at Faculty of Dentistry at ULP named after him by the Honorable Directive Council [The top decision-making committee of the university]

1998: Naming the Museum and Center of Historic Studies of the Faculty of Dentistry at UBA after him

2001: Naming the Museum of the Faculty of Dentistry at LPU after him

President of the organising commissions for the 90th anniversary (1981) and Centenary (1991) celebrations of the creation of the BA Dental School

1958: Chief of the Dental Service (dental practice) of the Honorable National Congress (parliament) after being admitted by acclamation)

1992-1997: Secretary of the Argentinian Council of the International Council of Museums

President, Argentine Dental Cooperative (a research institution)

2007: President, National Dental Academy

President of several dental institutions

Appendix 2 Publications

Although not discussed during the interview the following is a list of Prof Siutti's publications.

63 published articles on Technical Operative Dentistry,
Manual of Technical Operative Dentistry,
70 papers on the history of health sciences.

Some examples of important history articles by Siutti follow:

Los ochenta años de la cátedra de Prótesis [80 years of Prosthetics Chair], *Revista del Museo* June 1994; 8: 17.

1994. Sesquicentenario de la aplicación de la anestesia general en la extracción dentaria [1994. 150 years since the first general anaesthetic in dental extraction], *Revista del Museo* June 1995; 10: 19.

Bodas de brillante del doctorado en odontología [Brilliant wedding since creation of PhD in dentistry], *Revista del Museo* Dec 1995; 20: 24.

Breve biografía del Dr Alejandro Zabolinsky [Short biography of Dr Alejandro Zabolinsky], *Revista del Museo* Dec 2003; 34: 10.

Profesora Dra Esther Caramés de Aprile, *Revista del Museo*, Dec 2005; 37: 4.

Antecedentes de la Carrera Docente en la Facultad de Ciencias Médicas de Buenos Aires y su aplicación en la Escuela de Odontología de Buenos Aires [Antecedents of teaching career in Medical School and its utilisation in Dental School], *Revista de la Academia Nacional de Odontología*, Oct 2006; 5: 30.

Profesor Dr Ricardo César Guardo, *Revista del Museo*, Dec 2008; 40: 5.

Una plaza con sabor a historia [A square history-flavoured, - with some history], *Revista del Museo*, Dec 2008; 40: 7.

Acknowledgements

I wish to thank Prof Siutti for supplying the photograph and for his help in answering my questions. Acknowledgment is due to Prof Stanley Gelbier for his constant encouragement and helpful advice.

BOOK REVIEW

Stanley Gelbier

A history of dentistry in Sri Lanka by Hilary W M Cooray, BDS (Ceylon), MSc (London), MFGDP RCS, FICDCE (Ortho) Singapore, Colombo: Sri Lanka. Privately printed by the author, 2008. Hardback only, 105pp, price 750 Sri Lankan rupees (approximately £5 pounds sterling) + £4 postage & packing. Purchase from hilarycooray@sltnet.lk

Dr Hilary Cooray is a well known lecturer and writer on dental history in Sri Lanka. Chapters cover Buddhism, Ayurveda, the Portuguese period (1505-1656), the Dutch influence (1656-1788), the early British period, events in the 20th century, developments in dental education, the profession, its institutions and the school service.

2,500 years ago the Lord Buddha developed a code for monks to exercise and clean their teeth with chew sticks. Ancient Ayurveda is still practised. Its earliest *vedas* (books of knowledge) compiled 2,000 years ago symbolises total health care for patients. The *Sushruta Samhita* describes specialists, including *shalya vaidyas* (surgeons). Its 3 volumes with 46 chapters describe 20 sharp and 101 blunt instruments: archaeologists have founds possible dental instruments. It recommends practising incisions on cucumbers, suturing cloths and venesection on dead animals, heating instruments before use and surgeons taking a bath. 3 chapters describe diseases of the mouth and treatment including root problems. Toothbrushing was important, using a *danta kotha* (fresh twig of a tree or plant) plus powdered bark of medicinal trees. From 1505 the Portuguese landed. Care for soldiers, sailors and civilians was influenced by Ayurveda but Portuguese medicine was developed from Arabic medicine practised by the Moors in Spain. *Espiritalis* (hospitals) in garrison towns managed by Jesuit priests cared for soldiers and their families; later some civilians. By 1656 the Dutch built a hospital in Colombo for its soldiers, civilians, sailors and merchant seamen, gave medicines to the King of Kandy and appointed native physicians to their hospitals. In 1716 a Dutch doctor treated the King who had mouth ulcers, blood and pus oozing from his gums and loose teeth.

After arrival of the British East India Company Ceylon became a British colony in 1801. Initially dentistry was confined to tooth extraction by doctors serving the British Army. As it became more sophisticated in Britain the expatriates wanted a higher standard of care. Some dentists arrived to treat them and then the local population. As the latter adopted western foods they developed more dental disease for which they needed treatment. The organisation of dentistry emulated that in Britain. From 1915 dentists had to be registered; S Christoffelsz LRCP Edin LDSEdin was the first; 1916 saw SW Garne LDSEng as the first without a medical qualification. In 1925 a dental clinic was established - later the dental hospital. Dr W Balendra LMS LRCP MRCS LDS, its first dental surgeon, trained three apothecaries to scale and extract teeth. In 1932 the Ceylon Dental Association was founded based on the BDA. Garne was president. A dental hospital and school followed in 1938. Dentistry in Ceylon and then Sri Lanka has come a long way. Hilary Cooray is to be congratulated on bringing the story to our attention. His very readable book will interest members of the profession and dental historians. In a 2nd edition it would be helpful to see an index.

Reports from Societies

Lindsay Society for the History of Dentistry

Stuart Robson, Honorary Secretary

The Lillian Lindsay Memorial Lecture, held at the BDA annual scientific meeting in Glasgow on 6 June was an outstanding success with an audience of over one hundred members, friends and visitors. Under the chairmanship of Professor Robin Basker OBE, the guest speaker was Dr Howard Moody of Edinburgh University, an internationally renowned specialist on forensic dentistry. He presented a fascinating and beautifully illustrated 'History of forensic dentistry' ranging from the early Egyptians to contemporary times. In his own inimitable style Howard included some entertaining dark humour to lighten the tragedy of some of his case histories.

Prof Basker then presented the Lillian Lindsay Memorial Medal to Geoffrey F Garnett in recognition of his services to the Lindsay Society.

Dr Garnett receives medal from the president



Dr Garnett, a former BDA president, has been an active member for over twenty years during which time he has presented lectures, written articles on dental history, been editor of *Dental Historian* and is a former chairman of the society. Following the presentation, acclaimed by the large audience, he was

most gracious and appreciative of the honour and of the Society's activities.

The autumn meeting of the society will be on 2, 3 and 4 October 2009 at Ironbridge in Shropshire. The superb programme will include Stephen Hancocks on the history of the *BDJ*, Dame Margaret Seward, Mr Brian Avery on the history of maxillofacial surgery, Dr John Davenport on Painted faces through the ages, Ian McIntyre on Historic oral conditions of military operations and Prof Stanley Gelbier on the first president of the Ceylon Dental Association. The village of Ironbridge is a living museum to the industrial revolution set in a delightful rural setting along the banks of the River Severn. The venue, the Valley Hotel, has a delightful patio and gardens running

down to the riverside. A social programme includes a tour of the village on the Saturday afternoon followed by the society's dinner in the evening. Considerable interest has been expressed in this event so early booking is recommended.

The Henry Noble History of Dentistry Research Group

Rufus M Ross, Chairman

Our membership is now fifty-eight paid up members. The positive financial situation reported by our treasurer, Dr Marie Watt, has allowed the Group to invite lecturers from further afield. The *Dental Magazine* continues to receive widespread praise for its format and outstanding art work under the excellent management of Prof David McGowan, editor and Dr Jo Cummin, assistant editor. The latter will address the group in October on a subject to be announced.

Dr Robin Orchardson's presentation to the Odontological Society on 16 December 2008 was most enjoyable. It featured the popular subject of genealogy with the intriguing title of 'Extracting your roots'. Unfortunately, since that meeting, Dr Orchardson suffered a stroke but we are pleased to report he is now recovering.

The group has been considering the possibility of up-dating the history of the Glasgow Dental Hospital and School which it last recorded up to 1978 under the editorship of Bill Smith. Since then, there have been numerous changes to the hospital administration and structure and it is now considered that professional assistance is required. The Group have held conversations with Dr Malcolm Nicolson, Director of the Centre for the History of Medicine at the University of Glasgow. We have agreed to an affiliation with that body which will make available its facilities to undertake the task of recording the up-dating. Additionally, funding may be available through the Wellcome Trust.

In addition it is hoped the group will host a 'Witness Seminar' at the Centre in May 2010 which will involve short accounts from dentists who graduated around the advent of the NHS to describe their views on the impact of the NHS on dentistry in Scotland. It is also hoped that a Regional Dental Forum on the history of dentistry will be held in the Centre, probably in October 2010, if agreeable in association with the Lindsay Society.

Our Group agreed to contribute to the conservation of old dental books in the library of the Royal College of Physicians and Surgeons of Glasgow in return for the assistance of Archivist Carol Parry in choosing books on dental history on behalf of our Group. It is envisaged they will form part of a separate dental history unit at the

College. She manages our website and has been of great benefit to the Group in keeping the site up to date.

In a departure from our normal dental history topic, our Spring Lecture meeting was addressed by Prof Matthew Kaufman, emeritus professor of anatomy at the University of Edinburgh, on the subject of Phrenology in Edinburgh in the 19th century. This most enlightening and absorbing lecture was enjoyed by all present.

Demonstration of cohesive gold



The Lindsay Society and the BDA Museum joined together at the Glasgow conference to deliver a 30 minutes talk and demonstration on cohesive gold. The aim was to create a gold foil filling using historical equipment and, in particular, to introduce a younger audience to this process. Rachel Bairsto, Head of Museum Services, presented an outline of the history of gold foil from its mention in the 1536 book *Zene Artzney* to the heyday of its use in

the 19th century. Growing interest in gold foil was a result of a heightened interest in restorative techniques combined with the introduction of new equipment.

Peter Frost, a general dental practitioner and senior clinical teacher at King's College London's Dental Institute, then demonstrated the process using Victorian equipment from the Museum collection. A



Claudius Ash phantom head dating from the 1870s with porcelain teeth set in wax was used. A cavity was excavated using a treadle drill. Such drills were first patented in 1871 by the American dentist James Beall Morrison. Frost achieved a speed

of approximately 500 rpm. Gold cylinders were then laid in the cavity, gradually building up the filling using pressure from a hand plugger. Frost also demonstrated the use of a spring-loaded mallet and described how the introduction of the automatic mallet helped to speed up the slow

process. There was also a spirit lamp with a mica top on display which would have been used to cleanse the pellets of gold foil from grease and impurities before placement.

There were some interesting comments from the audience. Dr Clive Debenham, who had studied in the USA told how he had to place twenty very high standard gold foil restorations before taking the American state board examination in the 1970s. A few other people had placed the odd gold foil at dental school. Delegates were invited to examine the equipment and try out the treadle drill. It was encouraging to see so many younger dentists in the audience. The Lindsay Society and Museum hope to build on this historical success at next year's conference.